

GUTEKUNST

Always the right spring, ex-stock or custom-made ► www.federnshop.com

Springs



Welcome to Gutekunst Federn

Thank you for requesting the Gutekunst spring catalogue. With 12,603 sizes of compression springs, extension springs, torsion springs and various other items in standard steel (EN 10270-1) and stainless spring steel (EN 10270-3-1.4310) Gutekunst offers one of the most comprehensive ex stock ranges of metal springs. The quantity-dependent prices can be found in the price list enclosed in the cover. If you require larger quantities, please request an offer directly (see page 3). You can find further important information related to Gutekunst springs, such as locations, contact addresses, electronic selection media (catalogue CD-ROM, online spring shop) on the next few pages.

We wish you every success in selecting our items. And if you cannot find the spring you are looking for or require a customised spring, simply send us your technical requirement. We will then be pleased to prepare an individual quotation for you (see page 3 and 6).

Keep up-to-date with the latest news via Facebook or Twitter.



<http://www.facebook.com/Gutekunst.Federn>



<http://twitter.com/federnshop>



We confirm that none of our products contain substances such as lead, cadmium, chrome 6, PBB, PBDE, PentraBDE, DecaBDE or mercury which are forbidden under directives 2003/11EG, 2002/95/EU, 2011/65/EU, VDA list 232-101 and GADSL. Our products are RoHS and WEEE-compliant. You can find our RoHS certificate under:
www.federnshop.com/rohs.htm



REACH

For the purposes of REACH, Gutekunst Federn is a downstream user and is not directly responsible for the registration of chemicals. Nevertheless, we keep in close contact with our upstream suppliers to ensure that we conform to the REACH standards. For further information visit:
www.federnshop.com/reach.htm



Gutekunst Federn is certified to DIN 9001:2008 and 14001:2004. Our current certificates can be found at:
www.federnshop.com/cert.htm

You can satisfy all
your spring needs at

www.federnshop.com



Spring selection check card

Check the compression springs

for spring deflection (static use)

$$s2 \cdot R = \underline{F2} \rightarrow F2 < Fn \rightarrow s2 < sn$$

for spring lengths (static use)

$$(L0 - L2) \cdot R = \underline{F2} \rightarrow F2 < Fn \rightarrow L2 > Ln$$

for spring forces (static use)

$$\frac{F2}{R} = \underline{s2} \rightarrow s2 < sn \rightarrow F2 < Fn$$

for spring rate (static use)

$$\frac{F2 - F1}{L1 - L2} = \underline{R} \rightarrow F2 < Fn \rightarrow L2 > Ln$$

for spring stroke (dynamic use)

$$(L0 - L2) < shdyn$$

| | |
|--------------------------------|---|
| F0 = Initial tension | R = Spring rate |
| F1 = Prestressed spring force | s2 = Loaded spring deflection |
| F2 = Loaded spring force | sn = Maximum spring deflection |
| Fn = Maximum spring force | $\alpha 2$ = Loaded rotational angle |
| L0 = Unstressed spring length | αn = Maximum rotational angle |
| L1 = Prestressed spring length | M2 = Loaded torque |
| L2 = Loaded spring length | Mn = Maximum torque |
| Ln = Min./max. spring length | RH = Distance power flow point from centre (leverage) |

Check extension springs

for spring deflection

$$s2 \cdot R + F0 = \underline{F2} \rightarrow F2 < Fn \rightarrow s2 < sn$$

for spring lengths

$$(L2 - L0) \cdot R + F0 = \underline{F2} \rightarrow F2 < Fn \rightarrow L2 < Ln$$

for spring forces

$$\frac{F2 - F0}{R} = \underline{s2} \rightarrow s2 < sn \rightarrow F2 < Fn$$

for spring rate

$$\frac{F2 - F1}{L2 - L1} = \underline{R} \rightarrow F2 < Fn \rightarrow L2 < Ln$$

Check torsion springs

for rotational angle

$$\alpha 2 \cdot \frac{Mn}{\alpha n} = \underline{M2} \rightarrow M2 < Mn \rightarrow \alpha 2 < \alpha n$$

Calculate torque

$$F2 \cdot RH = \underline{M2} \rightarrow M2 < Mn$$

Calculate force

$$\frac{M2}{RH} = \underline{F2}$$

- The spring selection check card is designed to help you select our catalogue springs. You can enter your load parameters (s2, L2, F2 ...) to calculate further values to check and compare with the catalogue data.
- The equation symbols in blue must be entered by yourself in the calculation and compared with the data from the catalogue.
- For more detailed explanations of the equation symbols please see the descriptions at the beginning of the different spring types.
- Please remember when checking a dynamic compression spring to check the additional maximum spring stroke (L0-L2 < shdyn).
- We wish you every success in selecting our items.

Gutekunst catalogues



Online catalogue with spring calculation and CAD data generator (9 languages)

You can satisfy all your spring needs on the Gutekunst Federn website. In addition to the online spring catalogue with convenient selection possibilities and lots of information, you also have the customised spring calculation program WinFSB and the CAD data generator for catalogue and individually calculated springs available free of charge.

► www.federnshop.com



Catalogue in printed form

The complete catalogue spring range with compression, extension, torsion springs and various other items in 12,603 sizes directly from stock. Clearly set out on 430 pages, the spring catalogue is available free in German, English and French.



CD catalogue with spring calculation and CAD data generator

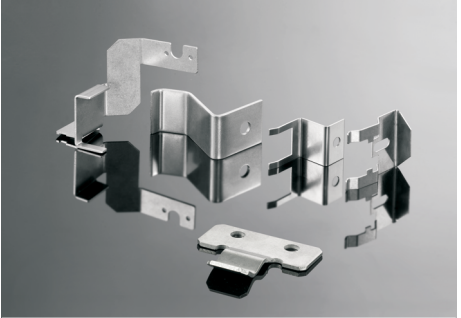
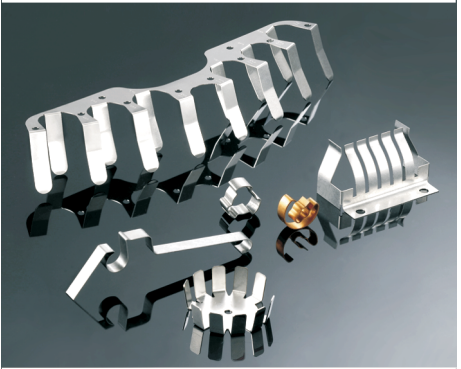
You can satisfy all your spring needs on CD. The CD version, which can be installed under all Windows versions, provides the PC version of the spring calculation program WinFSB 7 and the CAD data generator for catalogue and custom calculation springs in addition to convenient catalogue spring selection. The CD allows you to select in metric or imperial dimensions and in the languages German, English and French.

► **Request catalogues free**

Phone 0049 (0)7123 960-192 · Fax 0049 (0)7123 960-195
service@gutekunst-co.com · www.federnshop.com

Product note

Flat springs, sheet metal parts, laser parts and wireforms



Custom manufacturing in any shape and from all tooling steels and surface treatments.

Rational manufacturing in small quantities and large-scale series. Direct data import from CAD systems.

Phone 0049 (0)7445 8516-0
Fax 0049 (0)7445 8516-12
info@gutekunst-kg.de
www.formfedern.com

Gutekunst 
Stahlverformung KG

Siemensstraße 11 · D-72285 Pfalzgrafweiler

More information on page 423

Locations



Dispatch centre north
Mühlenweg 143
D-22844 Norderstedt
Phone 0049 (0)40 5353-1300
Fax 0049 (0)40 5353-1314
oder@gutekunst-co.com

**GUTEKUNST
FEDERN** 



Factory II
Gewerbegebiet Obercunewalde
D-02733 Cunewalde
Phone 0049 (0)35877 227-0
Fax 0049 (0)35877 227-14
order@gutekunst-co.com



Factory in France
Ferroflex Gutekunst Ressorts
Rte d'Aubepierre
F-52210 Arc en Barrois
Phone 0033 32 50 22 850
Fax 0033 32 50 22 855
ferroflex@wanadoo.fr

**FERRO
FLEX** 



Completion
Carl-Zeiss-Strasse 10
D-72555 Metzingen
Phone 0049 (0)7123 960-0
Fax 0049 (0)7123 960-195
order@gutekunst-co.com

**GUTEKUNST
FEDERN** 



**GUTEKUNST
FEDERN** 



Factory I
Carl-Zeiss-Strasse 15
D-72555 Metzingen
Phone 0049 (0)7123 960-0
Fax 0049 (0)7123 960-195
order@gutekunst-co.com



Dispatch centre south
James-Watt-Straße 7
D-72555 Metzingen
Phone 0049 (0)7123 960-0
Fax 0049 (0)7123 960-195
order@gutekunst-co.com

Frankreich

Lyon

Delivery dates

Phone 0049 (0)7123 960-194
Fax 0049 (0)7123 960-140

Sales catalog springs

Phone 0049 (0)7123 960-192
Fax 0049 (0)7123 960-195
order@gutekunst-co.com
www.federnshop.com

Technical support

Phone 0049 (0)35877 227-11
Phone 0049 (0)35877 227-13
Fax 0049 (0)35877 227-14
technik@gutekunst-co.com

Quality

Phone 0049 (0)35877 227-11
Fax 0049 (0)35877 227-14
tqm@gutekunst-co.com

Spring calculation

Phone 0049 (0)35877 227-13
Fax 0049 (0)35877 227-14
technik@gutekunst-co.com
www.federnshop.com

Complains

Phone 0049 (0)7123 960-145
Fax 0049 (0)7123 960-195
order@gutekunst-co.com

Sales customize springs

Phone 0049 (0)7123 960-193
Fax 0049 (0)7123 960-150
order@gutekunst-co.com
www.federnshop.com

Offers

Phone 0049 (0)7123 960-197
Fax 0049 (0)7123 960-150
order@gutekunst-co.com



CD

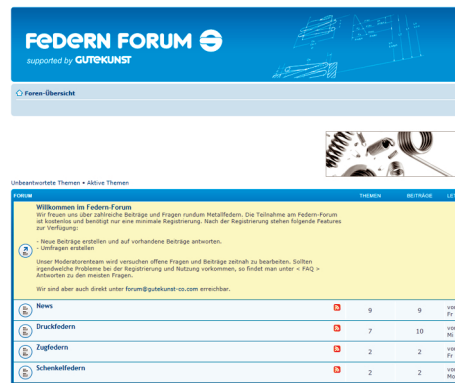


Request your free CD-ROM in three languages (D,GB,F) with spring catalogue, spring calculation and CAD generator. Numerous search functions according to dimensional and force characteristics will assist you in selecting the spring you require from our complete catalogue range. Prices, data sheets, force-path characteristics and CAD data are available for this purpose.

The spring calculation program WinFSB also included on the CD can be used to freely calculate compression, extension and torsion springs. CAD data for the calculated springs are also available immediately alongside various calculation variants.

Ask for your free copy under
Phone 0049 (0)7123 960-192
Fax 0049 (0)7123 960-195
service@gutekunst-co.com
www.federnshop.com

Forum



There is a metal springs forum available for anyone at federn-forum.de. The forum, which is supported by Gutekunst Federn, is concerned with everything to do with metal springs. It has been set up for engineers, technicians, students and all those interested in springs who have any questions about springs made of round or flat material or would like to share their experience with others. A moderator team from Gutekunst Federn takes care of open questions, contributions and provides support with all kinds of problems. In addition, Gutekunst Federn publishes interesting news and information from the world of metal springs regularly online.

Have a look. The forum is free to use. Brief registration with user name and e-mail address is all that's required.

www.federn-forum.de

App



Whether on the building site, on the customer's premises or on the road: you can now always take the Gutekunst spring catalogue with you as an app. Like in the spring shop, you can use the dimensions and path-force search to look for the springs you need from the Gutekunst catalogue range. You have an overview of all the spring data and prices available immediately.

As a web application, the spring catalogue can be reached at the following address via any mobile browser.

<http://app.gutekunst-online.com>



In the **App-Store** under *Gutekunst*

GUTEKUNST FEDERN Welcome to the Spring Shop

Spring catalogue Spring calculation Spring inquiry CAD data News Information Contact Login

Compr. spring catalogue

Extension spring catalogue

Torsion spring catalogue

Other articles catalogue

Custom compr. springs

Custom extension springs

Custom torsion springs

Custom other articles

Compr. spring calculator

Extension spring calculator

Torsion spring calculator

Extended spring range
After further increasing its range available from stock, Gutekunst Federn is now able to meet the needs of even more customers directly ...

Custom springs
Simultaneously with our stock program, we manufacture the most frequent types of springs and wire formings to your request up to a wire diameter of 12.0 mm ...

Separating springs
Ever tried to disentangle a pile of springs? If you have, then you'll know just how annoying and time-consuming it can be, not to mention the enormous costs that the ...

Spring Catalogue 2010 for free
Our spring catalogue in paper and CD-ROM with 11538 different spring sizes on stock. The technical spring data are in two measurements - metric and imperial.

Optimised for Internet Explorer 6.0, Firefox and Netscape 7 with a screen resolution of 1024x768. Pop-ups have to be allowed. Java Script and Cookies must be activated.

Gutekunst + Co.KG Federnfabriken · Carl-Zeiss-Straße 15 · D-72555 Metzingen
Imprint | deutsch | english | francais | italiano | cestina | espanol | portugues | magyar nyelv | jezyk polski

Contact

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service@gutekunst-co.com

Catalogue article search

Direct

- Ex-stock range
- Custom springs
- CAD data catalogue
- Custom CAD data
- Online spring calculation
- Request spring catalogue
- Request CD Rom
- Direct contact

RoHS + WEEE ✓
REACH ✓
ISO 9001:2008 ✓
ISO 14001:2004 ✓

Spring catalogue

Comprehensive Spring Catalogue

Search for article features

Material: EN 10270-1 VSSGO

4 items

| Material | Wire diameter | Outer diameter | Inner diameter | Free height | Free length |
|------------------|---------------|----------------|----------------|-------------|-------------|
| EN 10270-1 VSSGO | 2.0 | 10.0 | 6.0 | 20.0 | 22.0 |
| EN 10270-1 VSSGO | 2.5 | 12.5 | 8.5 | 25.0 | 27.5 |
| EN 10270-1 VSSGO | 3.0 | 15.0 | 11.0 | 30.0 | 33.0 |
| EN 10270-1 VSSGO | 3.5 | 17.5 | 13.5 | 35.0 | 38.5 |

Spring calculation

Comprehensive Spring Calculation

Material: EN 10270-1 VSSGO

Wire diameter: 2.0

Outer diameter: 10.0

Inner diameter: 6.0

Free height: 20.0

Free length: 22.0

Spring rate: 10000 N/m

Total force: 1000 N

Spring inquiry

Comprehensive Spring Inquiry

Material: EN 10270-1 VSSGO

Wire diameter: 2.0

Outer diameter: 10.0

Inner diameter: 6.0

Free height: 20.0

Free length: 22.0

Spring rate: 10000 N/m

Total force: 1000 N

You can satisfy all your spring needs at www.federnshop.com. Complete spring catalogue with comprehensive search possibilities | Data sheets | CAD data in different output formats | Online orders | Individual spring calculations with CAD data export | Individual spring inquiries with lots of information | Information and news | 9 languages.

9 languages



News

NEWS

Spring Catalogue 2010
Extended spring range
Custom Springs
Separating springs

Custom springs
Metal springs are used in many different applications. They can be made in small amounts or in large quantities, customised for your specific needs.

Information

INFO

About Gutekunst Federn
The company Gutekunst Federn has been founded in 1924. The production base covers the manufacture of different types of springs from all common spring steels for small standard or large quantities, with a diameter of up to 12.0 mm.

CAD data

GUTEKUNST FEDERN

Export CAD data

Material: EN 10270-1 VSSGO

Wire diameter: 2.0

Outer diameter: 10.0

Inner diameter: 6.0

Free height: 20.0

Free length: 22.0

Spring rate: 10000 N/m

Total force: 1000 N

Custom springs

Simultaneously with our stock programm, we manufacture the most frequent types of springs and wire formings to your request -

- + up to a wire diameter of 12.0 mm
- + of all spring steels
- + in small and large amounts
- + with special surface treatments
- + with packing methods easy to assemble

We would be happy to prepare an individual offer for you -

- + according to dimensional data
- + according to drawing
- + according to calculation
- + according to installation situation
- + according to sample
- + according to CAD data

Please contact our sales department directly or send us your requirements via www.federnshop.com.

Gutekunst + Co.KG Spring Factories **Sales department**

Carl-Zeiss-Straße 15, D-72555 Metzingen

Phone 0049 (0)7123 960-193

Fax 0049 (0)7123 960-195

order@gutekunst-co.com



Welcome, locations, contact, CD, spring shop, custom springs

Price list and Technical

Compression springs



Endless compression springs



Extension springs



Endless extension springs Loop pliers



Torsion springs



Spring assortments



Spring steel wires and strips



Other articles Double torsion springs · spring clips · spring plugs
draw bar springs · interlock garter springs



Terms of delivery, inquiry forms, request cards

The prices for all the springs which are represented in our [metal springs catalogue](#) can be determined as follows: **1.** Ascertain the price category (A-ZZ) for the required springs in the last column of the catalogue. **2.** The retail prices per spring, can be found in the corresponding column of the quantity required. **3.** The prices listed are net prices, ex warehouse and do not include packaging. **4.** There is a substantial reduction in price for purchases of larger quantities, please ask about our special offers! **5.** Prices are subject to change without prior consultation. **6.** All prices are in EUR.

Please note!

The prices of the individual purchasing quantities are given in different price units, price per unit and per 100 units.

| Price-group | Price per piece in € (EUR) | | | | | | | Price per 100 pieces in € (EUR) | | | | |
|-------------|----------------------------|-------------|-------------|-------------|--------------|--------------|--------------|---------------------------------|---------------|---------------|---------------|---------------|
| | min. 1 pc. | min. 2 pcs. | min. 3 pcs. | min. 7 pcs. | min. 17 pcs. | min. 37 pcs. | min. 75 pcs. | min. 125 pcs. | min. 175 pcs. | min. 250 pcs. | min. 350 pcs. | min. 450 pcs. |
| A | 4,61 | 3,25 | 3,10 | 1,73 | 0,69 | 0,36 | 0,19 | 15,03 | 11,89 | 9,39 | 6,94 | 6,30 |
| B | 4,72 | 3,33 | 3,17 | 1,77 | 0,74 | 0,42 | 0,20 | 16,64 | 12,53 | 10,02 | 7,58 | 6,94 |
| C | 4,81 | 3,39 | 3,23 | 1,81 | 0,78 | 0,47 | 0,27 | 22,26 | 16,89 | 15,03 | 11,99 | 10,11 |
| D | 4,85 | 3,42 | 3,26 | 1,84 | 0,83 | 0,52 | 0,34 | 28,17 | 21,92 | 18,78 | 14,52 | 12,64 |
| E | 4,90 | 3,46 | 3,30 | 1,89 | 0,93 | 0,57 | 0,39 | 35,66 | 30,67 | 28,17 | 25,26 | 18,95 |
| F | 4,94 | 3,48 | 3,32 | 1,99 | 1,00 | 0,61 | 0,46 | 39,45 | 36,31 | 31,93 | 27,80 | 22,12 |
| G | 5,01 | 3,53 | 3,37 | 2,14 | 1,04 | 0,66 | 0,50 | 41,32 | 36,96 | 32,56 | 28,42 | 24,64 |
| H | 5,11 | 3,60 | 3,43 | 2,22 | 1,12 | 0,74 | 0,55 | 45,70 | 40,69 | 35,67 | 30,95 | 26,52 |
| J | 5,16 | 3,64 | 3,47 | 2,42 | 1,15 | 0,85 | 0,68 | 48,59 | 41,96 | 36,95 | 35,36 | 32,84 |
| K | 5,27 | 3,72 | 3,54 | 2,51 | 1,22 | 0,90 | 0,73 | 50,70 | 44,44 | 41,32 | 38,53 | 35,36 |
| L | 5,42 | 3,82 | 3,64 | 2,66 | 1,38 | 1,02 | 0,89 | 58,23 | 54,45 | 49,45 | 46,10 | 41,69 |
| M | 5,53 | 3,90 | 3,71 | 2,90 | 1,43 | 1,10 | 0,94 | 65,11 | 61,35 | 57,60 | 53,06 | 49,27 |
| N | 5,67 | 4,00 | 3,81 | 2,99 | 1,52 | 1,20 | 1,01 | 73,87 | 78,29 | 61,98 | 59,36 | 53,68 |
| O | 5,78 | 4,08 | 3,89 | 3,07 | 1,59 | 1,28 | 1,12 | 85,13 | 79,51 | 72,63 | 61,28 | 58,11 |
| P | 5,97 | 4,21 | 4,01 | 3,21 | 1,77 | 1,35 | 1,19 | 97,03 | 88,90 | 82,02 | 77,05 | 71,36 |
| Q | 6,06 | 4,27 | 4,07 | 3,27 | 1,96 | 1,53 | 1,41 | 111,43 | 104,55 | 94,55 | 87,16 | 81,48 |
| R | 6,19 | 4,36 | 4,16 | 3,36 | 2,13 | 1,62 | 1,52 | 123,27 | 112,68 | 105,18 | 97,00 | 90,95 |
| S | 6,31 | 4,45 | 4,24 | 3,45 | 2,22 | 1,75 | 1,60 | | | | | |
| T | 6,44 | 4,54 | 4,33 | 3,57 | 2,30 | 1,83 | 1,74 | | | | | |
| U | 6,64 | 4,68 | 4,46 | 3,63 | 2,49 | 1,97 | 1,89 | | | | | |
| W | 6,83 | 4,81 | 4,59 | 3,74 | 2,52 | 2,09 | 1,97 | | | | | |
| X | 7,03 | 4,95 | 4,72 | 3,83 | 2,67 | 2,10 | 1,98 | | | | | |
| Y | 7,23 | 5,10 | 4,86 | 3,89 | 2,74 | 2,30 | 2,07 | | | | | |
| Z | 7,41 | 5,22 | 4,98 | 3,98 | 2,89 | 2,40 | 2,13 | 183,06 | 159,33 | 136,73 | 118,56 | 108,30 |

The prices are only applicable for a normal order procedure, i.e. order, invoice, delivery note are processed routinely by Gutekunst Federn. A surcharge will be added for special order processes such as WebEDI, EDI, supplier portal etc.

Price list Euro 23

| Price-group | Price per piece in € (EUR) | | | | | | Price per 100 pieces in € (EUR) | | | | |
|-------------|----------------------------|-------------|-------------|------------|--------------|--------------|---------------------------------|---------------|---------------|---------------|---------------|
| | min. 1 pc. | min. 2 pcs. | min. 3 pcs. | min. 7 pcs | min. 17 pcs. | min. 37 pcs. | min. 75 pcs. | min. 125 pcs. | min. 175 pcs. | min. 250 pcs. | min. 350 pcs. |
| AA | 12,37 | 9,85 | 5,13 | 3,05 | 1,66 | 1,39 | | | | | |
| AB | 12,48 | 9,95 | 5,42 | 3,28 | 1,83 | 1,54 | | | | | |
| AC | 12,71 | 10,12 | 5,62 | 3,47 | 2,17 | 1,81 | | | | | |
| AD | 12,92 | 10,29 | 5,86 | 3,71 | 2,37 | 2,00 | | | | | |
| AE | 13,18 | 10,50 | 6,06 | 3,91 | 2,54 | 2,12 | | | | | |
| AF | 13,36 | 10,64 | 6,15 | 4,00 | 2,61 | 2,20 | | | | | |
| AG | 13,53 | 10,78 | 6,23 | 4,28 | 2,71 | 2,31 | | | | | |
| AH | 13,88 | 11,05 | 6,59 | 4,61 | 2,95 | 2,46 | | | | | |
| AJ | 14,14 | 11,26 | 6,89 | 4,82 | 3,25 | 2,79 | | | | | |
| AK | 14,40 | 11,47 | 7,09 | 5,23 | 3,66 | 3,01 | | | | | |
| AL | 14,57 | 11,61 | 7,28 | 5,42 | 3,82 | 3,31 | | | | | |
| AM | 14,90 | 11,87 | 7,73 | 5,77 | 4,16 | 3,57 | | | | | |
| AN | 15,28 | 12,17 | 7,94 | 6,04 | 4,43 | 3,83 | | | | | |
| AO | 15,43 | 12,30 | 8,10 | 6,28 | 4,69 | 4,04 | | | | | |
| AP | 15,74 | 12,54 | 8,41 | 6,61 | 5,02 | 4,33 | | | | | |
| AQ | 16,04 | 12,77 | 8,78 | 6,92 | 5,30 | 4,55 | | | | | |
| AR | 16,38 | 13,05 | 9,07 | 7,22 | 5,72 | 4,95 | | | | | |
| AS | 16,72 | 13,32 | 9,48 | 7,59 | 6,10 | 5,22 | | | | | |
| AT | 16,99 | 13,54 | 9,71 | 8,09 | 6,32 | 5,62 | | | | | |
| AU | 17,29 | 13,77 | 10,09 | 8,33 | 7,15 | 6,17 | | | | | |
| AW | 17,94 | 14,29 | 10,33 | 8,75 | 7,37 | 6,48 | | | | | |
| AX | 18,62 | 14,83 | 11,10 | 9,40 | 7,83 | 6,83 | | | | | |
| AY | 18,80 | 14,97 | 11,47 | 9,93 | 8,77 | 7,38 | | | | | |
| AZ | 19,36 | 15,43 | 12,48 | 10,60 | 9,37 | 8,21 | | | | | |
| BA | 20,47 | 16,31 | 13,56 | 11,68 | 10,42 | 9,25 | | | | | |
| BB | 28,62 | 22,80 | 21,13 | 19,50 | 18,23 | 16,37 | | | | | |
| BC | 32,52 | 25,91 | 24,11 | 22,22 | 20,74 | 19,30 | | | | | |
| BD | 37,19 | 29,63 | 28,23 | 25,11 | 23,27 | 21,77 | | | | | |
| BE | 39,14 | 31,18 | 30,59 | 27,61 | 25,46 | 24,00 | | | | | |
| BF | 44,46 | 35,42 | 35,88 | 32,59 | 30,25 | 27,45 | | | | | |
| BG | 56,69 | 45,16 | 43,48 | 39,32 | 36,25 | 33,78 | | | | | |
| BH | 104,82 | 83,50 | 83,17 | 77,11 | 74,12 | 70,82 | | | | | |

Please enquire larger price groups
at order@gutekunst-co.com
or +49 7123 960-192

Price list Euro 23

| Price-group | Price per piece in € (EUR) | | | | | | Price per 100 pieces in € (EUR) | | | | | |
|-------------|----------------------------|-------------|-------------|-------------|--------------|--------------|---------------------------------|---------------|---------------|---------------|---------------|---------------|
| | min. 1 pc. | min. 2 pcs. | min. 3 pcs. | min. 7 pcs. | min. 17 pcs. | min. 37 pcs. | min. 75 pcs. | min. 125 pcs. | min. 175 pcs. | min. 250 pcs. | min. 350 pcs. | min. 450 pcs. |
| ZD | 5,98 | 3,77 | 2,19 | 1,83 | 0,83 | 0,55 | | | | | | |
| ZE | 6,09 | 3,84 | 2,23 | 1,86 | 0,94 | 0,58 | | | | | | |
| ZF | 6,16 | 3,88 | 2,35 | 1,96 | 1,00 | 0,61 | | | | | | |
| ZG | 6,23 | 3,92 | 2,53 | 2,11 | 1,05 | 0,68 | | | | | | |
| ZH | 6,34 | 3,99 | 2,63 | 2,19 | 1,12 | 0,76 | | | | | | |
| ZJ | 6,40 | 4,03 | 2,82 | 2,35 | 1,16 | 0,85 | | | | | | |
| ZK | 6,56 | 4,13 | 2,93 | 2,50 | 1,23 | 0,93 | | | | | | |
| ZL | 6,71 | 4,23 | 3,08 | 2,63 | 1,38 | 1,05 | | | | | | |
| ZM | 6,86 | 4,32 | 3,37 | 2,87 | 1,44 | 1,12 | | | | | | |
| ZN | 7,04 | 4,44 | 3,46 | 2,95 | 1,53 | 1,23 | | | | | | |
| ZO | 7,17 | 4,52 | 3,56 | 3,04 | 1,60 | 1,29 | | | | | | |
| ZP | 7,39 | 4,66 | 3,73 | 3,18 | 1,78 | 1,38 | | | | | | |
| ZQ | 7,52 | 4,74 | 3,78 | 3,22 | 1,95 | 1,56 | | | | | | |
| ZR | 7,68 | 4,84 | 3,90 | 3,32 | 2,15 | 1,66 | | | | | | |
| ZS | 7,85 | 4,95 | 4,00 | 3,41 | 2,22 | 1,79 | | | | | | |
| ZT | 8,01 | 5,05 | 4,13 | 3,52 | 2,31 | 1,87 | | | | | | |
| ZU | 8,23 | 5,18 | 4,21 | 3,59 | 2,50 | 2,02 | | | | | | |
| ZW | 8,49 | 5,35 | 4,33 | 3,70 | 2,53 | 2,13 | | | | | | |
| ZX | 8,71 | 5,49 | 4,44 | 3,78 | 2,66 | 2,16 | | | | | | |
| ZY | 8,95 | 5,64 | 4,50 | 3,84 | 2,75 | 2,35 | | | | | | |
| ZZ | 9,20 | 5,79 | 4,59 | 3,92 | 2,90 | 2,45 | | | | | | |

Please enquire larger price groups
at order@gutekunst-co.com
or +49 7123 960-192

| Price-group | Price per piece | Price for 2 pieces | Price for 5 pieces |
|-------------|-----------------|--------------------|--------------------|
| DA | 12,73 | | |
| DB | 14,41 | | |
| DC | 15,52 | | |
| DD | 16,62 | | |
| DE | 18,83 | | |
| DF | 19,36 | | |
| DG | 21,04 | | |
| DH | 22,14 | | |
| DI | 24,93 | | |
| DK | 27,67 | | |

| Price-group | Price per piece | Price for 2 pieces | Price for 5 pieces |
|-------------|-----------------|--------------------|--------------------|
| DN | | 19,88 | 21,55 |
| DO | | 22,10 | 24,30 |
| DP | | 24,94 | 27,15 |
| DQ | | 26,62 | 31,05 |
| DR | | 30,50 | 33,65 |
| DS | | 33,24 | 36,60 |
| DT | | 21,04 | 22,15 |
| DU | | 27,68 | 30,45 |
| | | | |
| | | | |

| Price-group | Price per piece |
|-------------|-----------------|
| EA | 58,70 |
| EB | 77,64 |
| EC | 102,57 |
| ED | 109,41 |
| | |
| | |
| | |
| | |

Price list €uro 23

| Price-group | Price per piece in € (EUR) | | | Price per 10 pieces in € (EUR) | | |
|-------------|----------------------------|-------------|-------------|--------------------------------|--------------|--------------|
| | min. 1 pc. | min. 3 pcs. | min. 7 pcs. | min. 17 pcs. | min. 37 pcs. | min. 75 pcs. |
| PA | | | | | | |
| PB | | | | | | |
| PC | | | | | | |
| PD | | | | | | |
| PE | | | | | | |
| PF | | | | | | |
| PG | | | | | | |
| PH | | | | | | |
| PJ | | | | | | |
| PK | | | | | | |
| PL | | | | | | |
| PM | | | | | | |
| PN | | | | | | |
| PO | | | | | | |
| PP | | | | | | |
| PQ | | | | | | |
| PR | | | | | | |
| PS | | | | | | |
| PT | | | | | | |
| PU | | | | | | |
| PV | | | | | | |
| PW | | | | | | |
| PX | | | | | | |
| PY | | | | | | |
| PZ | | | | | | |

Price request please directly
 at info@gutekunst-formfedern.de
 or +49 7445 85160

Please note !
 For the Price groups **PA** to **PZ**,
 the minimum order quantity
 is € 25,- (EUR) .



Gutekunst + Co.KG
 Spring Factories
 Carl-Zeiss-Straße 15
 D-72555 Metzingen

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order@gutekunst-co.com

Current price list at
www.federnshop.com/preis.htm

Production materials

In the following table we have listed the most common materials used in spring manufacture which we usually hold in stock in all standard wire diameters. The most important points to consider when selecting the correct spring steel from the table are primarily whether the steel

maximum operating temperature and its reaction in corrosive environments are suitable for the task in mind. We have included a price index with the table in order to give an impression of the relationship between the prices of the various materials. In the price index the

most common material „DH“ and „SH“ has been given 100 as a basic value. Please direct all questions concerning the selection of spring material to our customer service department - **Phone 0049 (0)7123 960-119, Fax -195 service@gutekunst-co.com.**

| DIN-Specification | DIN | DIN-EN | Symbol | France AFNOR | Great Britain BSI | Sweden SIS | USA AISI | Description | Shear module | Max. operating temp.* | Price-index | Application |
|-------------------|---------|---------|--------------------|---------------|-------------------|------------|-----------|-------------------|--------------|-----------------------|-------------|---|
| DH | 17223-1 | 10270-1 | DH | NFA 47-301-76 | BS 5216-75 | | AMS 5112 | Music wire | 81 500 | 80 °C | 100 | For all common springs |
| SH | 17223-1 | 10270-1 | SH | NFA 47-301-76 | BS 5216-75 | | AMS 5112 | Music wire | 81 500 | 80 °C | 100 | For all common springs |
| VDC (unalloyed) | 17223-2 | 10270-2 | VDC | | | | | Valve spring wire | 79 500 | 80 °C | 150 | In high dynamical stress |
| VDSiCr (alloyed) | 17223-2 | 10270-2 | VDSiCr | | 2803 685A55HD | | 6150 | Valve spring wire | 79 500 | 120 °C | 310 | In high dynamical stress above 100 °C |
| VDCrV (alloyed) | 17223-2 | 10270-2 | VDCrV | | | | | Valve spring wire | 85 500 | 120 °C | 270 | In high dynamical stress above 100 °C |
| 1.4310 | 17224 | 10270-3 | X10CrNi188 | Z12CN17.07 | 301S21 | 2330 | 301 | Stainless steel | 73 000 | 80 °C | 250 | High corrosion resistance |
| 1.4301 | 17440 | 10270-3 | X5CrNi1810 | Z6CN18.09 | 304S15 | 2332 | 304 | Stainless steel | 71 000 | 250 °C | 380 | Corrosion resistant |
| 1.4401 | 17224 | 10270-3 | X5CrNiMo17-12-2 | Z6CND17.11 | 316S31 | 2347 | 316 | Stainless steel | 71 000 | 300 °C | 400 | Corrosion resistance, good relaxation, non-magnetic |
| 1.4436 | 17440 | 10088-3 | X5CrNiMo17133 | Z6CND17.12 | 316S16 | 2343 | 316 | Stainless steel | 71 000 | 300 °C | 400 | Good corrosion resistance, slightly magnetic |
| 1.4539 | 17440 | 10270-3 | X1NiCrMoCuN25-20-5 | Z1NCDU25.20 | | 2562 | 904L | Stainless steel | 71 000 | 300 °C | 480 | For aggressive environments, non-magnetic |
| 1.4568 | 17224 | 10270-3 | X7CrNiAl17-7 | Z8CNA17.07.01 | 301S81 | 2388 | 631 | Stainless steel | 78 000 | 350 °C | 600 | Minimal relaxation, high dynamical stress |
| 1.4571 | 17440 | 10270-3 | X6CrNiMoTi17-12-2 | Z6CNDT17.12 | 320S31 | 2350 | 316Ti | Stainless steel | 68 000 | 300 °C | 400 | Corrosion resistant, high strength |
| CW507L | 17682 | 12166 | CuZn36 | | | | | Copper wire | 35 000 | 60 °C | 410 | Non-magnetic, salt-water proof |
| CW452K | 17682 | 12166 | CuSn6 | | | | | Bronze alloy | 39 000 | 60 °C | 410 | Non-magnetic, solderable, weldable, corrosion resistant |
| CW101C | 17682 | 12166 | CuBe2 | | | | | Beryllium | 49 000 | 80 °C | 1800 | Corrosion resistant, anto-magnetic, non-sparking |
| 2.4610 | 17744 | | NiMo16Cr16Ti | | 3076 NA45 | | 5698/5699 | Hastelloy C4 | 76 400 | 450 °C | 4100 | For very corrosive environments |
| 2.4669 | 17752 | | NiCr15Fe7TiAl | | HR 505 | | AMS 5698 | Inconel X750 | 74 000 | 600 °C | 3000 | High temperature, non-magnetic |
| 2.4632 | 17754 | | NiCr20Co18Ti | | BS 3075 (NA19) | | | Nimonic 90 | 85 000 | 500 °C | 6000 | Resistant to most gas corrosion |
| Duratherm | | | CoNiCrFe | | | | | Duratherm | 85 000 | 600 °C | 5500 | High temperatures |

* The maximum usage temperature depends on the degree of capacity utilisation or the pre-treatment of the spring.

Selecting springs according to your requirements

In appreciation of the growing demand for the highest standards as far as the precision and durability of our springs are concerned, the most important dimensions of all springs are given with tolerances.

The selection of springs should proceed in consideration of the following factors:

1. The temperature at which the spring will operate.
 - A. Springs manufactured from spring steel wire according to EN 10270-1 SH or DH may only be used in environments with temperatures between 0°C and 80°C.
 - B. Springs made from material 1.4310 (EN 10270-3) can be employed between -30°C and 80°C.

For temperatures beyond these boundaries a different material must be selected. Please contact our customer services department.

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2. Whether the springs is to be employed in an aggressive environment.
 - A. Springs manufactured from spring steel wire according to EN 10270-1 -SH or -DH are not suitable for use in acidic or alkalis environments.
 - B. The use of material 1.4310 in acidic conditions is limited, and it cannot be used at all in environments which contain chlorine.

If uncertainty exists about the employment of a spring in an aggressive environment, please do not hesitate to contact our customer services department.

3. Whether the springs is to be employed statically or dynamically. The information about our standard springs incorporates data for the static employment of the springs. For dynamic use please contact our sales department. The operation of the spring can be determined as follows:
 - A. The spring is engaged in static operation when it is working with a permanent load.

- B. The spring is engaged in dynamic operation when the occurring expansion tension is greater than 10% of the maximum permitted torsion regarding the length „Ln“. The spring has to be shot peened for dynamic use.

If uncertainty exists about the nature of the load which a spring has to endure in a particular application, i.e. whether it is a static or dynamic load, please do not hesitate to contact our customer services department.

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Selecting springs

Equations used for compression springs:

1. work/application $W = \frac{1}{2} \cdot F \cdot s$

2. load $F = \frac{G}{8} \cdot \frac{d^4 \cdot s}{D^3 \cdot n}$

3. deflection $s = \frac{8}{G} \cdot \frac{D^3 \cdot n}{d^4} \cdot F$

4. springrate $R = \frac{G}{8} \cdot \frac{d^4}{D^3 \cdot n}$

5. shear strain $\tau = \frac{8}{\pi} \cdot \frac{D}{d^3} \cdot F$

$$\tau = \frac{G}{\pi} \cdot \frac{d}{n \cdot D^2} \cdot s$$

dynamic $\tau_k = k \cdot \tau$

6. diameter of wire $d = \sqrt[3]{\frac{8}{\pi} \cdot \frac{F \cdot D}{\tau_{zul}}}$

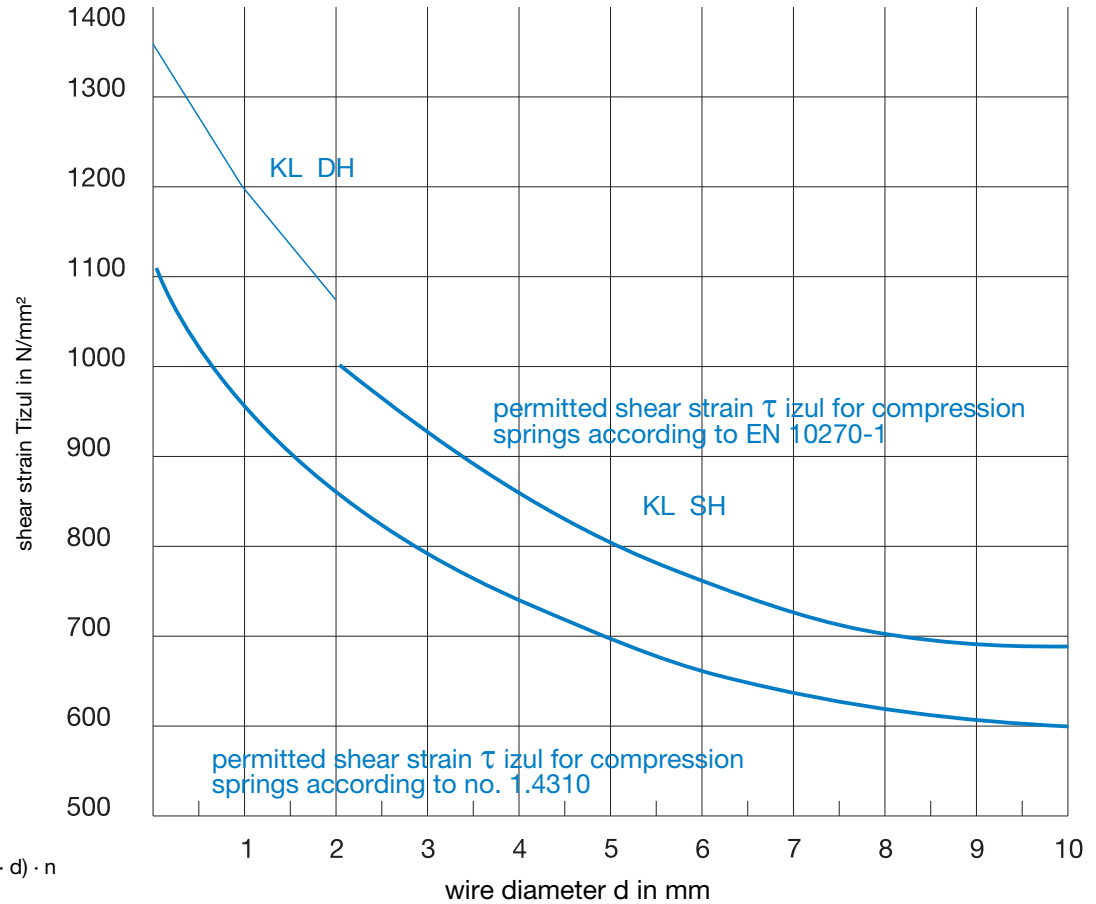
7. number of active coils $n = \frac{G}{8} \cdot \frac{d^4 \cdot s}{D^3 \cdot F}$

8. total number of coils $n_t = n + 2$

9. minimum distance between the active coils $s_a = (0,0015 \cdot \frac{D^2}{d} + 0,1 \cdot d) \cdot n$

10. deflection of the spring to buckling

$$s_k = L_0 \cdot \frac{0,5}{1 - \frac{G}{E}} \cdot \left[1 - \sqrt{1 - \frac{1 - \frac{G}{E}}{0,5 + \frac{G}{E}} \cdot \left(\frac{\pi \cdot D}{v \cdot L_0} \right)^2} \right]$$



Selecting springs

Additional equations for extension springs

1. work/application $W = \frac{1}{2} \cdot (F + F_0) \cdot s$

2. load $F = \frac{G}{8} \cdot \frac{d^4 \cdot s}{D^3 \cdot n}$
 replace "F" with the difference $F - F_0$ for prestressed extension springs

3. spring deflection $s = \frac{8}{G} \cdot \frac{D^3 \cdot n}{d^4} \cdot F$
 replace "F" with the difference $F - F_0$ for prestressed extension springs

4. spring rate without prestress $R = \frac{G}{8} \cdot \frac{d^4}{D^3 \cdot n} = \frac{\Delta F}{\Delta s} = \frac{F}{s}$

with prestress $R = \frac{G}{8} \cdot \frac{d^4}{D^3 \cdot n} = \frac{\Delta F}{\Delta s} = \frac{F}{s} = \frac{F - F_0}{s}$

5. shear strains $\tau = \frac{8}{\pi} \cdot \frac{D}{d^3} \cdot F$

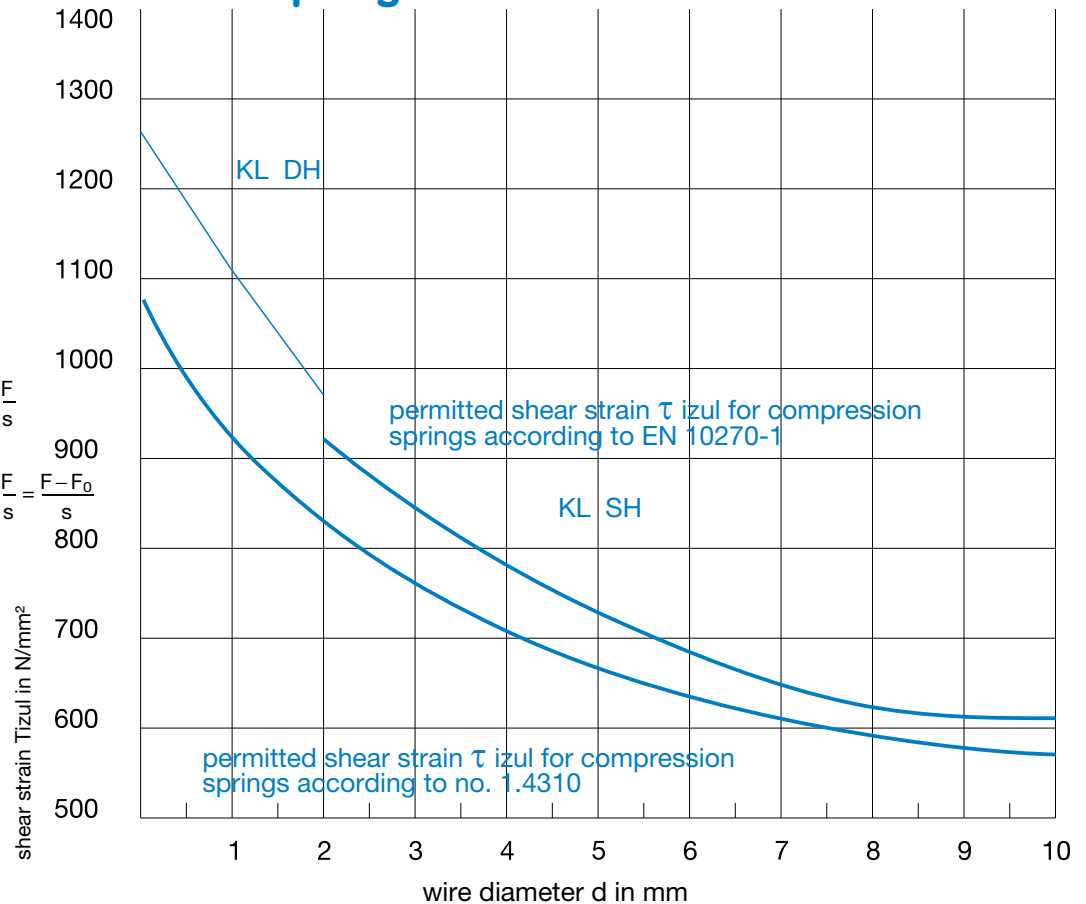
dynamic $\tau_k = k \cdot \tau$

6. diameter of wire $d = \sqrt[3]{\frac{8}{\pi} \cdot \frac{F \cdot D}{\tau_{zul}}}$

7. number of active coils $n = \frac{G}{8} \cdot \frac{d^4 \cdot s}{D^3 \cdot F}$
 replace "F" with the difference $F - F_0$ for prestressed extension springs

8. total number of coils (reference) $n_t = \frac{Lk}{d} - 1$

9. internal prestress $F_0 = F - s \cdot R$
 $= F - \frac{G}{8} \cdot \frac{d^4 \cdot s}{D^3 \cdot n}$



Surface treatment

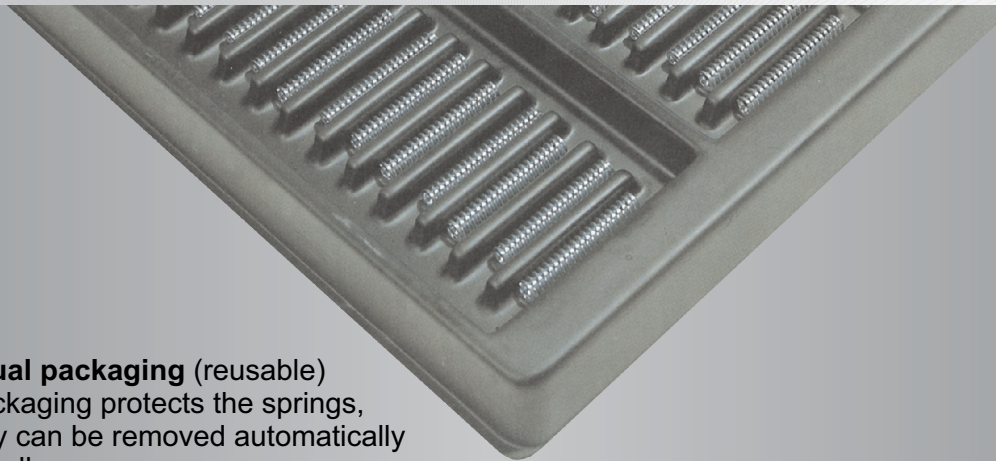
| Surface treatment | Attributes |
|--|--|
| Bronzed | Visual surface coating, smooth coloured surface, reduced noncorrosive properties. |
| DELTA®-TONE 9000 + DELTA®-SEAL | Very high anti-corrosion. |
| Thick-film passivation | High corrosion resistance, transparent look, chrome 6-free. |
| Elektro-polished | Surface coating for stainless steel, visual finishing. Mainly used for medical equipment. |
| Pickled | Removed by chemically encased pollutants. |
| Galvanised with polished finish | Visual surface coating, anti-corrosion protection. |
| Shot-peening | Increased dynamic lifespan. |
| Plastic powder coating | Visual surface coating, the 180 different RAL colours are colour fast, sheen durability. |
| Passivated | Surface resistance due to oxide film, self repairing, anti-corrosion protection. |
| Phosphating | Temporary corrosion protection, favourable sliding properties |
| Teflon-coating | Very good frictionless characteristics. |
| Chrome-plated | Visual surface coating, anti-corrosion protection. |
| Gold-plated | Visual surface coating, conductivity, prevents excessive arcing. Less mechanical and chemical resistance. |
| Copper-plated | Good conductivity, anti-corrosion protection. |
| Nickel-plated | Visual surface coating, anti-corrosion protection, affordable frictionless characteristics. |
| Galvanised | Anti-corrosion protection. |
| Galvanised with chromatic coating * | Visual surface coating, anti-corrosion protection (blue, yellow, black, oliv). Colour „blue“ is conform to RoHS. |

Springs packed

Springs are usually needed as part of an assembly process. Suitable packaging can serve to facilitate separating the springs on arrival, as well as minimizing the risk of damage during transportation. We have been concerned with improving our delivery methods for years, always looking for better ways to package our products and to meet our customers' needs. The following pages illustrate some packaging methods.

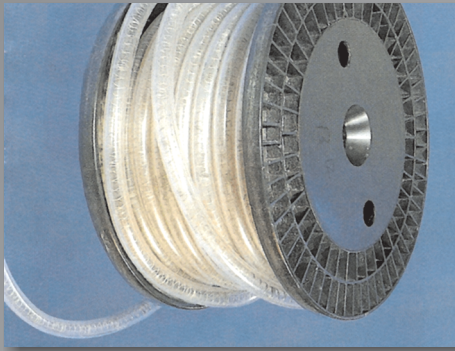
Please contact us if you have any problems with further processing.

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Individual packaging (reusable)

This packaging protects the springs, and they can be removed automatically or manually.

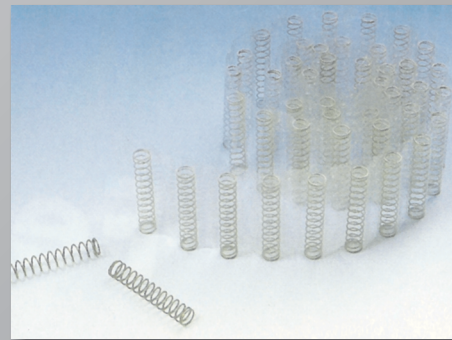


Springs in plastic tubing (reusable)
They are easily separated for further automatic processing.

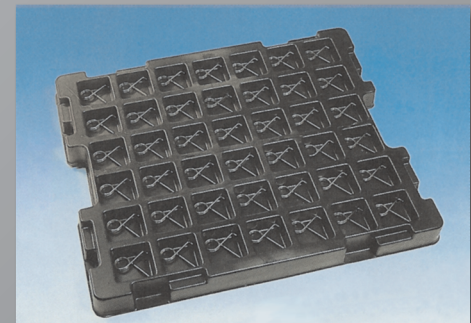


Sealed bags (disposable)
The springs are counted and put into bags, which can be delivered with or without labels.

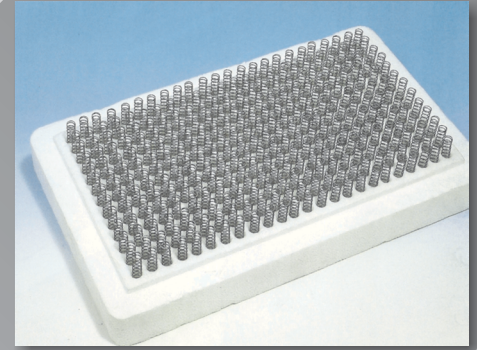
Springs packaged between plastic sheets (disposable)
The springs can be removed from the packaging by hand, or automatically using our removal device.



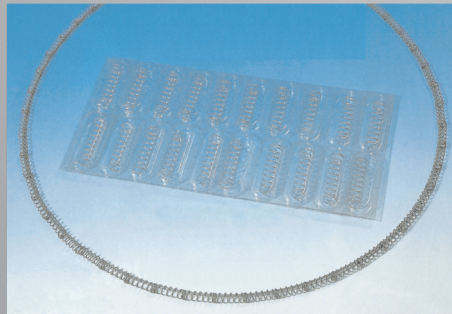
Honeycomb packaging (reusable)
This protects the springs, and they can be removed automatically or manually.



Palletted springs (reusable)
The springs can be removed easily by hand or automatically.

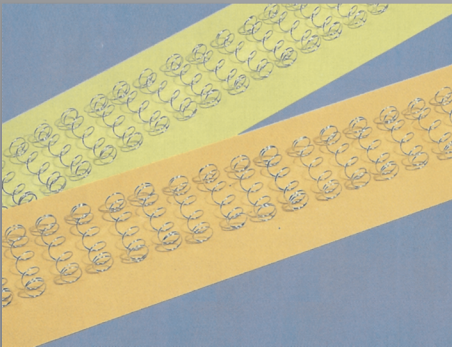


Plastic cases (reusable)
These are designed to carry the smallest precision parts, and ensure protection against damage and dirt as far as possible.



Bubble packaging (disposable)
With bubble packaging the springs are sealed against dirt particles and damage.

A wire loop of springs (disposable)
The individual springs can be easily separated either automatically or by hand.



Springs on card (disposable)
Springs attached to card with adhesive tape, the springs are easy to remove.

Supply-cart (reusable)

Springs of different types and sizes which are needed for a certain period of time or project can be delivered using the cart.



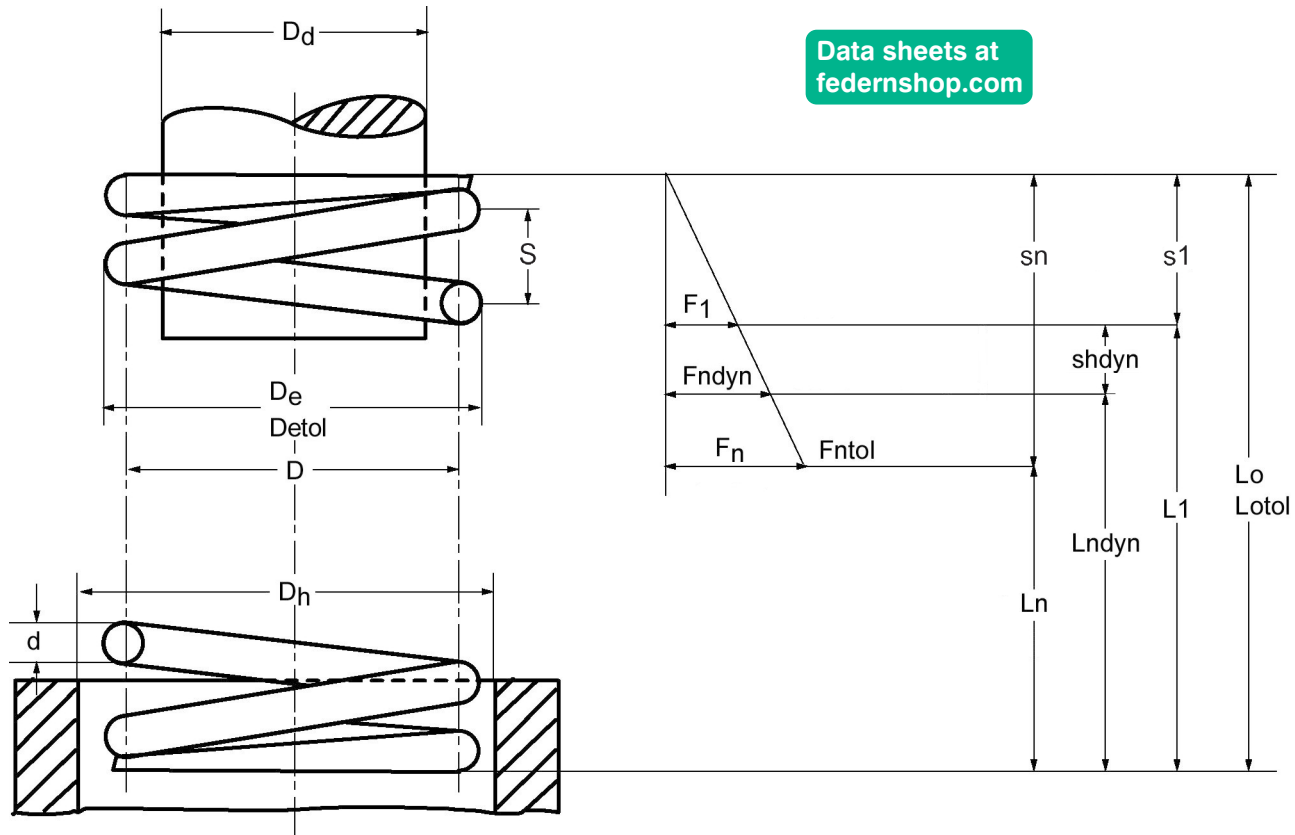
**GUTEKUNST
FEDERN** 

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Compression springs

Data sheets at federnshop.com



Compression springs

| formula | unit | technical term | inquiry | formula | unit | technical term | inquiry |
|---------|------|---------------------------------------|---------|---------|------|---|---------|
| d | mm | wire diameter | | L0tol | mm | +/- tolerance of unstressed spring length | |
| D | mm | mean coil diameter | | Ln | mm | minimum length in static use | |
| Dd | mm | maximum diameter of mandrel | | sn | mm | maximum spring deflection in static use | |
| De | mm | outer coil diameter | | n | pc. | number of active coils | |
| Detol | mm | +/- tolerance of outer coil diameter | | R | N/mm | spring rate | |
| Dh | mm | minimum diameter of bush | | Fndyn | N | maximum force in dynamic use | |
| Fn | N | maximum force in static use | | Fndtol | N | +/- tolerance of maximum dynamic force | |
| Fntol | N | +/- tolerance of maximum static force | | Lndyn | mm | minimum length in dynamic use | |
| Lk | mm | buckling length | | shdyn | mm | maximum stroke in dynamic use | |
| L0 | mm | unstressed spring length | | | | | |

Compression springs

Material

Patented drawn spring steel wire in compliance with EN 10270 part 1 type DH for all wire diameters up to 1.9 mm. For diameters between 2.0 and 12.0 mm type SH will be used (A228 / BS 5216). Our stainless steel springs are manufactured using spring steel wire material no. 1.4310 in compliance with EN 10270 part 3 (A301 / BS 301S21). The tolerances of the wire diameters comply with EN 10270.

Style

The springs are right-hand coiled (clockwise). All springs have closed ends. Springs with larger wire diameters than 0.45 mm are also closed and ground. All springs which show a tendency to set themselves (i.e. not to return to their original length after compression) are prestressed. All springs are ultimately thermally treated and stress relieved.

End coils

In the catalogue the number of active coils is given in the column "n". The number of closed coils on the spring ends must be added to this figure. 1.5 or 2 coils will be added, depending upon the original number of active coils, so that the optimum 180° position of the end coil can be reached. However, an exact 180° position of the end coil cannot always be obtained, because a production compensation for the stated tolerances is carried out according to the number of active coils.

Surface

Springs manufactured from spring steel EN 10270-1 type DH and SH are slightly lubricated following the thermal treatment. The springs can be delivered with any additional standard surface

protection for an extra charge. Springs made of material no.1.4310 will not be re-coated after the thermal coating, as a surface protection is not normally required.

For an extra charge we can deliver your springs with any common surface protection or with a surface strengthened through shot peening. Shot peening increases the springs' service life.

Please contact our services department in Metzingen and Cunewalde if you have any questions about surface treatment.

Metzingen
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Cunewalde
Phone 0049 (0)35877 227-0, Fax -14
technik@gutekunst-co.com

Quality control

All springs in our sales warehouse are quality controlled. This is carried out in our quality control department independent from the production process. The test for those springs destined for sale is carried out according to the DIN ISO 2859-1 inspection level II. The procedure normally consists of a simple spot check program, test-level AQL = 1.0. Every article tested receives a test mark, which is recorded in the quality record book. All procedures are explained in our Quality Handbook.

Standard springs are inspected for compliance to the stated tolerances. Specific tests can also be carried out and documented for each individual spring upon the customer's request.

The following charges apply for the quality control certificates issued by us.

In compliance with:

| | |
|---------------|-----------|
| EN 10204-2.1 | for free |
| EN 10204-2.2 | EUR 15,34 |
| EN 10204-3.1B | EUR 30,68 |

Please contact our Quality Assurance department with any questions you may have about testing and quality assurance.
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tqm@gutekunst-co.com

Spring design

The calculation and design of the springs is carried out in accordance with EN 13906-1.

Production Compensation

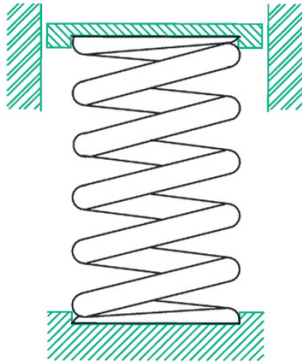
Production compensation is usually required in order to keep within the stated tolerances (refer to EN 15800).

All the tolerance ranges of our standard sized springs are stated (coil diameter - De, free length - L0, and maximum load - Fn). These tolerances are maintained by varying the number of the active coils (n). However, due to these measures the desired 180° position of the spring ends cannot always be obtained.

Compression springs

Buckling

The danger of buckling does exist with compression springs, and is dependent on the size, guide method and seat of the springs. If the spring is employed in conjunction with a bush or a mandrel it is impossible for it to buckle. In other cases buckling mostly depends upon the design of the seat. The buckling length (Lk), which is given in the table, shows the length to which a spring can be compressed without buckling, and is applicable to spring ends with a seat coefficient $v=0,5$ (EN 13906-1 part 9.14). This is following case:



The value given in the column "Lk" is the length as of which the risk of the spring buckling at the seat-coefficient $v=0,5$. If the value in this column is "0.00" the spring may be completely compressed to "Ln", without any danger of buckling.

Please contact our service department in Metzingen and Cunewalde if you have any questions about buckling prevention.
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technik@gutekunst-co.com

Setting of springs

In many cases compression springs are prone to "set" themselves. This means that the original free length of the spring (L0) can no longer be reached once the spring has been compressed to its minimum length (Ln), the spring has become shorter.

This tendency can be prevented through a so-called scragging procedure. This allows the compression springs to return to the original free length "L0", when they are in a relaxed position, no matter what the application. All springs which show this "setting" tendency because of their size are pre-set within the

Tolerances

The tolerances indicated correspond to the use of EN 15800 Grade 2 is used as standard, we can also supply all standard sized springs in Grade 1 for an extra charge.

Please contact our service department in Metzingen and Cunewalde if you have any questions about tolerances.
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technik@gutekunst-co.com

Dynamic application

The spring data for the dynamic applications (Fndyn, Fndtol, Lndyn and shdyn) higher than 0.8 mm wire diameter are relevant only for springs having a shot peened hardened surface. Spring data for the dynamic applications up to a wire diameter of 0.75 mm are relevant without shot peened hardened surface. Please talk to our sales department if you need shot peened hardened surface for springs up to 0.75 mm wire diameter.

werden. Bitte kontaktieren Sie hierzu unsere Beratungsabteilung.

Please contact our service department in Metzingen and Cunewalde if you have any questions about dynamic application.
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Cunewalde
Phone 0049 (0)35877 227-0, Fax -14
technik@gutekunst-co.com

Note

The dimensional data for "Ln" have been adapted to the current standard EN 13906-1. The dimensions of the compression springs have not been modified, which means the compression springs can still be used for all individual cases they have previously been used for.

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-2000 | 0,10 | 1,20 | 1,30 | 0,10 | 0,80 | 1,50 | 2,60 | 0,21 | 0,168 | 3,50 | 0,81 | 1,79 | 0,00 | 0,301 | 0,04 | 0,87 | 0,56 | 0,291 | 0,04 | 0,0013 | D |
| D-2001 | | | | | | | 3,80 | 0,29 | 0,107 | 5,50 | 1,07 | 2,73 | 0,00 | 0,292 | 0,04 | 1,16 | 0,90 | 0,283 | 0,04 | 0,0018 | D |
| D-2002 | | | | | | | 5,80 | 0,41 | 0,069 | 8,50 | 1,47 | 4,33 | 0,00 | 0,300 | 0,03 | 1,60 | 1,35 | 0,291 | 0,03 | 0,0025 | D |
| D-2003 | | | | | | | 8,40 | 0,57 | 0,047 | 12,50 | 2,00 | 6,41 | 6,15 | 0,302 | 0,03 | 2,19 | 1,98 | 0,293 | 0,03 | 0,0034 | D |
| D-2004 | | | | | | | 12,40 | 0,81 | 0,032 | 18,50 | 2,78 | 9,62 | 10,80 | 0,306 | 0,03 | 3,08 | 2,86 | 0,297 | 0,03 | 0,0048 | D |
| D-2005 | 1,00 | 1,10 | 0,10 | 0,70 | 1,40 | 2,00 | 0,14 | 0,291 | 3,50 | 0,79 | 1,21 | 0,00 | 0,353 | 0,05 | 0,83 | 0,38 | 0,341 | 0,04 | 0,0011 | D | |
| D-2006 | | | | | | 2,90 | 0,19 | 0,185 | 5,50 | 1,04 | 1,86 | 0,00 | 0,345 | 0,04 | 1,11 | 0,61 | 0,332 | 0,04 | 0,0015 | D | |
| D-2007 | | | | | | 4,40 | 0,26 | 0,120 | 8,50 | 1,41 | 2,99 | 0,00 | 0,358 | 0,04 | 1,52 | 0,91 | 0,345 | 0,04 | 0,0020 | D | |
| D-2008 | | | | | | 6,30 | 0,37 | 0,082 | 12,50 | 1,91 | 4,39 | 4,08 | 0,358 | 0,04 | 2,07 | 1,34 | 0,345 | 0,04 | 0,0028 | D | |
| D-2009 | | | | | | 9,20 | 0,52 | 0,055 | 18,50 | 2,66 | 6,54 | 7,89 | 0,360 | 0,03 | 2,89 | 1,96 | 0,347 | 0,03 | 0,0040 | D | |
| D-2010 | 0,80 | 0,90 | 0,07 | 0,50 | 1,10 | 1,50 | 0,09 | 0,568 | 3,50 | 0,77 | 0,73 | 0,00 | 0,416 | 0,06 | 0,80 | 0,24 | 0,398 | 0,06 | 0,0009 | D | |
| D-2011 | | | | | | 2,20 | 0,12 | 0,362 | 5,50 | 1,01 | 1,19 | 0,00 | 0,431 | 0,05 | 1,06 | 0,37 | 0,412 | 0,05 | 0,0012 | D | |
| D-2012 | | | | | | 3,20 | 0,17 | 0,234 | 8,50 | 1,37 | 1,83 | 0,00 | 0,429 | 0,05 | 1,45 | 0,57 | 0,410 | 0,05 | 0,0016 | D | |
| D-2013 | | | | | | 4,60 | 0,24 | 0,159 | 12,50 | 1,85 | 2,76 | 2,47 | 0,439 | 0,04 | 1,97 | 0,83 | 0,419 | 0,04 | 0,0023 | D | |
| D-2014 | | | | | | 6,60 | 0,34 | 0,108 | 18,50 | 2,56 | 4,04 | 5,40 | 0,434 | 0,04 | 2,74 | 1,23 | 0,415 | 0,04 | 0,0032 | D | |
| D-2015 | 0,63 | 0,73 | 0,05 | 0,40 | 0,90 | 1,20 | 0,08 | 1,164 | 3,50 | 0,76 | 0,44 | 0,00 | 0,517 | 0,02 | 0,78 | 0,14 | 0,489 | 0,02 | 0,0007 | D | |
| D-2016 | | | | | | 1,70 | 0,09 | 0,741 | 5,50 | 0,99 | 0,71 | 0,00 | 0,528 | 0,02 | 1,03 | 0,22 | 0,496 | 0,02 | 0,0009 | D | |
| D-2017 | | | | | | 2,40 | 0,11 | 0,479 | 8,50 | 1,34 | 1,06 | 0,00 | 0,510 | 0,02 | 1,40 | 0,35 | 0,479 | 0,02 | 0,0013 | D | |
| D-2018 | | | | | | 3,40 | 0,15 | 0,326 | 12,50 | 1,80 | 1,60 | 1,42 | 0,522 | 0,02 | 1,90 | 0,51 | 0,489 | 0,02 | 0,0018 | D | |
| D-2019 | | | | | | 4,90 | 0,24 | 0,220 | 18,50 | 2,50 | 2,40 | 3,88 | 0,530 | 0,02 | 2,64 | 0,74 | 0,498 | 0,02 | 0,0025 | D | |
| D-2020 | 0,50 | 0,60 | 0,04 | 0,30 | 0,80 | 1,00 | 0,07 | 2,329 | 3,50 | 0,75 | 0,25 | 0,00 | 0,582 | 0,03 | 0,71 | 0,07 | 0,675 | 0,03 | 0,0005 | D | |
| D-2021 | | | | | | 1,40 | 0,08 | 1,482 | 5,50 | 0,98 | 0,42 | 0,00 | 0,629 | 0,03 | 1,01 | 0,13 | 0,578 | 0,03 | 0,0007 | D | |
| D-2022 | | | | | | 2,00 | 0,11 | 0,959 | 8,50 | 1,32 | 0,68 | 0,00 | 0,655 | 0,03 | 1,38 | 0,20 | 0,594 | 0,03 | 0,0010 | D | |
| D-2023 | | | | | | 2,70 | 0,13 | 0,652 | 12,50 | 1,77 | 0,93 | 1,13 | 0,605 | 0,03 | 1,86 | 0,32 | 0,548 | 0,02 | 0,0014 | D | |
| D-2024 | | | | | | 3,90 | 0,18 | 0,441 | 18,50 | 2,45 | 1,45 | 3,09 | 0,637 | 0,03 | 2,58 | 0,45 | 0,582 | 0,03 | 0,0020 | D | |
| D-2025 | 0,12 | 1,60 | 1,72 | 0,10 | 1,20 | 2,10 | 3,60 | 0,32 | 0,147 | 3,50 | 0,99 | 2,61 | 0,00 | 0,384 | 0,05 | 1,07 | 0,85 | 0,373 | 0,05 | 0,0025 | D |
| D-2026 | | | | | | | 5,40 | 0,44 | 0,094 | 5,50 | 1,32 | 4,08 | 0,00 | 0,382 | 0,05 | 1,44 | 1,34 | 0,371 | 0,05 | 0,0034 | D |
| D-2027 | | | | | | | 8,20 | 0,62 | 0,061 | 8,50 | 1,81 | 6,39 | 0,00 | 0,387 | 0,04 | 2,00 | 2,04 | 0,376 | 0,04 | 0,0047 | D |
| D-2028 | | | | | | | 11,80 | 0,86 | 0,041 | 12,50 | 2,47 | 9,33 | 9,01 | 0,385 | 0,04 | 2,75 | 3,05 | 0,373 | 0,04 | 0,0065 | D |
| D-2029 | | | | | | | 17,40 | 1,22 | 0,028 | 18,50 | 3,45 | 13,95 | 15,68 | 0,389 | 0,04 | 3,86 | 4,42 | 0,377 | 0,04 | 0,0092 | D |
| D-2030 | 1,20 | 1,32 | 0,10 | 0,80 | 1,60 | 2,40 | 0,15 | 0,349 | 3,50 | 0,95 | 1,46 | 0,00 | 0,508 | 0,06 | 1,00 | 0,46 | 0,489 | 0,06 | 0,0019 | D | |
| D-2031 | | | | | | 3,50 | 0,21 | 0,222 | 5,50 | 1,25 | 2,26 | 0,00 | 0,501 | 0,06 | 1,33 | 0,73 | 0,482 | 0,05 | 0,0025 | D | |
| D-2032 | | | | | | 5,20 | 0,30 | 0,144 | 8,50 | 1,70 | 3,51 | 0,00 | 0,504 | 0,05 | 1,82 | 1,11 | 0,486 | 0,05 | 0,0035 | D | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-2000 | 0,10 | 1,20 | 1,30 | 0,10 | 0,80 | 1,50 | 2,60 | 0,25 | 0,145 | 3,50 | 0,81 | 1,79 | 0,00 | 0,259 | 0,04 | 0,87 | 0,60 | 0,250 | 0,04 | 0,0013 | E |
| VD-2001 | | | | | | | 3,80 | 0,34 | 0,092 | 5,50 | 1,07 | 2,73 | 0,00 | 0,251 | 0,04 | 1,16 | 0,99 | 0,243 | 0,04 | 0,0018 | E |
| VD-2002 | | | | | | | 5,80 | 0,48 | 0,060 | 8,50 | 1,47 | 4,33 | 0,00 | 0,258 | 0,03 | 1,60 | 1,46 | 0,250 | 0,03 | 0,0025 | E |
| VD-2003 | | | | | | | 8,40 | 0,66 | 0,041 | 12,50 | 2,00 | 6,41 | 6,07 | 0,259 | 0,03 | 2,19 | 2,11 | 0,252 | 0,03 | 0,0034 | E |
| VD-2004 | | | | | | | 12,20 | 0,94 | 0,027 | 18,50 | 2,78 | 9,42 | 10,77 | 0,258 | 0,03 | 3,08 | 3,28 | 0,250 | 0,03 | 0,0048 | E |
| VD-2005 | 1,00 | 1,10 | 0,10 | 0,70 | 1,40 | 2,00 | 0,10 | 0,250 | 3,50 | 0,79 | 1,21 | 0,00 | 0,303 | 0,04 | 0,83 | 0,42 | 0,293 | 0,04 | 0,0011 | E | |
| VD-2006 | | | | | | 2,90 | 0,22 | 0,159 | 5,50 | 1,04 | 1,86 | 0,00 | 0,296 | 0,04 | 1,11 | 0,68 | 0,285 | 0,04 | 0,0015 | E | |
| VD-2007 | | | | | | 4,40 | 0,31 | 0,103 | 8,50 | 1,41 | 2,99 | 0,00 | 0,308 | 0,04 | 1,52 | 0,99 | 0,296 | 0,04 | 0,0020 | E | |
| VD-2008 | | | | | | 6,30 | 0,43 | 0,070 | 12,50 | 1,91 | 4,39 | 4,08 | 0,307 | 0,03 | 2,07 | 1,46 | 0,296 | 0,03 | 0,0028 | E | |
| VD-2009 | | | | | | 9,20 | 0,60 | 0,047 | 18,50 | 2,66 | 6,54 | 7,89 | 0,309 | 0,03 | 2,89 | 2,15 | 0,298 | 0,03 | 0,0040 | E | |
| VD-2010 | 0,80 | 0,90 | 0,07 | 0,50 | 1,10 | 1,50 | 0,10 | 0,488 | 3,50 | 0,77 | 0,73 | 0,00 | 0,357 | 0,06 | 0,80 | 0,27 | 0,342 | 0,06 | 0,0009 | E | |
| VD-2011 | | | | | | 2,20 | 0,14 | 0,311 | 5,50 | 1,01 | 1,19 | 0,00 | 0,370 | 0,05 | 1,06 | 0,40 | 0,354 | 0,05 | 0,0012 | E | |
| VD-2012 | | | | | | 3,20 | 0,20 | 0,201 | 8,50 | 1,37 | 1,83 | 0,00 | 0,369 | 0,05 | 1,45 | 0,63 | 0,352 | 0,05 | 0,0016 | E | |
| VD-2013 | | | | | | 4,60 | 0,28 | 0,137 | 12,50 | 1,85 | 2,76 | 2,36 | 0,377 | 0,04 | 1,97 | 0,90 | 0,360 | 0,04 | 0,0023 | E | |
| VD-2014 | | | | | | 6,60 | 0,39 | 0,092 | 18,50 | 2,56 | 4,04 | 5,37 | 0,373 | 0,04 | 2,74 | 1,35 | 0,357 | 0,04 | 0,0032 | E | |
| VD-2015 | 0,63 | 0,73 | 0,05 | 0,40 | 0,90 | 1,20 | 0,08 | 1,000 | 3,50 | 0,76 | 0,44 | 0,00 | 0,444 | 0,03 | 0,78 | 0,16 | 0,420 | 0,03 | 0,0007 | E | |
| VD-2016 | | | | | | 1,70 | 0,09 | 0,636 | 5,50 | 0,99 | 0,71 | 0,00 | 0,453 | 0,03 | 1,03 | 0,24 | 0,426 | 0,03 | 0,0009 | E | |
| VD-2017 | | | | | | 2,40 | 0,11 | 0,412 | 8,50 | 1,34 | 1,06 | 0,00 | 0,438 | 0,03 | 1,40 | 0,39 | 0,412 | 0,03 | 0,0013 | E | |
| VD-2018 | | | | | | 3,40 | 0,15 | 0,280 | 12,50 | 1,80 | 1,60 | 1,20 | 0,448 | 0,03 | 1,90 | 0,56 | 0,420 | 0,03 | 0,0018 | E | |
| VD-2019 | | | | | | 4,90 | 0,24 | 0,189 | 18,50 | 2,50 | 2,40 | 3,85 | 0,455 | 0,03 | 2,64 | 0,81 | 0,427 | 0,03 | 0,0025 | E | |
| VD-2020 | 0,50 | 0,60 | 0,04 | 0,30 | 0,80 | 1,00 | 0,07 | 2,000 | 3,50 | 0,75 | 0,25 | 0,00 | 0,504 | 0,03 | 0,77 | 0,10 | 0,460 | 0,03 | 0,0005 | E | |
| VD-2021 | | | | | | 1,40 | 0,08 | 1,273 | 5,50 | 0,98 | 0,42 | 0,00 | 0,540 | 0,03 | 1,01 | 0,15 | 0,496 | 0,03 | 0,0007 | E | |
| VD-2022 | | | | | | 2,00 | 0,11 | 0,824 | 8,50 | 1,32 | 0,68 | 0,00 | 0,563 | 0,03 | 1,38 | 0,22 | 0,511 | 0,03 | 0,0010 | E | |
| VD-2023 | | | | | | 2,70 | 0,13 | 0,560 | 12,50 | 1,77 | 0,93 | 0,96 | 0,520 | 0,03 | 1,86 | 0,36 | 0,470 | 0,03 | 0,0014 | E | |
| VD-2024 | | | | | | 3,90 | 0,18 | 0,378 | 18,50 | 2,45 | 1,45 | 3,09 | 0,547 | 0,03 | 2,58 | 0,50 | 0,499 | 0,03 | 0,0020 | E | |
| VD-2025 | 0,12 | 1,60 | 1,72 | 0,10 | 1,20 | 2,10 | 3,60 | 0,37 | 0,127 | 3,50 | 0,99 | 2,61 | 0,00 | 0,330 | 0,05 | 1,07 | 0,93 | 0,320 | 0,05 | 0,0025 | E |
| VD-2026 | | | | | | | 5,40 | 0,51 | 0,081 | 5,50 | 1,32 | 4,08 | 0,00 | 0,328 | 0,05 | 1,44 | 1,47 | 0,319 | 0,05 | 0,0034 | E |
| VD-2027 | | | | | | | 8,20 | 0,72 | 0,052 | 8,50 | 1,81 | 6,39 | 0,00 | 0,333 | 0,04 | 2,00 | 2,26 | 0,323 | 0,04 | 0,0047 | E |
| VD-2028 | | | | | | | 11,80 | 1,00 | 0,035 | 12,50 | 2,47 | 9,33 | 8,93 | 0,331 | 0,04 | 2,75 | 3,40 | 0,321 | 0,04 | 0,0065 | E |
| VD-2029 | | | | | | | 17,40 | 1,42 | 0,024 | 18,50 | 3,45 | 13,95 | 15,64 | 0,334 | 0,04 | 3,86 | 4,86 | 0,324 | 0,04 | 0,0092 | E |
| VD-2030 | 1,20 | 1,32 | 0,10 | 0,80 | 1,60 | 2,40 | 0,18 | 0,300 | 3,50 | 0,95 | 1,46 | 0,00 | 0,437 | 0,06 | 1,00 | 0,50 | 0,420 | 0,06 | 0,0019 | E | |
| VD-2031 | | | | | | 3,50 | 0,25 | 0,191 | 5,50 | 1,25 | 2,26 | 0,00 | 0,431 | 0,05 | 1,33 | 0,80 | 0,414 | 0,05 | 0,0025 | E | |
| VD-2032 | | | | | | 5,20 | 0,35 | 0,124 | 8,50 | 1,70 | 3,51 | 0,00 | 0,433 | 0,05 | 1,82 | 1,22 | 0,418 | 0,05 | 0,0035 | E | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-2033 | 0,12 | 1,20 | 1,32 | 0,10 | 0,80 | 1,60 | 7,50 | 0,48 | 0,084 | 12,50 | 2,30 | 5,21 | 4,69 | 0,437 | 0,05 | 2,48 | 1,78 | 0,422 | 0,05 | 0,0049 | E | | | | | |
| VD-2034 | | | | | | | 10,90 | 0,68 | 0,057 | 18,50 | 3,20 | 7,71 | 9,26 | 0,437 | 0,05 | 3,47 | 2,61 | 0,422 | 0,05 | 0,0069 | E | | | | | |
| VD-2036 | | | | | | | 1,00 | 1,12 | 0,10 | 0,60 | 1,40 | 1,90 | 0,13 | 0,518 | 3,50 | 0,93 | 0,97 | 0,00 | 0,505 | 0,07 | 0,97 | 0,35 | 0,482 | 0,07 | 0,0015 | E |
| VD-2037 | | | | | | | | | | | | 2,70 | 0,17 | 0,330 | 5,50 | 1,21 | 1,49 | 0,00 | 0,490 | 0,06 | 1,28 | 0,57 | 0,468 | 0,06 | 0,0021 | E |
| VD-2038 | | | | | | | | | | | | 4,00 | 0,24 | 0,213 | 8,50 | 1,65 | 2,35 | 0,00 | 0,502 | 0,06 | 1,75 | 0,85 | 0,480 | 0,06 | 0,0029 | E |
| VD-2039 | | | | | | | | | | | | 5,80 | 0,34 | 0,145 | 12,50 | 2,23 | 3,57 | 3,19 | 0,519 | 0,06 | 2,38 | 1,19 | 0,496 | 0,06 | 0,0041 | E |
| VD-2040 | | 8,40 | 0,48 | 0,098 | 18,50 | 3,09 | | | | | | 5,31 | 6,95 | 0,520 | 0,05 | 3,32 | 1,76 | 0,498 | 0,05 | 0,0058 | E | | | | | |
| VD-2041 | | 0,80 | 0,92 | 0,07 | 0,50 | 1,20 | 1,50 | 0,09 | 1,013 | 3,50 | 0,91 | 0,59 | 0,00 | 0,597 | 0,05 | 0,95 | 0,22 | 0,557 | 0,11 | 0,0012 | E | | | | | |
| VD-2042 | | | | | | | 2,10 | 0,13 | 0,644 | 5,50 | 1,19 | 0,91 | 0,00 | 0,586 | 0,09 | 1,25 | 0,36 | 0,548 | 0,09 | 0,0017 | E | | | | | |
| VD-2043 | | | | | | | 3,10 | 0,18 | 0,417 | 8,50 | 1,61 | 1,49 | 0,00 | 0,621 | 0,08 | 1,70 | 0,51 | 0,584 | 0,08 | 0,0024 | E | | | | | |
| VD-2044 | | | | | | | 4,40 | 0,25 | 0,284 | 12,50 | 2,17 | 2,23 | 2,02 | 0,632 | 0,08 | 2,30 | 0,74 | 0,595 | 0,08 | 0,0033 | E | | | | | |
| VD-2045 | | | | | | | 6,30 | 0,35 | 0,192 | 18,50 | 3,01 | 3,29 | 5,02 | 0,630 | 0,08 | 3,20 | 1,09 | 0,594 | 0,08 | 0,0046 | E | | | | | |
| VD-2046 | | 0,63 | 0,75 | 0,06 | 0,40 | 0,90 | 1,20 | 0,08 | 2,902 | 2,50 | 0,80 | 0,40 | 0,00 | 1,161 | 0,03 | 0,91 | 0,06 | 0,842 | 0,03 | 0,0008 | E | | | | | |
| VD-2047 | | | | | | | 1,70 | 0,09 | 1,319 | 5,50 | 1,17 | 0,53 | 0,00 | 0,695 | 0,03 | 1,22 | 0,22 | 0,633 | 0,03 | 0,0013 | E | | | | | |
| VD-2048 | | | | | | | 2,40 | 0,14 | 0,854 | 8,50 | 1,58 | 0,82 | 0,00 | 0,696 | 0,03 | 1,66 | 0,34 | 0,632 | 0,03 | 0,0019 | E | | | | | |
| VD-2049 | | | | | | | 3,40 | 0,17 | 0,580 | 12,50 | 2,13 | 1,27 | 1,20 | 0,736 | 0,03 | 2,24 | 0,47 | 0,673 | 0,03 | 0,0026 | E | | | | | |
| VD-2050 | 4,90 | | | | | | 0,23 | 0,392 | 18,50 | 2,95 | 1,95 | 3,85 | 0,763 | 0,04 | 3,11 | 0,66 | 0,702 | 0,03 | 0,0036 | E | | | | | | |
| VD-2051 | 0,16 | 2,00 | 2,16 | 0,15 | 1,50 | 2,50 | 4,30 | 0,38 | 0,205 | 3,50 | 1,31 | 2,99 | 0,00 | 0,613 | 0,09 | 1,40 | 1,11 | 0,594 | 0,09 | 0,0055 | E | | | | | |
| VD-2052 | | | | | | | 6,50 | 0,53 | 0,130 | 5,50 | 1,73 | 4,77 | 0,00 | 0,621 | 0,08 | 1,88 | 1,73 | 0,602 | 0,08 | 0,0075 | E | | | | | |
| VD-2053 | | | | | | | 9,80 | 0,74 | 0,084 | 8,50 | 2,37 | 7,43 | 0,00 | 0,626 | 0,07 | 2,60 | 2,64 | 0,607 | 0,07 | 0,0105 | E | | | | | |
| VD-2054 | | | | | | | 14,20 | 1,03 | 0,057 | 12,50 | 3,23 | 10,97 | 10,40 | 0,629 | 0,07 | 3,56 | 2,87 | 0,610 | 0,07 | 0,0145 | E | | | | | |
| VD-2055 | | | | | | | 20,90 | 1,46 | 0,039 | 18,50 | 4,51 | 16,39 | 18,59 | 0,635 | 0,07 | 5,00 | 5,56 | 0,616 | 0,07 | 0,0205 | E | | | | | |
| VD-2056 | | | | | | | 1,60 | 1,76 | 0,10 | 1,10 | 2,10 | 3,10 | 0,22 | 0,400 | 3,50 | 1,26 | 1,84 | 0,00 | 0,736 | 0,10 | 1,33 | 0,71 | 0,708 | 0,09 | 0,0044 | E |
| VD-2057 | | 4,70 | 0,30 | 0,255 | 5,50 | 1,66 | | | | | | 3,04 | 0,00 | 0,774 | 0,09 | 1,77 | 1,05 | 0,746 | 0,09 | 0,0060 | E | | | | | |
| VD-2058 | | 7,00 | 0,43 | 0,165 | 8,50 | 2,26 | | | | | | 4,74 | 0,00 | 0,781 | 0,08 | 2,43 | 1,60 | 0,753 | 0,08 | 0,0084 | E | | | | | |
| VD-2059 | | 10,00 | 0,59 | 0,112 | 12,50 | 3,06 | | | | | | 6,94 | 6,25 | 0,777 | 0,08 | 3,31 | 2,37 | 0,749 | 0,08 | 0,0116 | E | | | | | |
| VD-2060 | | 14,60 | 0,84 | 0,076 | 18,50 | 4,26 | | | | | | 10,34 | 12,43 | 0,782 | 0,08 | 4,63 | 3,45 | 0,754 | 0,07 | 0,0164 | E | | | | | |
| VD-2061 | | 1,20 | 1,36 | 0,08 | 0,80 | 1,60 | 2,20 | 0,13 | 0,948 | 3,50 | 1,22 | 0,98 | 0,00 | 0,926 | 0,14 | 1,27 | 0,40 | 0,882 | 0,14 | 0,0033 | E | | | | | |
| VD-2062 | | | | | | | 3,20 | 0,18 | 0,603 | 5,50 | 1,60 | 1,60 | 0,00 | 0,964 | 0,12 | 1,68 | 0,59 | 0,917 | 0,12 | 0,0045 | E | | | | | |
| VD-2063 | | | | | | | 4,70 | 0,25 | 0,390 | 8,50 | 2,17 | 2,53 | 0,00 | 0,987 | 0,11 | 2,30 | 0,89 | 0,937 | 0,11 | 0,0063 | E | | | | | |
| VD-2064 | | | | | | | 6,70 | 0,35 | 0,265 | 12,50 | 2,93 | 3,77 | 3,05 | 1,001 | 0,11 | 3,11 | 1,29 | 0,953 | 0,11 | 0,0087 | E | | | | | |
| VD-2065 | | | | | | | 9,70 | 0,50 | 0,179 | 18,50 | 4,07 | 5,63 | 7,80 | 1,011 | 0,10 | 4,34 | 1,88 | 0,961 | 0,10 | 0,0123 | E | | | | | |
| VD-2066 | | | | | | | 1,00 | 1,16 | 0,07 | 0,60 | 1,30 | 1,90 | 0,10 | 1,638 | 3,50 | 1,21 | 0,69 | 0,00 | 1,132 | 0,19 | 1,25 | 0,25 | 1,065 | 0,19 | 0,0027 | E |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|-------|--------|--------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-2033 | 0,12 | 1,20 | 1,32 | 0,10 | 0,80 | 1,60 | 7,50 | 0,42 | 0,098 | 12,50 | 2,30 | 5,21 | 4,79 | 0,509 | 0,05 | 2,48 | 1,62 | 0,491 | 0,05 | 0,0049 | D | | | | |
| D-2034 | | | | | | | 10,90 | 0,59 | 0,066 | 18,50 | 3,20 | 7,71 | 9,30 | 0,509 | 0,05 | 3,47 | 2,40 | 0,491 | 0,05 | 0,0069 | D | | | | |
| D-2036 | | | | | | | 1,00 | 1,12 | 0,10 | 0,60 | 1,40 | 1,90 | 0,11 | 0,604 | 3,50 | 0,93 | 0,97 | 0,00 | 0,588 | 0,07 | 0,97 | 0,31 | 0,561 | 0,07 | 0,0015 |
| D-2037 | | 2,70 | 0,15 | 0,384 | 5,50 | 1,21 | | | | | | 1,49 | 0,00 | 0,570 | 0,07 | 1,28 | 0,51 | 0,545 | 0,07 | 0,0021 | C | | | | |
| D-2038 | | 4,00 | 0,21 | 0,249 | 8,50 | 1,65 | | | | | | 2,35 | 0,00 | 0,584 | 0,06 | 1,75 | 0,77 | 0,559 | 0,06 | 0,0029 | C | | | | |
| D-2039 | | 5,80 | 0,29 | 0,169 | 12,50 | 2,23 | | | | | | 3,57 | 3,19 | 0,604 | 0,06 | 2,38 | 1,09 | 0,578 | 0,06 | 0,0041 | C | | | | |
| D-2040 | | 8,40 | 0,41 | 0,114 | 18,50 | 3,09 | 5,31 | 6,95 | 0,606 | 0,06 | 3,32 | 1,61 | 0,580 | 0,06 | 0,0058 | C | | | | | | | | | |
| D-2041 | 0,80 | 0,92 | 0,07 | 0,50 | 1,20 | 1,50 | 0,08 | 1,179 | 3,50 | 0,91 | 0,59 | 0,00 | 0,696 | 0,10 | 0,95 | 0,20 | 0,648 | 0,11 | 0,0012 | C | | | | | |
| D-2042 | | | | | | 2,10 | 0,11 | 0,750 | 5,50 | 1,19 | 0,91 | 0,00 | 0,683 | 0,09 | 1,25 | 0,32 | 0,638 | 0,09 | 0,0017 | C | | | | | |
| D-2043 | | | | | | 3,10 | 0,15 | 0,485 | 8,50 | 1,61 | 1,49 | 0,00 | 0,723 | 0,09 | 1,70 | 0,47 | 0,680 | 0,09 | 0,0024 | C | | | | | |
| D-2044 | | | | | | 4,40 | 0,21 | 0,330 | 12,50 | 2,17 | 2,23 | 2,02 | 0,736 | 0,08 | 2,30 | 0,67 | 0,693 | 0,08 | 0,0033 | C | | | | | |
| D-2045 | | | | | | 6,30 | 0,30 | 0,223 | 18,50 | 3,01 | 3,29 | 5,02 | 0,734 | 0,08 | 3,20 | 1,00 | 0,691 | 0,07 | 0,0046 | C | | | | | |
| D-2046 | | | | | | 0,63 | 0,75 | 0,06 | 0,40 | 0,90 | 1,20 | 0,06 | 3,379 | 2,50 | 0,76 | 0,44 | 0,00 | 1,479 | 0,08 | 0,86 | 0,05 | 1,149 | 0,09 | 0,0008 | C |
| D-2047 | | | | | | | | | | | 1,70 | 0,08 | 1,536 | 5,50 | 1,17 | 0,53 | 0,00 | 0,809 | 0,05 | 1,22 | 0,20 | 0,737 | 0,04 | 0,0013 | C |
| D-2048 | 2,40 | 0,12 | 0,994 | 8,50 | 1,58 | | | | | | 0,82 | 0,00 | 0,811 | 0,05 | 1,66 | 0,30 | 0,736 | 0,04 | 0,0019 | C | | | | | |
| D-2049 | 3,40 | 0,15 | 0,676 | 12,50 | 2,13 | | | | | | 1,27 | 1,42 | 0,857 | 0,04 | 2,24 | 0,42 | 0,784 | 0,04 | 0,0026 | C | | | | | |
| D-2050 | 4,90 | 0,21 | 0,457 | 18,50 | 2,95 | | | | | | 1,95 | 3,88 | 0,889 | 0,04 | 3,11 | 0,60 | 0,817 | 0,04 | 0,0036 | C | | | | | |
| D-2051 | 0,16 | 2,00 | 2,16 | 0,15 | 1,50 | | | | | | 2,50 | 4,30 | 0,33 | 0,238 | 3,50 | 1,31 | 2,99 | 0,00 | 0,714 | 0,03 | 1,40 | 1,01 | 0,691 | 0,03 | 0,0055 |
| D-2052 | | | | | | 6,50 | 0,45 | 0,152 | 5,50 | 1,73 | | 4,77 | 0,00 | 0,723 | 0,08 | 1,88 | 1,56 | 0,701 | 0,07 | 0,0075 | C | | | | |
| D-2053 | | | | | | 9,80 | 0,64 | 0,098 | 8,50 | 2,37 | | 7,43 | 0,00 | 0,729 | 0,07 | 2,60 | 2,40 | 0,707 | 0,06 | 0,0105 | C | | | | |
| D-2054 | | | | | | 14,20 | 0,88 | 0,067 | 12,50 | 3,23 | | 10,97 | 10,52 | 0,732 | 0,07 | 3,56 | 3,49 | 0,710 | 0,06 | 0,0145 | C | | | | |
| D-2055 | | | | | | 20,90 | 1,25 | 0,045 | 18,50 | 4,51 | | 16,39 | 18,64 | 0,739 | 0,00 | 5,00 | 5,14 | 0,717 | 0,06 | 0,0205 | C | | | | |
| D-2056 | | 1,60 | 1,76 | 0,10 | 1,10 | 2,10 | 3,10 | 0,19 | 0,466 | 3,50 | 1,26 | 1,84 | 0,00 | 0,857 | 0,10 | 1,33 | 0,64 | 0,824 | 0,10 | 0,0044 | C | | | | |
| D-2057 | | | | | | | 4,70 | 0,26 | 0,296 | 5,50 | 1,66 | 3,04 | 0,00 | 0,901 | 0,09 | 1,77 | 0,96 | 0,868 | 0,09 | 0,0060 | C | | | | |
| D-2058 | | | | | | | 7,00 | 0,37 | 0,192 | 8,50 | 2,26 | 4,74 | 0,00 | 0,909 | 0,08 | 2,43 | 1,46 | 0,876 | 0,08 | 0,0084 | C | | | | |
| D-2059 | | | | | | | 10,00 | 0,51 | 0,130 | 12,50 | 3,06 | 6,94 | 6,39 | 0,905 | 0,08 | 3,31 | 2,17 | 0,872 | 0,07 | 0,0116 | C | | | | |
| D-2060 | | | | | | | 14,60 | 0,72 | 0,088 | 18,50 | 4,26 | 10,34 | 12,48 | 0,911 | 0,08 | 4,63 | 3,18 | 0,878 | 0,06 | 0,0164 | C | | | | |
| D-2061 | 1,20 | 1,36 | 0,08 | 0,80 | 1,60 | 2,20 | 0,11 | 1,104 | 3,50 | 1,22 | 0,98 | 0,00 | 1,078 | 0,14 | 1,27 | 0,35 | 1,027 | 0,14 | 0,0033 | C | | | | | |
| D-2062 | | | | | | 3,20 | 0,15 | 0,702 | 5,50 | 1,60 | 1,60 | 0,00 | 1,122 | 0,13 | 1,68 | 0,54 | 1,068 | 0,13 | 0,0045 | C | | | | | |
| D-2063 | | | | | | 4,70 | 0,22 | 0,455 | 8,50 | 2,17 | 2,53 | 0,00 | 1,150 | 0,12 | 2,30 | 0,81 | 1,091 | 0,12 | 0,0063 | C | | | | | |
| D-2064 | | | | | | 6,70 | 0,30 | 0,309 | 12,50 | 2,93 | 3,77 | 3,27 | 1,166 | 0,11 | 3,11 | 1,17 | 1,110 | 0,11 | 0,0087 | C | | | | | |
| D-2065 | | | | | | 9,70 | 0,43 | 0,209 | 18,50 | 4,07 | 5,63 | 7,85 | 1,177 | 0,11 | 4,34 | 1,72 | 1,119 | 0,11 | 0,0123 | C | | | | | |
| D-2066 | | | | | | 1,00 | 1,16 | 0,07 | 0,60 | 1,30 | 1,90 | 0,09 | 1,908 | 3,50 | 1,21 | 0,69 | 0,00 | 1,318 | 0,19 | 1,25 | 0,23 | 1,240 | 0,19 | 0,0027 | C |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|-------|-------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-2067 | 0,16 | 1,00 | 1,16 | 0,07 | 0,60 | 1,30 | 2,70 | 0,12 | 1,214 | 5,50 | 1,58 | 1,12 | 0,00 | 1,360 | 0,17 | 1,65 | 0,35 | 1,275 | 0,17 | 0,0037 | C | | | | | |
| D-2068 | | | | | | | 3,80 | 0,17 | 0,785 | 8,50 | 2,14 | 1,66 | 0,00 | 1,307 | 0,16 | 2,24 | 0,56 | 1,225 | 0,16 | 0,0052 | C | | | | | |
| D-2069 | | | | | | | 5,40 | 0,24 | 0,534 | 12,50 | 2,88 | 2,52 | 2,26 | 1,347 | 0,15 | 3,04 | 0,80 | 1,261 | 0,15 | 0,0072 | C | | | | | |
| D-2070 | | | | | | | 7,80 | 0,34 | 0,361 | 18,50 | 3,99 | 3,81 | 6,19 | 1,375 | 0,14 | 4,22 | 1,16 | 1,292 | 0,14 | 0,0102 | C | | | | | |
| D-2071 | | 0,80 | 0,96 | 0,07 | 0,40 | 1,20 | 1,60 | 0,07 | 3,726 | 3,50 | 1,20 | 0,40 | 0,00 | 1,501 | 0,30 | 1,24 | 0,15 | 1,341 | 0,30 | 0,0022 | C | | | | | |
| D-2072 | | | | | | | 2,20 | 0,10 | 2,371 | 5,50 | 1,56 | 0,64 | 0,00 | 1,515 | 0,26 | 1,62 | 0,23 | 1,375 | 0,26 | 0,0030 | C | | | | | |
| D-2073 | | | | | | | 3,10 | 0,14 | 1,534 | 8,50 | 2,11 | 0,99 | 0,00 | 1,523 | 0,24 | 2,20 | 0,36 | 1,381 | 0,24 | 0,0042 | C | | | | | |
| D-2074 | | | | | | | 4,40 | 0,20 | 1,043 | 12,50 | 2,84 | 1,57 | 2,03 | 1,633 | 0,23 | 2,97 | 0,49 | 1,492 | 0,23 | 0,0058 | C | | | | | |
| D-2075 | | | | | | | 6,20 | 0,28 | 0,705 | 18,50 | 3,93 | 2,27 | 4,90 | 1,602 | 0,22 | 4,13 | 0,74 | 1,459 | 0,22 | 0,0082 | C | | | | | |
| D-001 | 0,20 | 2,90 | 3,10 | 0,25 | 2,30 | 3,40 | 7,50 | 0,96 | 0,095 | 7,00 | 2,68 | 4,82 | 0,00 | 0,460 | 0,10 | 2,97 | 4,53 | 0,433 | 0,10 | 0,0204 | A | | | | | |
| D-002 | | | | | | | 2,50 | 2,70 | 0,15 | 2,00 | 3,10 | 5,40 | 0,38 | 0,298 | 3,50 | 1,63 | 3,77 | 0,00 | 1,122 | 0,13 | 1,75 | 1,25 | 1,088 | 0,13 | 0,0107 | A |
| D-003 | | | | | | | | | | | | 8,20 | 0,53 | 0,190 | 5,50 | 2,17 | 6,03 | 0,00 | 1,144 | 0,12 | 2,35 | 1,92 | 1,110 | 0,12 | 0,0146 | A |
| D-004 | | 12,70 | 0,75 | 0,123 | 8,50 | 2,97 | | | | | | 9,73 | 0,00 | 1,194 | 0,11 | 3,25 | 2,83 | 1,160 | 0,11 | 0,0205 | A | | | | | |
| D-005 | | 18,80 | 1,03 | 0,083 | 12,50 | 4,04 | | | | | | 14,76 | 14,53 | 1,232 | 0,10 | 4,45 | 4,04 | 1,198 | 0,10 | 0,0283 | A | | | | | |
| D-006 | | 25,30 | 1,46 | 0,056 | 18,50 | 5,64 | | | | | | 19,66 | 22,30 | 1,109 | 0,10 | 6,26 | 6,74 | 1,074 | 0,10 | 0,0400 | A | | | | | |
| D-006A | | 2,30 | 2,50 | 0,15 | 1,90 | 2,90 | | | | | | 5,00 | 0,34 | 0,335 | 4,00 | 1,74 | 3,26 | 0,00 | 1,092 | 0,13 | 1,86 | 1,32 | 1,052 | 0,12 | 0,0108 | C |
| D-006B | | | | | | | 8,00 | 0,48 | 0,206 | 6,50 | 2,39 | 5,61 | 0,00 | 1,157 | 0,12 | 2,58 | 2,07 | 1,117 | 0,12 | 0,0153 | C | | | | | |
| D-006C | | | | | | | 10,00 | 0,60 | 0,158 | 8,50 | 2,91 | 7,09 | 0,00 | 1,118 | 0,11 | 3,16 | 2,75 | 1,078 | 0,11 | 0,0188 | C | | | | | |
| D-006D | 15,00 | | | | | | 0,83 | 0,107 | 12,50 | 3,95 | 11,05 | 10,18 | 1,185 | 0,11 | 4,32 | 3,84 | 1,145 | 0,11 | 0,0260 | C | | | | | | |
| D-006E | 20,00 | | | | | | 1,06 | 0,081 | 16,50 | 4,98 | 15,02 | 16,77 | 1,219 | 0,10 | 5,48 | 4,93 | 1,179 | 0,10 | 0,0332 | C | | | | | | |
| D-007 | 2,00 | 2,20 | 0,15 | 1,50 | 2,60 | 3,80 | 0,22 | 0,582 | 3,50 | 1,58 | 2,23 | 0,00 | 1,295 | 0,15 | 1,66 | 0,83 | 1,246 | 0,15 | 0,0086 | A | | | | | | |
| D-007A | | | | | | 4,00 | 0,30 | 0,370 | 5,50 | 2,08 | 1,93 | 0,00 | 0,713 | 0,12 | 2,21 | 1,79 | 0,663 | 0,12 | 0,0117 | A | | | | | | |
| D-008 | | | | | | 5,50 | 0,30 | 0,370 | 5,50 | 2,08 | 3,43 | 0,00 | 1,269 | 0,13 | 2,21 | 1,33 | 1,219 | 0,12 | 0,0117 | A | | | | | | |
| D-008A | | | | | | 5,90 | 0,30 | 0,370 | 5,50 | 2,08 | 3,83 | 0,00 | 1,417 | 0,13 | 2,21 | 1,19 | 1,367 | 0,13 | 0,0117 | A | | | | | | |
| D-009 | | | | | | 8,40 | 0,43 | 0,240 | 8,50 | 2,83 | 5,58 | 0,00 | 1,336 | 0,12 | 3,04 | 1,95 | 1,285 | 0,12 | 0,0164 | A | | | | | | |
| D-009A | | | | | | 8,70 | 0,43 | 0,240 | 8,50 | 2,83 | 5,88 | 0,00 | 1,408 | 0,12 | 3,04 | 1,85 | 1,357 | 0,12 | 0,0164 | A | | | | | | |
| D-010 | | | | | | 11,90 | 0,59 | 0,163 | 12,50 | 3,83 | 8,08 | 6,95 | 1,316 | 0,12 | 4,14 | 2,91 | 1,265 | 0,12 | 0,0226 | A | | | | | | |
| D-010A | | | | | | 12,60 | 0,59 | 0,163 | 12,50 | 3,83 | 8,78 | 8,15 | 1,430 | 0,12 | 4,14 | 2,67 | 1,379 | 0,12 | 0,0226 | A | | | | | | |
| D-011 | | | | | | 17,80 | 0,84 | 0,110 | 18,50 | 5,33 | 12,48 | 15,07 | 1,374 | 0,11 | 5,79 | 4,14 | 1,323 | 0,11 | 0,0320 | A | | | | | | |
| D-011A | | | | | | 18,30 | 0,84 | 0,110 | 18,50 | 5,33 | 12,98 | 15,66 | 1,429 | 0,11 | 5,79 | 3,96 | 1,378 | 0,11 | 0,0320 | A | | | | | | |
| D-011B | | | | | | 1,80 | 2,00 | 0,15 | 1,30 | 2,40 | 2,80 | 0,18 | 0,799 | 3,50 | 1,56 | 1,24 | 0,00 | 0,994 | 0,16 | 1,63 | 0,85 | 0,934 | 0,15 | 0,0077 | C | |
| D-011C | | | | | | | | | | | 4,40 | 0,24 | 0,508 | 5,50 | 2,04 | 2,36 | 0,00 | 1,197 | 0,14 | 2,17 | 1,19 | 1,133 | 0,14 | 0,0105 | C | |
| D-011D | | | | | | | | | | | 6,80 | 0,34 | 0,329 | 8,50 | 2,78 | 4,02 | 0,00 | 1,323 | 0,13 | 2,96 | 1,71 | 1,263 | 0,13 | 0,0147 | C | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | | | | | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|---------------------------|-------------|-----------------------------|----------------------------|-------|-------|-------|--------|------|-------|-------|-------|------|------|------|-------|-------|--------|------|
| | | | | | | | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | | | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | | | | | | |
| VD-2067 | 0,16 | 1,00 | 1,16 | 0,07 | 0,60 | 1,30 | 2,70 | 0,14 | 1,043 | 5,50 | 1,58 | 1,12 | 0,00 | 1,168 | 0,17 | 1,65 | 0,38 | 1,095 | 0,17 | 0,0037 | E | | | | | | | | | | | | | | | |
| VD-2068 | | | | | | | 3,80 | 0,20 | 0,675 | 8,50 | 2,14 | 1,66 | 0,00 | 1,123 | 0,15 | 2,24 | 0,52 | 1,052 | 0,15 | 0,0052 | E | | | | | | | | | | | | | | | |
| VD-2069 | | | | | | | 5,40 | 0,28 | 0,459 | 12,50 | 2,88 | 2,52 | 1,92 | 1,157 | 0,15 | 3,04 | 0,88 | 1,083 | 0,15 | 0,0072 | E | | | | | | | | | | | | | | | |
| VD-2070 | | | | | | | 7,80 | 0,40 | 0,310 | 18,50 | 3,99 | 3,81 | 6,14 | 1,181 | 0,14 | 4,22 | 1,27 | 1,110 | 0,14 | 0,0102 | E | | | | | | | | | | | | | | | |
| VD-2071 | | 0,80 | 0,96 | 0,07 | 0,40 | 1,20 | 1,60 | 0,09 | 3,200 | 3,50 | 1,20 | 0,40 | 0,00 | 1,290 | 0,30 | 1,24 | 0,17 | 1,152 | 0,29 | 0,0022 | E | | | | | | | | | | | | | | | |
| VD-2072 | | | | | | | 2,20 | 0,12 | 2,036 | 5,50 | 1,56 | 0,64 | 0,00 | 1,301 | 0,26 | 1,62 | 0,26 | 1,181 | 0,26 | 0,0030 | E | | | | | | | | | | | | | | | |
| VD-2073 | | | | | | | 3,10 | 0,17 | 1,318 | 8,50 | 2,11 | 0,99 | 0,00 | 1,308 | 0,24 | 2,20 | 0,40 | 1,186 | 0,24 | 0,0042 | E | | | | | | | | | | | | | | | |
| VD-2074 | | | | | | | 4,40 | 0,23 | 0,896 | 12,50 | 2,84 | 1,57 | 1,83 | 1,402 | 0,23 | 2,97 | 0,54 | 1,281 | 0,23 | 0,0058 | E | | | | | | | | | | | | | | | |
| VD-2075 | | | | | | | 6,20 | 0,32 | 0,605 | 18,50 | 3,93 | 2,27 | 4,86 | 1,376 | 0,22 | 4,13 | 0,82 | 1,253 | 0,22 | 0,0082 | E | | | | | | | | | | | | | | | |
| VD-001 | 0,20 | 2,90 | 3,10 | 0,25 | 2,30 | 3,40 | 7,50 | 1,12 | 0,082 | 7,00 | 2,68 | 4,82 | 0,00 | 0,395 | 0,10 | 2,97 | 4,53 | 0,371 | 0,10 | 0,0204 | D | | | | | | | | | | | | | | | |
| VD-002 | | | | | | | 2,50 | 2,70 | 0,15 | 2,00 | 3,10 | 5,40 | 0,45 | 0,256 | 3,50 | 1,63 | 3,77 | 0,00 | 0,964 | 0,13 | 1,75 | 1,38 | 0,934 | 0,13 | 0,0107 | D | | | | | | | | | | |
| VD-003 | | | | | | | | | | | | 8,20 | 0,62 | 0,163 | 5,50 | 2,17 | 6,03 | 0,00 | 0,983 | 0,12 | 2,35 | 2,11 | 0,953 | 0,12 | 0,0146 | D | | | | | | | | | | |
| VD-004 | | | | | | | 18,80 | 1,20 | 0,072 | 12,50 | 4,04 | 14,76 | 14,43 | 1,058 | 0,10 | 4,45 | 4,25 | 1,029 | 0,10 | 0,0283 | D | | | | | | | | | | | | | | | |
| VD-005 | | | | | | | | | | | | | | | | | | | | | | 25,30 | 1,70 | 0,048 | 18,50 | 5,64 | 19,66 | 22,87 | 0,952 | 0,10 | 6,26 | 7,51 | 0,922 | 0,10 | 0,0400 | D |
| VD-006 | | | | | | | | | | | | | | | | | | | | | | 2,30 | 2,50 | 0,15 | 2,00 | 2,90 | 5,00 | 0,39 | 0,288 | 4,00 | 1,74 | 3,26 | 0,00 | 0,938 | 0,13 | 1,86 |
| VD-006A | | 8,00 | 0,56 | 0,177 | 6,50 | 2,39 | 5,61 | 0,00 | 0,993 | 0,11 | 2,58 | 2,28 | 0,959 | 0,11 | 0,0153 | D | | | | | | | | | | | | | | | | | | | | |
| VD-006B | | 10,00 | 0,70 | 0,135 | 8,50 | 2,91 | 7,09 | 0,00 | 0,960 | 0,11 | 3,16 | 3,12 | 0,926 | 0,11 | 0,0188 | D | | | | | | | | | | | | | | | | | | | | |
| VD-006C | | 15,00 | 0,97 | 0,092 | 12,50 | 3,95 | 11,05 | 10,00 | 1,018 | 0,10 | 4,32 | 4,27 | 0,983 | 0,10 | 0,0260 | D | | | | | | | | | | | | | | | | | | | | |
| VD-006D | | 20,00 | 1,23 | 0,070 | 16,50 | 4,98 | 15,02 | 16,69 | 1,047 | 0,10 | 5,48 | 5,39 | 1,013 | 0,10 | 0,0332 | D | | | | | | | | | | | | | | | | | | | | |
| VD-006E | | 2,00 | 2,20 | 0,15 | 1,50 | 2,60 | 3,80 | 0,26 | 0,500 | 3,50 | 1,58 | 2,23 | 0,00 | 1,113 | 0,15 | 1,66 | 0,93 | 1,070 | 0,15 | 0,0086 | D | | | | | | | | | | | | | | | |
| VD-007 | | | | | | | 4,00 | 0,35 | 0,318 | 5,50 | 2,08 | 1,93 | 0,00 | 0,613 | 0,12 | 2,21 | 1,79 | 0,570 | 0,12 | 0,0117 | D | | | | | | | | | | | | | | | |
| VD-007A | | | | | | | 5,50 | 0,35 | 0,318 | 5,50 | 2,08 | 3,43 | 0,00 | 1,090 | 0,13 | 2,21 | 1,50 | 1,047 | 0,13 | 0,0117 | D | | | | | | | | | | | | | | | |
| VD-008 | | | | | | | 5,90 | 0,35 | 0,318 | 5,50 | 2,08 | 3,83 | 0,00 | 1,217 | 0,13 | 2,21 | 1,30 | 1,174 | 0,13 | 0,0117 | D | | | | | | | | | | | | | | | |
| VD-008A | | | | | | | 8,40 | 0,50 | 0,206 | 8,50 | 2,83 | 5,58 | 0,00 | 1,148 | 0,12 | 3,04 | 2,17 | 1,104 | 0,12 | 0,0164 | D | | | | | | | | | | | | | | | |
| VD-009 | | | | | | | 8,70 | 0,50 | 0,206 | 8,50 | 2,83 | 5,88 | 0,00 | 1,210 | 0,12 | 3,04 | 2,03 | 1,165 | 0,12 | 0,0164 | D | | | | | | | | | | | | | | | |
| VD-009A | | | | | | | 11,90 | 0,69 | 0,140 | 12,50 | 3,83 | 8,08 | 6,72 | 1,131 | 0,11 | 4,14 | 3,26 | 1,086 | 0,11 | 0,0226 | D | | | | | | | | | | | | | | | |
| VD-010 | | | | | | | 12,60 | 0,69 | 0,140 | 12,50 | 3,83 | 8,78 | 7,98 | 1,229 | 0,12 | 4,14 | 2,94 | 1,184 | 0,11 | 0,0226 | D | | | | | | | | | | | | | | | |
| VD-010A | | | | | | | 17,80 | 0,98 | 0,095 | 18,50 | 5,33 | 12,48 | 15,00 | 1,180 | 0,11 | 5,79 | 4,54 | 1,136 | 0,11 | 0,0320 | D | | | | | | | | | | | | | | | |
| VD-011 | 18,30 | | | | | | 0,98 | 0,095 | 18,50 | 5,33 | 12,98 | 15,60 | 1,227 | 0,11 | 5,79 | 4,29 | 1,183 | 0,11 | 0,0320 | D | | | | | | | | | | | | | | | | |
| VD-011A | 1,80 | 2,00 | 0,15 | 1,30 | 2,40 | 2,80 | 0,21 | 0,686 | 3,50 | 1,56 | 1,24 | 0,00 | 0,854 | 0,16 | 1,63 | 1,01 | 0,802 | 0,15 | 0,0077 | D | | | | | | | | | | | | | | | | |
| VD-011B | | | | | | 4,40 | 0,29 | 0,436 | 5,50 | 2,04 | 2,36 | 0,00 | 1,028 | 0,14 | 2,17 | 1,39 | 0,973 | 0,14 | 0,0105 | D | | | | | | | | | | | | | | | | |
| VD-011C | | | | | | 6,80 | 0,44 | 0,282 | 8,50 | 2,78 | 4,02 | 0,00 | 1,136 | 0,13 | 2,96 | 1,96 | 1,084 | 0,13 | 0,0147 | D | | | | | | | | | | | | | | | | |
| VD-011D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|-------|-------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-011E | 0,20 | 1,80 | 2,00 | 0,15 | 1,30 | 2,40 | 10,00 | 0,56 | 0,192 | 12,50 | 3,75 | 6,25 | 4,43 | 1,200 | 0,13 | 4,03 | 2,72 | 1,147 | 0,12 | 0,0204 | D | | | | | |
| VD-011F | | | | | | | 14,80 | 0,79 | 0,130 | 18,50 | 5,22 | 9,58 | 12,01 | 1,243 | 0,12 | 5,63 | 3,85 | 1,190 | 0,12 | 0,0288 | D | | | | | |
| VD-011G | | | | | | | 1,60 | 1,80 | 0,08 | 1,10 | 2,10 | 3,10 | 0,17 | 0,977 | 3,50 | 1,54 | 1,56 | 0,00 | 1,526 | 0,19 | 1,61 | 0,49 | 1,455 | 0,19 | 0,0069 | D |
| VD-011H | | | | | | | | | | | | 4,40 | 0,23 | 0,621 | 5,50 | 2,02 | 2,38 | 0,00 | 1,482 | 0,17 | 2,12 | 0,81 | 1,417 | 0,17 | 0,0094 | D |
| VD-011J | | | | | | | | | | | | 6,40 | 0,33 | 0,402 | 8,50 | 2,73 | 3,67 | 0,00 | 1,474 | 0,15 | 2,90 | 1,26 | 1,407 | 0,15 | 0,0131 | D |
| VD-011K | | | | | | | | | | | | 9,20 | 0,45 | 0,273 | 12,50 | 3,69 | 5,51 | 4,71 | 1,507 | 0,15 | 3,94 | 1,80 | 1,438 | 0,15 | 0,0181 | D |
| VD-011L | | 13,30 | 0,64 | 0,185 | 18,50 | 5,13 | 8,17 | 10,86 | 1,510 | 0,14 | 5,49 | 2,64 | 1,443 | 0,14 | 0,0256 | D | | | | | | | | | | |
| VD-011M | | 1,20 | 1,40 | 0,08 | 0,80 | 1,70 | 2,30 | 0,12 | 2,315 | 3,50 | 1,51 | 0,79 | 0,00 | 1,834 | 0,30 | 1,56 | 0,29 | 1,713 | 0,30 | 0,0051 | D | | | | | |
| VD-011N | | | | | | | 3,20 | 0,15 | 1,473 | 5,50 | 1,97 | 1,23 | 0,00 | 1,813 | 0,27 | 2,05 | 0,46 | 1,694 | 0,27 | 0,0070 | D | | | | | |
| VD-011O | | | | | | | 4,60 | 0,23 | 0,953 | 8,50 | 2,66 | 1,94 | 0,00 | 1,847 | 0,25 | 2,79 | 0,70 | 1,725 | 0,24 | 0,0098 | D | | | | | |
| VD-011P | | | | | | | 6,50 | 0,32 | 0,648 | 12,50 | 3,59 | 2,92 | 2,39 | 1,889 | 0,23 | 3,78 | 1,00 | 1,763 | 0,23 | 0,0136 | D | | | | | |
| VD-011Q | | | | | | | 9,30 | 0,45 | 0,438 | 18,50 | 4,97 | 4,33 | 7,29 | 1,896 | 0,23 | 5,25 | 1,46 | 1,774 | 0,22 | 0,0192 | D | | | | | |
| VD-011R | | | | | | | 1,00 | 1,20 | 0,07 | 0,60 | 1,40 | 2,00 | 0,10 | 4,000 | 3,50 | 1,50 | 0,50 | 0,00 | 2,015 | 0,43 | 1,54 | 0,21 | 1,840 | 0,43 | 0,0043 | D |
| VD-011S | | 2,70 | 0,14 | 2,545 | 5,50 | 1,95 | | | | | | 0,75 | 0,00 | 1,906 | 0,38 | 2,03 | 0,35 | 1,705 | 0,38 | 0,0059 | D | | | | | |
| VD-011T | | 3,90 | 0,19 | 1,647 | 8,50 | 2,63 | | | | | | 1,27 | 0,00 | 2,086 | 0,35 | 2,75 | 0,49 | 1,894 | 0,35 | 0,0082 | D | | | | | |
| VD-011U | | 5,50 | 0,27 | 1,120 | 12,50 | 3,54 | | | | | | 1,96 | 2,28 | 2,191 | 0,33 | 3,72 | 0,68 | 1,994 | 0,33 | 0,0113 | D | | | | | |
| VD-011V | 7,80 | 0,38 | 0,757 | 18,50 | 4,91 | 2,89 | | | | | | 6,14 | 2,188 | 0,32 | 5,16 | 1,00 | 1,998 | 0,32 | 0,0160 | D | | | | | | |
| VD-011W | 0,25 | 4,40 | 4,65 | 0,30 | 3,70 | 5,10 | | | | | | 4,40 | 1,32 | 0,115 | 3,50 | 2,24 | 2,16 | 0,00 | 0,247 | 0,16 | 2,49 | 1,91 | 0,219 | 0,16 | 0,0295 | D |
| VD-011X | | | | | | | 8,00 | 1,83 | 0,073 | 5,50 | 3,03 | 4,97 | 0,00 | 0,363 | 0,14 | 3,41 | 4,59 | 0,335 | 0,14 | 0,0402 | D | | | | | |
| VD-011Y | | | | | | | 15,00 | 2,21 | 0,047 | 8,50 | 4,20 | 10,80 | 0,00 | 0,510 | 0,13 | 4,80 | 10,20 | 0,481 | 0,13 | 0,0563 | A | | | | | |
| VD-011Z | | | | | | | 22,10 | 3,56 | 0,032 | 12,50 | 5,76 | 16,34 | 0,00 | 0,524 | 0,12 | 6,65 | 15,45 | 0,496 | 0,12 | 0,0778 | D | | | | | |
| VD-011Z-01 | | | | | | | 29,20 | 5,04 | 0,022 | 18,50 | 8,11 | 21,09 | 19,91 | 0,457 | 0,12 | 9,42 | 19,78 | 0,429 | 0,12 | 0,1100 | D | | | | | |
| VD-012 | | | | | | | 3,20 | 3,45 | 0,20 | 2,50 | 4,00 | 6,90 | 0,56 | 0,298 | 3,50 | 2,05 | 4,85 | 0,00 | 1,445 | 0,19 | 2,20 | 1,86 | 1,401 | 0,19 | 0,0215 | D |
| VD-012A | | | | | | | | | | | | 7,10 | 0,56 | 0,298 | 3,50 | 2,05 | 5,05 | 0,00 | 1,504 | 0,19 | 2,20 | 1,76 | 1,460 | 0,19 | 0,0215 | D |
| VD-013 | | | | | | | | | | | | 10,60 | 0,77 | 0,190 | 5,50 | 2,73 | 7,87 | 0,00 | 1,493 | 0,17 | 2,96 | 2,76 | 1,449 | 0,17 | 0,0293 | D |
| VD-013A | | | | | | | | | | | | 10,70 | 0,77 | 0,190 | 5,50 | 2,73 | 7,97 | 0,00 | 1,512 | 0,17 | 2,96 | 2,74 | 1,468 | 0,17 | 0,0293 | D |
| VD-013B | | | | | | | | | | | | 16,10 | 1,08 | 0,123 | 8,50 | 3,73 | 12,37 | 0,00 | 1,517 | 0,16 | 4,10 | 4,22 | 1,473 | 0,16 | 0,0410 | D |
| VD-014 | 16,20 | 1,08 | 0,123 | 8,50 | 3,73 | 12,47 | | | | | | 0,00 | 1,530 | 0,16 | 4,10 | 4,14 | 1,485 | 0,16 | 0,0410 | D | | | | | | |
| VD-015 | 22,70 | 1,50 | 0,083 | 12,50 | 5,08 | 17,62 | | | | | | 16,62 | 1,470 | 0,15 | 5,62 | 6,55 | 1,425 | 0,15 | 0,0566 | D | | | | | | |
| VD-015A | 23,30 | 1,50 | 0,083 | 12,50 | 5,08 | 18,22 | | | | | | 17,45 | 1,520 | 0,15 | 5,62 | 6,25 | 1,475 | 0,15 | 0,0566 | D | | | | | | |
| VD-016 | 32,40 | 2,12 | 0,056 | 18,50 | 7,10 | 25,30 | | | | | | 28,57 | 1,427 | 0,14 | 7,90 | 10,09 | 1,381 | 0,14 | 0,0800 | D | | | | | | |
| VD-016A | 34,10 | 2,12 | 0,056 | 18,50 | 7,10 | 27,00 | | | | | | 30,49 | 1,522 | 0,14 | 7,90 | 9,26 | 1,477 | 0,14 | 0,0800 | D | | | | | | |
| VD-016B | 2,95 | 3,20 | 0,20 | 2,30 | 3,50 | 8,00 | | | | | | 0,62 | 0,242 | 5,50 | 2,67 | 5,33 | 0,00 | 1,289 | 0,17 | 2,89 | 3,02 | 1,237 | 0,17 | 0,0270 | D | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|--------|--------|--------|------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | | |
| D-011E | 0,20 | 1,80 | 2,00 | 0,15 | 1,30 | 2,40 | 10,00 | 0,48 | 0,224 | 12,50 | 3,75 | 6,25 | 4,79 | 1,397 | 0,13 | 4,03 | 2,40 | 1,335 | 0,13 | 0,0204 | C | | | | | | | | | |
| D-011F | | | | | | | 14,80 | 0,68 | 0,151 | 18,50 | 5,22 | 9,58 | 12,09 | 1,447 | 0,12 | 5,63 | 3,44 | 1,385 | 0,12 | 5,63 | 3,44 | 1,385 | 0,12 | 0,0288 | C | | | | | |
| D-011G | | | | | | | 1,60 | 1,80 | 0,08 | 1,10 | 2,10 | 3,10 | 0,14 | 1,137 | 3,50 | 1,54 | 1,56 | 0,00 | 1,777 | 0,19 | 1,61 | 0,46 | 1,694 | 0,19 | 0,0069 | C | | | | |
| D-011H | | | | | | | | | | | | 4,40 | 0,20 | 0,724 | 5,50 | 2,02 | 2,38 | 0,00 | 1,725 | 0,17 | 2,12 | 0,74 | 1,650 | 0,17 | 2,12 | 0,74 | 1,650 | 0,17 | 0,0094 | C |
| D-011J | | | | | | | | | | | | 6,40 | 0,28 | 0,468 | 8,50 | 2,73 | 3,67 | 0,00 | 1,717 | 0,16 | 2,90 | 1,15 | 1,639 | 0,16 | 2,90 | 1,15 | 1,639 | 0,16 | 0,0131 | C |
| D-011K | | | | | | | | | | | | 9,20 | 0,39 | 0,318 | 12,50 | 3,69 | 5,51 | 4,94 | 1,754 | 0,15 | 3,94 | 1,65 | 1,675 | 0,15 | 3,94 | 1,65 | 1,675 | 0,15 | 0,0181 | C |
| D-011L | | | | | | | | | | | | 13,30 | 0,55 | 0,215 | 18,50 | 5,13 | 8,17 | 10,92 | 1,758 | 0,15 | 5,49 | 2,43 | 1,680 | 0,15 | 5,49 | 2,43 | 1,680 | 0,15 | 0,0256 | C |
| D-011M | | 1,20 | 1,40 | 0,08 | 0,80 | 1,70 | | | | | | 2,30 | 0,10 | 2,695 | 3,50 | 1,51 | 0,79 | 0,00 | 2,135 | 0,31 | 1,56 | 0,26 | 1,994 | 0,31 | 0,0051 | C | | | | |
| D-011N | | | | | | | 3,20 | 0,14 | 1,715 | 5,50 | 1,97 | 1,23 | 0,00 | 2,111 | 0,27 | 2,05 | 0,42 | 1,972 | 0,27 | 2,05 | 0,42 | 1,972 | 0,27 | 0,0070 | C | | | | | |
| D-011O | | | | | | | 4,60 | 0,20 | 1,110 | 8,50 | 2,66 | 1,94 | 0,00 | 2,151 | 0,25 | 2,79 | 0,63 | 2,009 | 0,25 | 2,79 | 0,63 | 2,009 | 0,25 | 0,0098 | C | | | | | |
| D-011P | | | | | | | 6,50 | 0,27 | 0,755 | 12,50 | 3,59 | 2,92 | 2,77 | 2,200 | 0,24 | 3,78 | 0,91 | 2,053 | 0,24 | 3,78 | 0,91 | 2,053 | 0,24 | 0,0136 | C | | | | | |
| D-011Q | | | | | | | 9,30 | 0,38 | 0,510 | 18,50 | 4,97 | 4,33 | 7,35 | 2,208 | 0,23 | 5,25 | 1,33 | 2,065 | 0,23 | 5,25 | 1,33 | 2,065 | 0,23 | 0,0192 | C | | | | | |
| D-011R | | | | | | | 1,00 | 1,20 | 0,07 | 0,60 | 1,40 | 2,00 | 0,09 | 4,657 | 3,50 | 1,50 | 0,50 | 0,00 | 2,346 | 0,44 | 1,54 | 0,18 | 2,142 | 0,44 | 0,0043 | C | | | | |
| D-011S | | 2,70 | 0,12 | 2,964 | 5,50 | 1,95 | | | | | | 0,75 | 0,00 | 2,219 | 0,40 | 2,03 | 0,31 | 1,986 | 0,38 | 2,03 | 0,31 | 1,986 | 0,38 | 0,0059 | C | | | | | |
| D-011T | 3,90 | 0,17 | 1,918 | 8,50 | 2,63 | 1,27 | | | | | | 0,00 | 2,428 | 0,36 | 2,75 | 0,44 | 2,205 | 0,35 | 2,75 | 0,44 | 2,205 | 0,35 | 0,0082 | C | | | | | | |
| D-011U | 5,50 | 0,23 | 1,304 | 12,50 | 3,54 | 1,96 | | | | | | 2,53 | 2,551 | 0,34 | 3,72 | 0,61 | 2,321 | 0,34 | 3,72 | 0,61 | 2,321 | 0,34 | 0,0113 | C | | | | | | |
| D-011V | 7,80 | 0,33 | 0,881 | 18,50 | 4,91 | 2,89 | | | | | | 6,19 | 2,547 | 0,33 | 5,16 | 0,90 | 2,326 | 0,32 | 5,16 | 0,90 | 2,326 | 0,32 | 0,0160 | C | | | | | | |
| D-011W | 0,25 | 4,40 | 4,65 | 0,30 | 3,70 | 5,10 | | | | | | 4,40 | 1,14 | 0,133 | 3,50 | 2,24 | 2,16 | 0,00 | 0,288 | 0,16 | 2,49 | 1,91 | 0,255 | 0,16 | 0,0295 | A | | | | |
| D-011X | | | | | | | 8,00 | 1,57 | 0,085 | 5,50 | 3,03 | 4,97 | 0,00 | 0,422 | 0,14 | 3,41 | 4,59 | 0,390 | 0,14 | 3,41 | 4,59 | 0,390 | 0,14 | 0,0402 | A | | | | | |
| D-011Y | | | | | | | 15,00 | 2,21 | 0,055 | 8,50 | 4,20 | 10,80 | 0,00 | 0,594 | 0,13 | 4,80 | 10,20 | 0,561 | 0,13 | 4,80 | 10,20 | 0,561 | 0,13 | 0,0563 | A | | | | | |
| D-011Z | | | | | | | 22,10 | 3,06 | 0,037 | 12,50 | 5,76 | 16,34 | 0,00 | 0,611 | 0,12 | 6,65 | 15,45 | 0,577 | 0,12 | 6,65 | 15,45 | 0,577 | 0,12 | 0,0778 | A | | | | | |
| D-011Z-01 | | | | | | | 29,20 | 4,33 | 0,025 | 18,50 | 8,11 | 21,09 | 20,23 | 0,533 | 0,12 | 9,42 | 19,78 | 0,499 | 0,12 | 9,42 | 19,78 | 0,499 | 0,12 | 0,1100 | A | | | | | |
| D-012 | | | | | | | 3,20 | 3,45 | 0,20 | 2,50 | 4,00 | 6,90 | 0,48 | 0,347 | 3,50 | 2,05 | 4,85 | 0,00 | 1,682 | 0,19 | 2,20 | 1,68 | 1,631 | 0,19 | 0,0215 | A | | | | |
| D-012A | | | | | | | | | | | | 7,10 | 0,48 | 0,347 | 3,50 | 2,05 | 5,05 | 0,00 | 1,751 | 0,19 | 2,20 | 1,61 | 1,700 | 0,19 | 2,20 | 1,61 | 1,700 | 0,19 | 0,0215 | A |
| D-013 | | 10,60 | 0,66 | 0,221 | 5,50 | 2,73 | | | | | | 7,87 | 0,00 | 1,739 | 0,17 | 2,96 | 2,54 | 1,687 | 0,17 | 2,96 | 2,54 | 1,687 | 0,17 | 0,0293 | A | | | | | |
| D-013A | | 10,70 | 0,66 | 0,221 | 5,50 | 2,73 | | | | | | 7,97 | 0,00 | 1,761 | 0,17 | 2,96 | 2,51 | 1,709 | 0,17 | 2,96 | 2,51 | 1,709 | 0,17 | 0,0293 | A | | | | | |
| D-013B | | 16,10 | 0,93 | 0,143 | 8,50 | 3,73 | | | | | | 12,37 | 0,00 | 1,767 | 0,16 | 4,10 | 3,86 | 1,715 | 0,16 | 4,10 | 3,86 | 1,715 | 0,16 | 0,0410 | A | | | | | |
| D-014 | | 16,20 | 0,93 | 0,143 | 8,50 | 3,73 | | | | | | 12,47 | 0,00 | 1,781 | 0,16 | 4,10 | 3,83 | 1,729 | 0,16 | 4,10 | 3,83 | 1,729 | 0,16 | 0,0410 | A | | | | | |
| D-015 | | 22,70 | 1,29 | 0,097 | 12,50 | 5,08 | | | | | | 17,62 | 16,85 | 1,712 | 0,15 | 5,62 | 5,89 | 1,659 | 0,15 | 5,62 | 5,89 | 1,659 | 0,15 | 0,0566 | A | | | | | |
| D-015A | | 23,30 | 1,29 | 0,097 | 12,50 | 5,08 | | | | | | 18,22 | 17,66 | 1,770 | 0,15 | 5,62 | 5,69 | 1,718 | 0,15 | 5,62 | 5,69 | 1,718 | 0,15 | 0,0566 | A | | | | | |
| D-016 | | 32,40 | 1,82 | 0,066 | 18,50 | 7,10 | | | | | | 25,30 | 28,66 | 1,661 | 0,14 | 7,90 | 8,93 | 1,608 | 0,14 | 7,90 | 8,93 | 1,608 | 0,14 | 0,0800 | A | | | | | |
| D-016A | 34,10 | 1,82 | 0,066 | 18,50 | 7,10 | 27,00 | | | | | | 30,57 | 1,772 | 0,15 | 7,90 | 8,34 | 1,720 | 0,15 | 7,90 | 8,34 | 1,720 | 0,15 | 0,0800 | A | | | | | | |
| D-016B | 8,00 | 0,53 | 0,282 | 5,50 | 2,67 | 5,33 | | | | | | 0,00 | 1,501 | 0,17 | 2,89 | 2,60 | 1,440 | 0,17 | 2,89 | 2,60 | 1,440 | 0,17 | 0,0270 | C | | | | | | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-016C | 0,25 | 2,95 | 3,20 | 0,20 | 2,30 | 3,50 | 12,00 | 0,71 | 0,194 | 8,00 | 3,49 | 8,51 | 0,00 | 1,648 | 0,16 | 3,80 | 3,62 | 1,589 | 0,16 | 0,0360 | C | | | | |
| D-016D | | | | | | | 15,00 | 0,86 | 0,155 | 10,00 | 4,15 | 10,85 | 0,00 | 1,682 | 0,16 | 4,53 | 4,33 | 1,623 | 0,16 | 0,0432 | C | | | | |
| D-016E | | | | | | | 18,00 | 1,00 | 0,129 | 12,00 | 4,80 | 13,20 | 11,05 | 1,705 | 0,16 | 5,26 | 5,14 | 1,646 | 0,15 | 0,0503 | C | | | | |
| D-016F | | | | | | | 20,00 | 1,11 | 0,115 | 13,50 | 5,29 | 14,71 | 14,18 | 1,689 | 0,15 | 5,81 | 5,99 | 1,629 | 0,15 | 0,0557 | C | | | | |
| D-017 | 2,50 | 2,75 | 0,15 | 1,90 | 3,10 | 4,80 | 0,26 | 0,728 | 3,50 | 1,97 | 2,83 | 0,00 | 2,060 | 0,22 | 2,08 | 1,02 | 1,979 | 0,22 | 0,0168 | A | | | | | |
| D-017A | | | | | | 4,90 | 0,26 | 0,728 | 3,50 | 1,97 | 2,93 | 0,00 | 2,133 | 0,22 | 2,08 | 0,98 | 2,052 | 0,22 | 0,0168 | A | | | | | |
| D-018 | | | | | | 7,30 | 0,36 | 0,463 | 5,50 | 2,59 | 4,71 | 0,00 | 2,179 | 0,20 | 2,77 | 1,51 | 2,098 | 0,20 | 0,0229 | A | | | | | |
| D-019 | | | | | | 10,90 | 0,50 | 0,300 | 8,50 | 3,53 | 7,37 | 0,00 | 2,208 | 0,18 | 3,80 | 2,30 | 2,127 | 0,18 | 0,0320 | A | | | | | |
| D-020 | | | | | | 15,40 | 0,69 | 0,204 | 12,50 | 4,78 | 10,62 | 9,61 | 2,164 | 0,17 | 5,17 | 3,45 | 2,084 | 0,17 | 0,0442 | A | | | | | |
| D-020A | | | | | | 15,70 | 0,69 | 0,204 | 12,50 | 4,78 | 10,92 | 10,11 | 2,225 | 0,18 | 5,17 | 3,35 | 2,145 | 0,17 | 0,0442 | A | | | | | |
| D-021 | | | | | | 22,80 | 0,98 | 0,138 | 18,50 | 6,66 | 16,14 | 19,49 | 2,222 | 0,17 | 7,23 | 4,96 | 2,144 | 0,17 | 0,0625 | A | | | | | |
| D-021A | | | | | | 22,90 | 0,98 | 0,138 | 18,50 | 6,66 | 16,24 | 19,61 | 2,236 | 0,17 | 7,23 | 4,92 | 2,157 | 0,17 | 0,0625 | A | | | | | |
| D-021B | | | | | | 2,25 | 2,50 | 0,15 | 1,60 | 2,90 | 5,00 | 0,27 | 0,699 | 5,00 | 2,40 | 2,60 | 0,00 | 1,815 | 0,22 | 2,54 | 1,38 | 1,719 | 0,21 | 0,0192 | A |
| D-021C | | | | | | | | | | | 8,00 | 0,38 | 0,437 | 8,00 | 3,32 | 4,68 | 0,00 | 2,045 | 0,20 | 3,54 | 2,03 | 1,948 | 0,20 | 0,0274 | A |
| D-021D | | | | | | | | | | | 10,00 | 0,46 | 0,349 | 10,00 | 3,93 | 6,07 | 0,00 | 2,121 | 0,19 | 4,21 | 2,47 | 2,023 | 0,19 | 0,0329 | A |
| D-021E | 12,50 | 0,56 | 0,279 | 12,50 | 4,69 | | | | | | 7,81 | 5,98 | 2,182 | 0,19 | 5,04 | 3,01 | 2,085 | 0,19 | 0,0398 | A | | | | | |
| D-021F | 16,00 | 0,69 | 0,218 | 16,00 | 5,76 | | | | | | 10,24 | 11,87 | 2,236 | 0,19 | 6,20 | 3,77 | 2,140 | 0,18 | 0,0494 | A | | | | | |
| D-022 | 2,00 | 2,25 | 0,10 | 1,50 | 2,60 | 3,60 | 0,17 | 1,421 | 3,50 | 1,92 | 1,68 | 0,00 | 2,386 | 0,28 | 2,01 | 0,66 | 2,260 | 0,28 | 0,0134 | A | | | | | |
| D-022A | | | | | | 3,70 | 0,17 | 1,421 | 3,50 | 1,92 | 1,78 | 0,00 | 2,528 | 0,28 | 2,01 | 0,63 | 2,402 | 0,28 | 0,0134 | A | | | | | |
| D-023 | | | | | | 5,30 | 0,23 | 0,904 | 5,50 | 2,52 | 2,78 | 0,00 | 2,515 | 0,25 | 2,65 | 0,99 | 2,397 | 0,25 | 0,0183 | A | | | | | |
| D-023A | | | | | | 5,50 | 0,23 | 0,904 | 5,50 | 2,52 | 2,98 | 0,00 | 2,696 | 0,25 | 2,65 | 0,92 | 2,578 | 0,25 | 0,0183 | A | | | | | |
| D-024 | | | | | | 7,80 | 0,33 | 0,585 | 8,50 | 3,42 | 4,38 | 0,00 | 2,565 | 0,23 | 3,62 | 1,50 | 2,446 | 0,23 | 0,0256 | A | | | | | |
| D-024A | | | | | | 8,00 | 0,33 | 0,585 | 8,50 | 3,42 | 4,58 | 0,00 | 2,682 | 0,23 | 3,62 | 1,43 | 2,563 | 0,23 | 0,0256 | A | | | | | |
| D-025 | | | | | | 11,10 | 0,45 | 0,398 | 12,50 | 4,61 | 6,49 | 5,29 | 2,582 | 0,22 | 4,92 | 2,20 | 2,459 | 0,22 | 0,0354 | A | | | | | |
| D-025A | | | | | | 11,40 | 0,45 | 0,398 | 12,50 | 4,61 | 6,79 | 5,97 | 2,701 | 0,22 | 4,92 | 2,09 | 2,579 | 0,22 | 0,0354 | A | | | | | |
| D-026 | | | | | | 16,20 | 0,64 | 0,269 | 18,50 | 6,41 | 9,79 | 13,13 | 2,633 | 0,21 | 6,86 | 3,18 | 2,511 | 0,21 | 0,0500 | A | | | | | |
| D-026A | | | | | | 16,60 | 0,64 | 0,269 | 18,50 | 6,41 | 10,19 | 13,62 | 2,741 | 0,21 | 6,86 | 3,05 | 2,619 | 0,21 | 0,0500 | A | | | | | |
| D-026B | | | | | | 1,75 | 2,00 | 0,10 | 1,20 | 2,40 | 3,20 | 0,14 | 2,122 | 3,50 | 1,90 | 1,30 | 0,00 | 2,754 | 0,34 | 1,98 | 0,49 | 2,588 | 0,34 | 0,0117 | A |
| D-026C | 4,90 | 0,19 | 1,350 | 5,50 | 2,49 | | | | | | 2,41 | 0,00 | 3,256 | 0,31 | 2,61 | 0,64 | 3,092 | 0,31 | 0,0160 | A | | | | | |
| D-026D | 7,20 | 0,27 | 0,874 | 8,50 | 3,37 | | | | | | 3,83 | 0,00 | 3,347 | 0,29 | 3,55 | 0,94 | 3,189 | 0,29 | 0,0224 | A | | | | | |
| D-026E | 10,30 | 0,38 | 0,594 | 12,50 | 4,54 | | | | | | 5,76 | 5,87 | 3,420 | 0,28 | 4,89 | 1,39 | 3,214 | 0,27 | 0,0309 | A | | | | | |
| D-026F | 15,00 | 0,53 | 0,401 | 18,50 | 6,30 | | | | | | 8,70 | 12,58 | 3,491 | 0,27 | 6,70 | 1,99 | 3,331 | 0,26 | 0,0437 | A | | | | | |
| D-026G | 1,60 | 1,85 | 0,08 | 1,00 | 2,20 | 3,00 | 0,13 | 2,776 | 3,50 | 1,89 | 1,11 | 0,00 | 3,078 | 0,40 | 1,96 | 0,39 | 2,887 | 0,40 | 0,0107 | A | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|-------|------|--------|---|
| | | | | | | | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-016C | 0,25 | 2,95 | 3,20 | 0,20 | 2,30 | 3,50 | 12,00 | 0,83 | 0,166 | 8,00 | 3,49 | 8,51 | 0,00 | 1,416 | 0,16 | 3,80 | 4,02 | 1,365 | 0,16 | 0,0360 | D | | | | |
| VD-016D | | | | | | | 15,00 | 1,00 | 0,133 | 10,00 | 4,15 | 10,85 | 0,00 | 1,445 | 0,16 | 4,53 | 4,91 | 1,394 | 0,15 | 0,0432 | D | | | | |
| VD-016E | | | | | | | 18,00 | 1,17 | 0,111 | 12,00 | 4,80 | 13,20 | 10,75 | 1,464 | 0,15 | 5,26 | 5,79 | 1,413 | 0,15 | 0,0503 | D | | | | |
| VD-016F | | | | | | | 20,00 | 1,29 | 0,099 | 13,50 | 5,29 | 14,71 | 13,99 | 1,450 | 0,15 | 5,81 | 6,56 | 1,399 | 0,15 | 0,0557 | D | | | | |
| VD-017 | 2,50 | 2,75 | 0,15 | 1,90 | 3,10 | 4,80 | 0,30 | 0,625 | 3,50 | 1,97 | 2,83 | 0,00 | 1,770 | 0,22 | 2,08 | 1,14 | 1,700 | 0,21 | 0,0168 | D | | | | | |
| VD-017A | | | | | | 4,90 | 0,30 | 0,625 | 3,50 | 1,97 | 2,93 | 0,00 | 1,832 | 0,22 | 2,08 | 1,09 | 1,763 | 0,21 | 0,0168 | D | | | | | |
| VD-018 | | | | | | 7,30 | 0,41 | 0,398 | 5,50 | 2,59 | 4,71 | 0,00 | 1,872 | 0,19 | 2,77 | 1,66 | 1,802 | 0,19 | 0,0229 | D | | | | | |
| VD-019 | | | | | | 10,90 | 0,85 | 0,257 | 8,50 | 3,53 | 7,37 | 0,00 | 1,896 | 0,18 | 3,80 | 2,53 | 1,827 | 0,18 | 0,0320 | D | | | | | |
| VD-020 | | | | | | 15,40 | 0,81 | 0,175 | 12,50 | 4,78 | 10,62 | 9,37 | 1,858 | 0,17 | 5,17 | 3,81 | 1,790 | 0,17 | 0,0442 | D | | | | | |
| VD-020A | | | | | | 15,70 | 0,81 | 0,175 | 12,50 | 4,78 | 10,92 | 9,89 | 1,911 | 0,17 | 5,17 | 3,67 | 1,843 | 0,17 | 0,0442 | D | | | | | |
| VD-021 | | | | | | 22,80 | 1,14 | 0,118 | 18,50 | 6,66 | 16,14 | 19,41 | 1,909 | 0,16 | 7,23 | 5,45 | 1,841 | 0,16 | 0,0625 | D | | | | | |
| VD-021A | | | | | | 22,90 | 1,14 | 0,118 | 18,50 | 6,66 | 16,24 | 19,52 | 1,921 | 0,16 | 7,23 | 5,40 | 1,853 | 0,16 | 0,0625 | D | | | | | |
| VD-021B | | | | | | 2,25 | 2,50 | 0,15 | 1,60 | 2,90 | 5,00 | 0,31 | 0,600 | 5,00 | 2,40 | 2,60 | 0,00 | 1,559 | 0,21 | 2,54 | 1,62 | 1,476 | 0,21 | 0,0192 | D |
| VD-021C | | | | | | | | | | | 8,00 | 0,45 | 0,375 | 8,00 | 3,32 | 4,68 | 0,00 | 1,756 | 0,20 | 3,54 | 2,33 | 1,673 | 0,19 | 0,0274 | D |
| VD-021D | | | | | | | | | | | 10,00 | 0,54 | 0,300 | 10,00 | 3,93 | 6,07 | 0,00 | 1,822 | 0,19 | 4,21 | 2,81 | 1,737 | 0,19 | 0,0329 | D |
| VD-021E | 12,50 | 0,57 | 0,240 | 12,50 | 4,69 | | | | | | 7,81 | 5,54 | 1,874 | 0,18 | 5,04 | 3,40 | 1,791 | 0,18 | 0,0398 | D | | | | | |
| VD-021F | 16,00 | 0,81 | 0,188 | 16,00 | 5,76 | | | | | | 10,24 | 11,74 | 1,920 | 0,18 | 6,20 | 4,21 | 1,838 | 0,18 | 0,0494 | D | | | | | |
| VD-022 | 2,00 | 2,25 | 0,10 | 1,50 | 2,60 | 3,60 | 0,20 | 1,221 | 3,50 | 1,92 | 1,68 | 0,00 | 2,049 | 0,27 | 2,01 | 0,75 | 1,941 | 0,27 | 0,0134 | D | | | | | |
| VD-022A | | | | | | 3,70 | 0,20 | 1,221 | 3,50 | 1,92 | 1,78 | 0,00 | 2,171 | 0,27 | 2,01 | 0,70 | 2,063 | 0,27 | 0,0134 | D | | | | | |
| VD-023 | | | | | | 5,30 | 0,27 | 0,777 | 5,50 | 2,52 | 2,78 | 0,00 | 2,160 | 0,24 | 2,65 | 1,11 | 2,059 | 0,24 | 0,0183 | D | | | | | |
| VD-023A | | | | | | 5,50 | 0,27 | 0,777 | 5,50 | 2,52 | 2,98 | 0,00 | 2,315 | 0,25 | 2,65 | 1,01 | 2,214 | 0,24 | 0,0183 | D | | | | | |
| VD-024 | | | | | | 7,80 | 0,38 | 0,503 | 8,50 | 3,42 | 4,38 | 0,00 | 2,203 | 0,23 | 3,62 | 1,67 | 2,101 | 0,22 | 0,0256 | D | | | | | |
| VD-024A | | | | | | 8,00 | 0,38 | 0,503 | 8,50 | 3,42 | 4,58 | 0,00 | 2,304 | 0,23 | 3,62 | 1,57 | 2,202 | 0,23 | 0,0256 | D | | | | | |
| VD-025 | | | | | | 11,10 | 0,53 | 0,342 | 12,50 | 4,61 | 6,49 | 4,89 | 2,217 | 0,21 | 4,92 | 2,44 | 2,112 | 0,21 | 0,0354 | D | | | | | |
| VD-025A | | | | | | 11,40 | 0,53 | 0,342 | 12,50 | 4,61 | 6,79 | 5,66 | 2,320 | 0,22 | 4,92 | 2,29 | 2,215 | 0,21 | 0,0354 | D | | | | | |
| VD-026 | | | | | | 16,20 | 0,75 | 0,231 | 18,50 | 6,41 | 9,79 | 13,04 | 2,262 | 0,21 | 6,86 | 3,52 | 2,157 | 0,21 | 0,0500 | D | | | | | |
| VD-026A | | | | | | 16,60 | 0,75 | 0,231 | 18,50 | 6,41 | 10,19 | 13,54 | 2,354 | 0,21 | 6,86 | 3,32 | 2,249 | 0,21 | 0,0500 | D | | | | | |
| VD-026B | | | | | | 1,75 | 2,00 | 0,10 | 1,20 | 2,40 | 3,20 | 0,16 | 1,822 | 3,50 | 1,90 | 1,30 | 0,00 | 2,366 | 0,34 | 1,98 | 0,55 | 2,223 | 0,33 | 0,0117 | D |
| VD-026C | 4,90 | 0,22 | 1,160 | 5,50 | 2,49 | | | | | | 2,41 | 0,00 | 2,796 | 0,30 | 2,61 | 0,68 | 2,655 | 0,30 | 0,0160 | D | | | | | |
| VD-026D | 7,20 | 0,32 | 0,750 | 8,50 | 3,37 | | | | | | 3,83 | 0,00 | 2,875 | 0,28 | 3,55 | 0,99 | 2,739 | 0,28 | 0,0224 | D | | | | | |
| VD-026E | 10,30 | 0,44 | 0,510 | 12,50 | 4,54 | | | | | | 5,76 | 5,66 | 2,938 | 0,27 | 4,81 | 1,40 | 2,801 | 0,27 | 0,0309 | D | | | | | |
| VD-026F | 15,00 | 0,62 | 0,345 | 18,50 | 6,30 | | | | | | 8,70 | 12,43 | 2,998 | 0,26 | 6,70 | 1,98 | 2,861 | 0,26 | 0,0437 | D | | | | | |
| VD-026G | 1,60 | 1,85 | 0,08 | 1,00 | 2,20 | | | | | | 3,00 | 0,15 | 2,384 | 3,50 | 1,89 | 1,11 | 0,00 | 2,643 | 0,39 | 1,96 | 0,43 | 2,480 | 0,39 | 0,0107 | D |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-026H | 0,25 | 1,60 | 1,85 | 0,08 | 1,00 | 2,20 | 4,30 | 0,20 | 1,517 | 5,50 | 2,47 | 1,83 | 0,00 | 2,773 | 0,35 | 2,58 | 0,64 | 2,610 | 0,35 | 0,0146 | D | | | | | |
| VD-026J | | | | | | | 6,20 | 0,29 | 0,982 | 8,50 | 3,34 | 2,86 | 0,00 | 2,805 | 0,32 | 3,51 | 0,97 | 2,641 | 0,32 | 0,0205 | D | | | | | |
| VD-026K | | | | | | | 8,70 | 0,40 | 0,668 | 12,50 | 4,50 | 4,20 | 3,32 | 2,801 | 0,31 | 4,76 | 1,43 | 2,630 | 0,30 | 0,0283 | D | | | | | |
| VD-026L | | | | | | | 12,50 | 0,56 | 0,451 | 18,50 | 6,25 | 6,25 | 9,85 | 2,821 | 0,30 | 6,62 | 2,09 | 2,652 | 0,29 | 0,0400 | D | | | | | |
| VD-026M | 1,20 | 1,45 | 0,08 | 0,70 | 1,80 | 2,40 | 0,11 | 5,651 | 3,50 | 1,87 | 0,53 | 0,00 | 3,008 | 0,69 | 1,93 | 0,26 | 2,656 | 0,69 | 0,0080 | D | | | | | | |
| VD-026N | | | | | | 3,30 | 0,16 | 3,596 | 5,50 | 2,44 | 0,86 | 0,00 | 3,111 | 0,61 | 2,53 | 0,40 | 2,769 | 0,61 | 0,0110 | D | | | | | | |
| VD-026O | | | | | | 4,70 | 0,22 | 2,327 | 8,50 | 3,29 | 1,41 | 0,00 | 3,291 | 0,56 | 3,43 | 0,58 | 2,955 | 0,56 | 0,0154 | D | | | | | | |
| VD-026P | | | | | | 6,60 | 0,30 | 1,582 | 12,50 | 4,42 | 2,18 | 2,74 | 3,449 | 0,53 | 4,63 | 0,80 | 3,117 | 0,52 | 0,0212 | D | | | | | | |
| VD-026Q | 0,30 | 3,70 | 4,00 | 0,20 | 2,90 | 4,50 | 9,40 | 0,43 | 1,069 | 18,50 | 6,12 | 3,28 | 7,42 | 3,504 | 0,51 | 6,43 | 1,16 | 3,175 | 0,51 | 0,0300 | D | | | | | |
| VD-026Q-10 | | | | | | | 5,00 | 0,30 | 0,800 | 1,75 | 1,75 | 3,25 | 0,00 | 2,601 | 0,34 | 1,83 | 0,70 | 2,535 | 0,36 | 0,0244 | D | | | | | |
| VD-026Q-11 | | | | | | | 6,00 | 0,40 | 0,560 | 2,50 | 2,05 | 3,95 | 0,00 | 2,213 | 0,29 | 2,17 | 1,40 | 2,144 | 0,31 | 0,0292 | D | | | | | |
| VD-026R-01 | | | | | | | 7,00 | 0,57 | 0,400 | 3,50 | 2,44 | 4,56 | 0,00 | 1,821 | 0,26 | 2,62 | 2,48 | 1,751 | 0,26 | 0,0357 | D | | | | | |
| VD-026R-02 | | | | | | | 11,00 | 0,79 | 0,254 | 5,50 | 3,24 | 7,76 | 0,00 | 1,974 | 0,23 | 3,51 | 3,60 | 1,905 | 0,23 | 0,0487 | D | | | | | |
| VD-026R-03 | | | | | | | 17,00 | 1,11 | 0,165 | 8,50 | 4,44 | 12,56 | 0,00 | 2,068 | 0,21 | 4,86 | 5,27 | 1,998 | 0,21 | 0,0682 | D | | | | | |
| VD-026R-04 | | | | | | | 25,00 | 1,54 | 0,112 | 12,50 | 6,03 | 18,97 | 17,42 | 2,123 | 0,20 | 6,65 | 7,52 | 2,054 | 0,20 | 0,0942 | D | | | | | |
| VD-026R-05 | | | | | | | 37,00 | 2,18 | 0,076 | 18,50 | 8,42 | 28,58 | 32,50 | 2,162 | 0,20 | 9,33 | 10,81 | 2,093 | 0,20 | 0,1331 | D | | | | | |
| VD-026X | | | | | | | 3,30 | 3,60 | 0,20 | 2,60 | 4,10 | 18,00 | 0,91 | 0,208 | 9,50 | 4,70 | 13,30 | 7,10 | 2,761 | 0,23 | 5,10 | 3,51 | 2,678 | 0,23 | 0,0666 | D |
| VD-026R-10 | | | | | | | 2,90 | 3,20 | 0,20 | 2,10 | 3,80 | 5,00 | 0,32 | 0,830 | 3,50 | 2,35 | 2,65 | 0,00 | 2,198 | 0,30 | 4,48 | 0,52 | 0,432 | 0,30 | 0,0280 | D |
| VD-026R-11 | | | | | | | | | | | | 7,70 | 0,44 | 0,528 | 5,50 | 3,10 | 4,60 | 0,00 | 2,432 | 0,27 | 3,29 | 2,18 | 2,330 | 0,27 | 0,0382 | D |
| VD-026R-12 | | | | | | | | | | | | 12,00 | 0,62 | 0,342 | 8,50 | 4,21 | 7,79 | 0,00 | 2,662 | 0,25 | 4,52 | 3,04 | 2,557 | 0,25 | 0,0535 | D |
| VD-026R-13 | | | | | | | | | | | | 17,50 | 0,85 | 0,232 | 12,50 | 5,70 | 11,80 | 10,22 | 2,743 | 0,24 | 6,15 | 4,30 | 2,639 | 0,24 | 0,0738 | D |
| VD-026R-14 | | | | | | | 26,00 | 1,21 | 0,157 | 18,50 | 7,93 | 18,07 | 21,98 | 2,838 | 0,23 | 8,60 | 6,06 | 2,733 | 0,23 | 0,1044 | D | | | | | |
| VD-026R-20 | | | | | | | 2,20 | 2,50 | 0,10 | 1,50 | 2,80 | 2,80 | 0,20 | 1,902 | 3,50 | 2,29 | 0,51 | 0,00 | 0,970 | 0,39 | 2,38 | 0,42 | 0,799 | 0,39 | 0,0212 | D |
| VD-026R-21 | | | | | | | | | | | | 4,50 | 0,27 | 1,210 | 5,50 | 3,00 | 1,50 | 0,00 | 1,818 | 0,36 | 3,15 | 1,35 | 1,634 | 0,36 | 0,0290 | D |
| VD-026R-22 | 6,80 | 0,38 | 0,783 | 8,50 | 4,06 | 2,74 | | | | | | 0,00 | 2,145 | 0,33 | 4,29 | 2,47 | 1,966 | 0,33 | 0,0405 | D | | | | | | |
| VD-026R-23 | 10,00 | 0,53 | 0,532 | 12,50 | 5,48 | 4,52 | | | | | | 0,00 | 2,408 | 0,32 | 5,82 | 3,40 | 2,226 | 0,32 | 0,0560 | D | | | | | | |
| VD-026R-24 | 14,80 | 0,75 | 0,360 | 18,50 | 7,60 | 7,20 | 10,26 | 2,590 | 0,31 | 8,10 | 4,77 | 2,411 | 0,31 | 0,0792 | D | | | | | | | | | | | |
| VD-027 | 1,90 | 2,20 | 0,10 | 1,30 | 2,60 | 13,00 | 0,44 | 0,827 | 12,50 | 5,70 | 7,30 | 9,18 | 6,035 | 0,46 | 7,60 | 1,26 | 4,464 | 0,45 | 0,0484 | D | | | | | | |
| VD-027A | 0,32 | 4,00 | 4,32 | 0,20 | 3,20 | 4,80 | 5,50 | 0,40 | 0,819 | 1,75 | 1,87 | 3,63 | 0,00 | 2,976 | 0,38 | 1,96 | 0,75 | 2,900 | 0,40 | 0,0300 | D | | | | | |
| VD-027B | | | | | | | 7,00 | 0,50 | 0,573 | 2,50 | 2,19 | 4,81 | 0,00 | 2,760 | 0,33 | 2,32 | 1,25 | 2,682 | 0,35 | 0,0359 | D | | | | | |
| VD-028 | | | | | | | 8,50 | 0,62 | 0,410 | 3,50 | 2,61 | 5,89 | 0,00 | 2,411 | 0,29 | 2,80 | 2,28 | 2,335 | 0,29 | 0,0439 | D | | | | | |
| VD-028A | | | | | | | 8,70 | 0,62 | 0,410 | 3,50 | 2,61 | 6,09 | 0,00 | 2,493 | 0,29 | 2,80 | 2,18 | 2,417 | 0,29 | 0,0439 | D | | | | | |
| VD-029 | | | | | | | 12,70 | 0,86 | 0,261 | 5,50 | 3,47 | 9,23 | 0,00 | 2,406 | 0,26 | 3,76 | 3,58 | 2,330 | 0,26 | 0,0599 | D | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|---------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-026H | 0,25 | 1,60 | 1,85 | 0,08 | 1,00 | 2,20 | 4,30 | 0,17 | 1,766 | 5,50 | 2,47 | 1,83 | 0,00 | 3,229 | 0,36 | 2,58 | 0,58 | 3,038 | 0,36 | 0,0146 | A | | | | | |
| D-026J | | | | | | | 6,20 | 0,25 | 1,143 | 8,50 | 3,34 | 2,86 | 0,00 | 3,266 | 0,33 | 3,51 | 0,88 | 3,075 | 0,33 | 0,0205 | A | | | | | |
| D-026K | | | | | | | 8,70 | 0,34 | 0,777 | 12,50 | 4,50 | 4,20 | 3,78 | 3,261 | 0,31 | 4,76 | 1,30 | 3,062 | 0,31 | 0,0283 | A | | | | | |
| D-026L | | | | | | | 12,50 | 0,48 | 0,525 | 18,50 | 6,25 | 6,25 | 9,92 | 3,284 | 0,30 | 6,62 | 1,91 | 3,088 | 0,30 | 0,0400 | A | | | | | |
| D-026M | 1,20 | 1,45 | 0,08 | 0,70 | 1,80 | 2,40 | 0,10 | 6,580 | 3,50 | 1,87 | 0,53 | 0,00 | 3,502 | 0,70 | 1,93 | 0,23 | 3,093 | 0,69 | 0,0080 | A | | | | | | |
| D-026N | | | | | | 3,30 | 0,13 | 4,187 | 5,50 | 2,44 | 0,86 | 0,00 | 3,622 | 0,62 | 2,53 | 0,35 | 3,224 | 0,61 | 0,0110 | A | | | | | | |
| D-026O | | | | | | 4,70 | 0,19 | 2,709 | 8,50 | 3,29 | 1,41 | 0,00 | 3,831 | 0,57 | 3,43 | 0,51 | 3,441 | 0,56 | 0,0154 | A | | | | | | |
| D-026P | | | | | | 6,60 | 0,26 | 1,842 | 12,50 | 4,42 | 2,18 | 3,04 | 4,015 | 0,54 | 4,63 | 0,72 | 3,629 | 0,54 | 0,0212 | A | | | | | | |
| D-026Q | 0,30 | 3,70 | 4,00 | 0,20 | 2,90 | 4,50 | 9,40 | 0,37 | 1,245 | 18,50 | 6,12 | 3,28 | 7,47 | 4,080 | 0,52 | 6,43 | 1,04 | 3,697 | 0,52 | 0,0300 | A | | | | | |
| D-026Q-10 | | | | | | | 5,00 | 0,32 | 0,931 | 1,75 | 1,75 | 3,25 | 11,68 | 3,028 | 0,34 | 1,83 | 0,75 | 2,951 | 0,38 | 0,0244 | A | | | | | |
| D-026Q-11 | | | | | | | 6,00 | 0,40 | 0,652 | 2,50 | 2,05 | 3,95 | 10,85 | 2,577 | 0,30 | 2,17 | 1,33 | 2,496 | 0,30 | 0,0292 | A | | | | | |
| D-026R-01 | | | | | | | 7,00 | 0,49 | 0,465 | 3,50 | 2,44 | 4,56 | 0,00 | 2,120 | 0,26 | 2,62 | 2,15 | 2,039 | 0,26 | 0,0357 | A | | | | | |
| D-026R-02 | | | | | | | 11,00 | 0,68 | 0,296 | 5,50 | 3,24 | 7,76 | 0,00 | 2,298 | 0,24 | 3,51 | 3,17 | 2,219 | 0,24 | 0,0487 | A | | | | | |
| D-026R-03 | | | | | | | 17,00 | 0,96 | 0,192 | 8,50 | 4,44 | 12,56 | 0,00 | 2,408 | 0,22 | 4,86 | 4,69 | 2,327 | 0,22 | 0,0682 | A | | | | | |
| D-026R-04 | | | | | | | 25,00 | 1,32 | 0,130 | 12,50 | 6,03 | 18,97 | 17,66 | 2,472 | 0,21 | 6,65 | 6,75 | 2,392 | 0,21 | 0,0942 | A | | | | | |
| D-026R-05 | | | | | | | 37,00 | 1,87 | 0,088 | 18,50 | 8,42 | 28,58 | 32,61 | 2,517 | 0,20 | 9,33 | 9,80 | 2,437 | 0,20 | 0,1331 | A | | | | | |
| D-026X | | | | | | | 3,30 | 3,60 | 0,20 | 2,60 | 4,10 | 18,00 | 0,78 | 0,242 | 9,50 | 4,70 | 13,30 | 7,92 | 3,214 | 0,24 | 5,10 | 3,35 | 3,118 | 0,24 | 0,0666 | A |
| D-026R-10 | | | | | | | 2,90 | 3,20 | 0,20 | 2,10 | 3,80 | 5,00 | 0,27 | 0,967 | 3,50 | 2,35 | 2,65 | 0,00 | 2,560 | 0,30 | 2,48 | 1,31 | 2,436 | 0,30 | 0,0280 | A |
| D-026R-11 | | | | | | | | | | | | 7,70 | 0,38 | 0,615 | 5,50 | 3,10 | 4,60 | 0,00 | 2,832 | 0,28 | 3,29 | 1,92 | 2,713 | 0,27 | 0,0382 | A |
| D-026R-12 | | | | | | | | | | | | 12,00 | 0,53 | 0,398 | 8,50 | 4,21 | 7,79 | 0,00 | 3,100 | 0,26 | 4,52 | 2,72 | 2,977 | 0,26 | 0,0535 | A |
| D-026R-13 | | | | | | | | | | | | 17,50 | 0,73 | 0,271 | 12,50 | 5,70 | 11,80 | 10,52 | 3,194 | 0,25 | 6,15 | 3,88 | 3,072 | 0,25 | 0,0738 | A |
| D-026R-14 | | | | | | | 26,00 | 1,04 | 0,183 | 18,50 | 7,93 | 18,07 | 22,08 | 3,304 | 0,24 | 8,60 | 5,54 | 3,182 | 0,24 | 0,1044 | A | | | | | |
| D-026R-20 | | | | | | | 2,20 | 2,50 | 0,10 | 1,50 | 2,80 | 2,80 | 0,17 | 2,214 | 3,50 | 2,29 | 0,51 | 0,00 | 1,130 | 0,40 | 2,38 | 0,42 | 0,930 | 0,40 | 0,0212 | A |
| D-026R-21 | | | | | | | | | | | | 4,50 | 0,23 | 1,409 | 5,50 | 3,00 | 1,50 | 0,00 | 2,116 | 0,36 | 3,15 | 1,35 | 1,902 | 0,36 | 0,0290 | A |
| D-026R-22 | 6,80 | 0,33 | 0,912 | 8,50 | 4,06 | 2,74 | | | | | | 0,00 | 2,497 | 0,34 | 4,29 | 2,06 | 2,288 | 0,34 | 0,0405 | A | | | | | | |
| D-026R-23 | 10,00 | 0,45 | 0,620 | 12,50 | 5,48 | 4,52 | | | | | | 0,00 | 2,804 | 0,33 | 5,82 | 2,86 | 2,591 | 0,32 | 0,0560 | A | | | | | | |
| D-026R-24 | 14,80 | 0,64 | 0,419 | 18,50 | 7,60 | 7,20 | 10,41 | 3,015 | 0,32 | 8,10 | 4,05 | 2,807 | 0,31 | 0,0792 | A | | | | | | | | | | | |
| D-027 | 1,90 | 2,20 | 0,10 | 1,30 | 2,60 | 13,00 | 0,38 | 0,962 | 12,50 | 5,40 | 7,60 | 9,31 | 7,314 | 0,48 | 6,38 | 0,86 | 6,371 | 0,47 | 0,0484 | A | | | | | | |
| D-027A | 0,32 | 4,00 | 4,32 | 0,20 | 3,20 | 4,80 | 5,50 | 0,35 | 0,954 | 1,75 | 1,87 | 3,63 | 0,00 | 3,465 | 0,38 | 1,96 | 0,81 | 3,376 | 0,38 | 0,0300 | B | | | | | |
| D-027B | | | | | | | 7,00 | 0,43 | 0,668 | 2,50 | 2,19 | 4,81 | 0,00 | 3,213 | 0,34 | 2,32 | 1,29 | 3,125 | 0,38 | 0,0359 | B | | | | | |
| D-028 | | | | | | | 8,50 | 0,53 | 0,477 | 3,50 | 2,61 | 5,89 | 0,00 | 2,807 | 0,30 | 2,80 | 2,05 | 2,718 | 0,30 | 0,0439 | B | | | | | |
| D-028A | | | | | | | 8,70 | 0,53 | 0,477 | 3,50 | 2,61 | 6,09 | 0,00 | 2,902 | 0,30 | 2,80 | 1,98 | 2,814 | 0,30 | 0,0439 | B | | | | | |
| D-029 | | | | | | | 12,70 | 0,74 | 0,303 | 5,50 | 3,47 | 9,23 | 0,00 | 2,802 | 0,27 | 3,76 | 3,23 | 2,713 | 0,26 | 0,0599 | B | | | | | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-029A | 0,32 | 4,00 | 4,32 | 0,20 | 3,20 | 4,80 | 13,10 | 0,74 | 0,303 | 5,50 | 3,47 | 9,63 | 0,00 | 2,923 | 0,27 | 3,76 | 3,09 | 2,834 | 0,27 | 0,0599 | B | | | | |
| D-030 | | | | | | | 19,20 | 1,04 | 0,196 | 8,50 | 4,75 | 14,45 | 0,00 | 2,838 | 0,25 | 5,20 | 4,93 | 2,749 | 0,25 | 0,0839 | B | | | | |
| D-030A | | | | | | | 19,80 | 1,44 | 0,134 | 12,50 | 6,46 | 13,34 | 0,00 | 1,782 | 0,22 | 7,13 | 9,95 | 1,692 | 0,22 | 0,1158 | B | | | | |
| D-030B | | | | | | | 28,60 | 1,44 | 0,134 | 12,50 | 6,46 | 22,14 | 21,31 | 2,957 | 0,24 | 7,13 | 6,91 | 2,867 | 0,24 | 0,1158 | B | | | | |
| D-031 | | | | | | | 28,90 | 1,44 | 0,134 | 12,50 | 6,46 | 22,44 | 21,72 | 2,997 | 0,24 | 7,13 | 6,80 | 2,907 | 0,24 | 0,1158 | B | | | | |
| D-032 | | | | | | | 41,60 | 2,03 | 0,090 | 18,50 | 9,02 | 32,58 | 37,06 | 2,940 | 0,23 | 10,01 | 10,25 | 2,850 | 0,23 | 0,1638 | B | | | | |
| D-032A | | | | | | | 41,90 | 2,03 | 0,090 | 18,50 | 9,02 | 32,88 | 37,40 | 2,967 | 0,23 | 10,01 | 10,25 | 2,877 | 0,23 | 0,1638 | B | | | | |
| D-033 | 3,20 | 3,52 | 0,20 | 2,40 | 4,00 | 6,10 | 0,31 | 0,931 | 3,50 | 2,52 | 3,58 | 0,00 | 3,335 | 0,34 | 2,66 | 1,32 | 3,204 | 0,34 | 0,0352 | B | | | | | |
| D-033A | | | | | | 6,30 | 0,31 | 0,931 | 3,50 | 2,52 | 3,78 | 0,00 | 3,521 | 0,34 | 2,66 | 1,25 | 3,390 | 0,34 | 0,0352 | B | | | | | |
| D-034 | | | | | | 9,10 | 0,42 | 0,593 | 5,50 | 3,32 | 5,78 | 0,00 | 3,426 | 0,30 | 3,54 | 2,05 | 3,296 | 0,30 | 0,0479 | B | | | | | |
| D-034A | | | | | | 9,40 | 0,42 | 0,593 | 5,50 | 3,32 | 6,08 | 0,00 | 3,604 | 0,31 | 3,54 | 1,95 | 3,473 | 0,30 | 0,0479 | B | | | | | |
| D-035 | | | | | | 13,70 | 0,60 | 0,384 | 8,50 | 4,52 | 9,18 | 0,00 | 3,521 | 0,28 | 4,86 | 3,03 | 3,390 | 0,28 | 0,0671 | B | | | | | |
| D-035A | | | | | | 14,00 | 0,60 | 0,384 | 8,50 | 4,52 | 9,48 | 0,00 | 3,636 | 0,28 | 4,86 | 2,93 | 3,505 | 0,28 | 0,0671 | B | | | | | |
| D-036 | | | | | | 19,50 | 0,83 | 0,261 | 12,50 | 6,12 | 13,38 | 11,94 | 3,490 | 0,27 | 6,62 | 4,50 | 3,359 | 0,27 | 0,0927 | B | | | | | |
| D-036A | | | | | | 20,10 | 0,83 | 0,261 | 12,50 | 6,12 | 13,98 | 12,95 | 3,646 | 0,27 | 6,62 | 4,29 | 3,516 | 0,27 | 0,0927 | B | | | | | |
| D-037 | | | | | | 28,60 | 1,17 | 0,176 | 18,50 | 8,52 | 20,08 | 24,26 | 3,538 | 0,26 | 9,26 | 6,57 | 3,408 | 0,26 | 0,1310 | B | | | | | |
| D-037A | | | | | | 29,30 | 1,17 | 0,176 | 18,50 | 8,52 | 20,78 | 25,08 | 3,662 | 0,26 | 9,26 | 6,33 | 3,531 | 0,26 | 0,1310 | B | | | | | |
| D-038 | | | | | | 2,50 | 2,82 | 0,10 | 1,90 | 3,10 | 4,40 | 0,19 | 1,953 | 3,50 | 2,45 | 1,95 | 0,00 | 3,800 | 0,44 | 2,56 | 0,84 | 3,594 | 0,44 | 0,0275 | B |
| D-038A | | | | | | | | | | | 4,70 | 0,19 | 1,953 | 3,50 | 2,45 | 2,25 | 0,00 | 4,386 | 0,45 | 2,56 | 0,74 | 4,180 | 0,45 | 0,0275 | B |
| D-039 | | | | | | | | | | | 6,50 | 0,27 | 1,243 | 5,50 | 3,22 | 3,28 | 0,00 | 4,081 | 0,40 | 3,39 | 1,24 | 3,866 | 0,39 | 0,0374 | B |
| D-039A | | | | | | | | | | | 6,80 | 0,27 | 1,243 | 5,50 | 3,22 | 3,58 | 0,00 | 4,454 | 0,40 | 3,39 | 1,14 | 4,239 | 0,40 | 0,0374 | B |
| D-040 | 9,50 | 0,38 | 0,804 | 8,50 | 4,36 | | | | | | 5,14 | 0,00 | 4,133 | 0,37 | 4,62 | 1,91 | 3,925 | 0,36 | 0,0524 | B | | | | | |
| D-040A | 10,00 | 0,38 | 0,804 | 8,50 | 4,36 | | | | | | 5,64 | 0,00 | 4,536 | 0,37 | 4,62 | 1,74 | 4,327 | 0,37 | 0,0524 | B | | | | | |
| D-041 | 13,60 | 0,52 | 0,547 | 12,50 | 5,89 | | | | | | 7,71 | 5,90 | 4,219 | 0,35 | 6,27 | 2,74 | 4,009 | 0,35 | 0,0724 | B | | | | | |
| D-041A | 14,20 | 0,52 | 0,547 | 12,50 | 5,89 | | | | | | 8,31 | 7,36 | 4,547 | 0,35 | 6,27 | 2,53 | 4,337 | 0,35 | 0,0724 | B | | | | | |
| D-042 | 19,60 | 0,74 | 0,370 | 18,50 | 8,17 | | | | | | 11,43 | 15,59 | 4,223 | 0,34 | 8,74 | 4,04 | 4,013 | 0,33 | 0,1024 | B | | | | | |
| D-042A | 20,60 | 0,74 | 0,370 | 18,50 | 8,17 | | | | | | 12,43 | 16,84 | 4,592 | 0,34 | 8,74 | 3,70 | 4,383 | 0,34 | 0,1024 | B | | | | | |
| D-042B | 2,00 | 2,32 | 0,10 | 1,40 | 2,60 | 3,70 | 0,15 | 3,815 | 3,50 | 2,42 | 1,28 | 0,00 | 4,892 | 0,64 | 2,51 | 0,49 | 4,540 | 0,63 | 0,0220 | B | | | | | |
| D-042C | | | | | | 5,30 | 0,20 | 2,428 | 5,50 | 3,16 | 2,14 | 0,00 | 5,198 | 0,57 | 3,30 | 0,73 | 4,856 | 0,57 | 0,0300 | B | | | | | |
| D-042D | | | | | | 7,70 | 0,28 | 1,571 | 8,50 | 4,27 | 3,43 | 0,00 | 5,386 | 0,53 | 4,49 | 1,09 | 5,043 | 0,53 | 0,0419 | B | | | | | |
| D-042E | | | | | | 10,90 | 0,39 | 1,068 | 12,50 | 5,75 | 5,15 | 4,80 | 5,497 | 0,51 | 6,07 | 1,57 | 5,160 | 0,50 | 0,0579 | B | | | | | |
| D-042F | | | | | | 15,60 | 0,56 | 0,722 | 18,50 | 7,98 | 7,62 | 12,37 | 5,501 | 0,49 | 8,45 | 2,32 | 5,161 | 0,48 | 0,0819 | B | | | | | |
| D-042F-01 | 1,60 | 1,92 | 0,08 | 1,00 | 2,20 | 3,10 | 0,12 | 7,451 | 3,50 | 2,39 | 0,71 | 0,00 | 5,261 | 0,98 | 2,47 | 0,33 | 4,694 | 0,97 | 0,0176 | B | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-029A | 0,32 | 4,00 | 4,32 | 0,20 | 3,20 | 4,80 | 13,10 | 0,86 | 0,261 | 5,50 | 3,47 | 9,63 | 0,00 | 2,510 | 0,26 | 3,76 | 3,39 | 2,435 | 0,26 | 0,0599 | D | | | | |
| VD-030 | | | | | | | 19,20 | 1,21 | 0,169 | 8,50 | 4,75 | 14,45 | 0,00 | 2,437 | 0,24 | 5,20 | 5,44 | 2,361 | 0,24 | 0,0839 | D | | | | |
| VD-030A | | | | | | | 19,80 | 1,67 | 0,115 | 12,50 | 6,46 | 13,34 | 0,00 | 1,530 | 0,21 | 7,13 | 11,93 | 1,453 | 0,21 | 0,1158 | D | | | | |
| VD-030B | | | | | | | 28,60 | 1,67 | 0,115 | 12,50 | 6,46 | 22,14 | 21,09 | 2,539 | 0,23 | 7,13 | 7,56 | 2,462 | 0,23 | 0,1158 | D | | | | |
| VD-031 | | | | | | | 28,90 | 1,67 | 0,115 | 12,50 | 6,46 | 22,44 | 21,50 | 2,574 | 0,23 | 7,13 | 7,41 | 2,497 | 0,23 | 0,1158 | D | | | | |
| VD-032 | | | | | | | 41,60 | 2,37 | 0,077 | 18,50 | 9,02 | 32,58 | 36,96 | 2,525 | 0,22 | 10,01 | 11,42 | 2,448 | 0,22 | 0,1638 | D | | | | |
| VD-032A | | | | | | | 41,90 | 2,37 | 0,077 | 18,50 | 9,02 | 32,88 | 37,29 | 2,548 | 0,22 | 10,01 | 11,25 | 2,471 | 0,22 | 0,1638 | D | | | | |
| VD-033 | 3,20 | 3,52 | 0,20 | 2,40 | 4,00 | 6,10 | 0,36 | 0,800 | 3,50 | 2,52 | 3,58 | 0,00 | 2,864 | 0,33 | 2,66 | 1,48 | 2,752 | 0,33 | 0,0352 | D | | | | | |
| VD-033A | | | | | | 6,30 | 0,36 | 0,800 | 3,50 | 2,52 | 3,78 | 0,00 | 3,024 | 0,33 | 2,66 | 1,38 | 2,912 | 0,33 | 0,0352 | D | | | | | |
| VD-034 | | | | | | 9,10 | 0,49 | 0,509 | 5,50 | 3,32 | 5,78 | 0,00 | 2,943 | 0,30 | 3,54 | 2,25 | 2,831 | 0,29 | 0,0479 | D | | | | | |
| VD-034A | | | | | | 9,40 | 0,49 | 0,509 | 5,50 | 3,32 | 6,08 | 0,00 | 3,095 | 0,30 | 3,54 | 2,10 | 2,983 | 0,30 | 0,0479 | D | | | | | |
| VD-035 | | | | | | 13,70 | 0,69 | 0,329 | 8,50 | 4,52 | 9,18 | 0,00 | 3,024 | 0,27 | 4,86 | 3,36 | 2,912 | 0,27 | 0,0671 | D | | | | | |
| VD-035A | | | | | | 14,00 | 0,69 | 0,329 | 8,50 | 4,52 | 9,48 | 0,00 | 3,123 | 0,28 | 4,86 | 3,21 | 3,011 | 0,27 | 0,0671 | D | | | | | |
| VD-036 | | | | | | 19,50 | 0,96 | 0,224 | 12,50 | 6,12 | 13,38 | 11,62 | 2,997 | 0,26 | 6,62 | 4,99 | 2,885 | 0,26 | 0,0927 | D | | | | | |
| VD-036A | | | | | | 20,10 | 0,96 | 0,224 | 12,50 | 6,12 | 13,98 | 12,67 | 3,132 | 0,26 | 6,62 | 4,69 | 3,020 | 0,26 | 0,0927 | D | | | | | |
| VD-037 | | | | | | 28,60 | 1,36 | 0,151 | 18,50 | 8,52 | 20,08 | 24,15 | 3,039 | 0,25 | 9,26 | 7,27 | 2,927 | 0,25 | 0,1310 | D | | | | | |
| VD-037A | | | | | | 29,30 | 1,36 | 0,151 | 18,50 | 8,52 | 20,78 | 24,98 | 3,145 | 0,25 | 9,26 | 6,92 | 3,033 | 0,25 | 0,1310 | D | | | | | |
| VD-038 | | | | | | 2,50 | 2,82 | 0,10 | 1,90 | 3,10 | 4,40 | 0,23 | 1,678 | 3,50 | 2,45 | 1,95 | 0,00 | 3,264 | 0,43 | 2,56 | 0,96 | 3,087 | 0,43 | 0,0275 | D |
| VD-038A | | | | | | | | | | | 4,70 | 0,23 | 1,678 | 3,50 | 2,45 | 2,25 | 0,00 | 3,767 | 0,44 | 2,56 | 0,81 | 3,590 | 0,44 | 0,0275 | D |
| VD-039 | | | | | | | | | | | 6,50 | 0,31 | 1,068 | 5,50 | 3,22 | 3,28 | 0,00 | 3,505 | 0,39 | 3,39 | 1,40 | 3,320 | 0,38 | 0,0374 | D |
| VD-039A | | | | | | | | | | | 6,80 | 0,31 | 1,068 | 5,50 | 3,22 | 3,58 | 0,00 | 3,825 | 0,39 | 3,39 | 1,25 | 3,641 | 0,39 | 0,0374 | D |
| VD-040 | 9,50 | 0,44 | 0,691 | 8,50 | 4,36 | | | | | | 5,14 | 0,00 | 3,550 | 0,36 | 4,62 | 2,13 | 3,371 | 0,35 | 0,0524 | D | | | | | |
| VD-040A | 10,00 | 0,44 | 0,691 | 8,50 | 4,36 | | | | | | 5,64 | 0,00 | 3,896 | 0,36 | 4,62 | 1,88 | 3,717 | 0,36 | 0,0524 | D | | | | | |
| VD-041 | 13,60 | 0,61 | 0,470 | 12,50 | 5,89 | | | | | | 7,71 | 5,25 | 3,624 | 0,34 | 6,27 | 3,06 | 3,443 | 0,34 | 0,0724 | D | | | | | |
| VD-041A | 14,20 | 0,61 | 0,470 | 12,50 | 5,89 | | | | | | 8,31 | 6,96 | 3,906 | 0,34 | 6,27 | 2,76 | 3,725 | 0,40 | 0,0724 | D | | | | | |
| VD-042 | 19,60 | 0,86 | 0,317 | 18,50 | 8,17 | | | | | | 11,43 | 15,48 | 3,627 | 0,33 | 8,74 | 4,56 | 3,447 | 0,32 | 0,1024 | D | | | | | |
| VD-042A | 20,60 | 0,86 | 0,317 | 18,50 | 8,17 | | | | | | 12,43 | 16,74 | 3,944 | 0,33 | 8,74 | 4,04 | 3,764 | 0,33 | 0,1024 | D | | | | | |
| VD-042B | 2,00 | 2,32 | 0,10 | 1,40 | 2,60 | 3,70 | 0,17 | 3,277 | 3,50 | 2,42 | 1,28 | 0,00 | 4,202 | 0,63 | 2,51 | 0,56 | 3,899 | 0,62 | 0,0220 | D | | | | | |
| VD-042C | | | | | | 5,30 | 0,23 | 2,085 | 5,50 | 3,16 | 2,14 | 0,00 | 4,464 | 0,56 | 3,30 | 0,82 | 4,170 | 0,56 | 0,0300 | D | | | | | |
| VD-042D | | | | | | 7,70 | 0,33 | 1,349 | 8,50 | 4,27 | 3,43 | 0,00 | 4,626 | 0,52 | 4,49 | 1,20 | 4,331 | 0,51 | 0,0419 | D | | | | | |
| VD-042E | | | | | | 10,90 | 0,46 | 0,918 | 12,50 | 5,75 | 5,15 | 4,23 | 4,721 | 0,49 | 6,07 | 1,71 | 4,432 | 0,49 | 0,0579 | D | | | | | |
| VD-042F | | | | | | 15,60 | 0,65 | 0,620 | 18,50 | 7,98 | 7,62 | 12,28 | 4,725 | 0,47 | 8,45 | 2,54 | 4,433 | 0,47 | 0,0819 | D | | | | | |
| VD-042F-01 | | | | | | 1,60 | 1,92 | 0,08 | 1,00 | 2,20 | 3,10 | 0,14 | 6,400 | 3,50 | 2,39 | 0,71 | 0,00 | 4,518 | 0,97 | 2,47 | 0,39 | 4,032 | 0,96 | 0,0176 | D |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-042F-02 | 0,32 | 1,60 | 1,92 | 0,08 | 1,00 | 2,20 | 4,40 | 0,19 | 4,073 | 5,50 | 3,12 | 1,28 | 0,00 | 5,205 | 0,87 | 3,24 | 0,52 | 4,724 | 0,86 | 0,0240 | D |
| VD-042F-03 | | | | | | | 6,30 | 0,27 | 2,635 | 8,50 | 4,21 | 2,09 | 0,00 | 5,497 | 0,80 | 4,40 | 0,75 | 5,007 | 0,79 | 0,0336 | D |
| VD-042F-04 | | | | | | | 8,70 | 0,37 | 1,792 | 12,50 | 5,67 | 3,03 | 3,30 | 5,430 | 0,75 | 5,95 | 1,13 | 4,928 | 0,75 | 0,0463 | D |
| VD-042F-05 | | | | | | | 12,54 | 0,53 | 1,211 | 18,50 | 7,85 | 4,69 | 9,85 | 5,674 | 0,73 | 8,26 | 1,57 | 5,182 | 0,72 | 0,0655 | D |
| VD-042F-08 | 0,40 | 6,60 | 7,00 | 0,35 | 5,70 | 7,90 | 10,50 | 0,90 | 0,445 | 1,75 | 2,46 | 8,04 | 0,00 | 3,581 | 0,50 | 2,63 | 1,60 | 3,504 | 0,52 | 0,0772 | E |
| VD-042F-09 | | | | | | | 15,50 | 1,10 | 0,283 | 2,75 | 3,06 | 12,44 | 0,00 | 3,525 | 0,40 | 3,34 | 2,55 | 3,445 | 0,44 | 0,0978 | E |
| VD-042F-10 | | | | | | | 20,50 | 1,30 | 0,208 | 3,75 | 3,66 | 16,84 | 0,00 | 3,498 | 0,40 | 4,10 | 3,55 | 3,407 | 0,40 | 0,1184 | E |
| VD-042G | | | | | | | 25,20 | 1,85 | 0,173 | 4,50 | 4,12 | 21,08 | 0,00 | 3,651 | 0,38 | 4,90 | 4,60 | 3,515 | 0,37 | 0,1339 | E |
| VD-042H | | | | | | | 35,80 | 2,44 | 0,120 | 6,50 | 5,32 | 30,48 | 13,47 | 3,653 | 0,35 | 6,45 | 6,60 | 3,518 | 0,35 | 0,1751 | E |
| VD-042J | | | | | | | 57,00 | 3,60 | 0,074 | 10,50 | 7,74 | 49,26 | 47,41 | 3,656 | 0,32 | 9,45 | 10,69 | 3,528 | 0,32 | 0,2575 | E |
| VD-042J-01 | | 5,60 | 6,00 | 0,25 | 4,80 | 6,60 | 12,90 | 0,99 | 0,364 | 3,50 | 3,35 | 9,55 | 0,00 | 3,480 | 0,41 | 3,63 | 3,50 | 3,378 | 0,41 | 0,0961 | E |
| VD-042J-02 | | | | | | | 19,80 | 1,37 | 0,232 | 5,50 | 4,47 | 15,33 | 0,00 | 3,556 | 0,37 | 4,90 | 5,33 | 3,455 | 0,37 | 0,1311 | E |
| VD-042J-03 | | | | | | | 30,20 | 1,92 | 0,150 | 8,50 | 6,14 | 24,06 | 10,73 | 3,611 | 0,34 | 6,81 | 8,06 | 3,510 | 0,34 | 0,1835 | E |
| VD-042J-04 | | | | | | | 44,10 | 2,67 | 0,102 | 12,50 | 8,37 | 35,73 | 34,92 | 3,646 | 0,33 | 9,36 | 11,69 | 3,545 | 0,33 | 0,2534 | E |
| VD-042J-05 | | | | | | | 64,70 | 3,77 | 0,069 | 18,50 | 11,72 | 52,98 | 58,93 | 3,653 | 0,32 | 13,17 | 17,21 | 3,553 | 0,31 | 0,3582 | E |
| VD-043 | | 5,00 | 5,40 | 0,25 | 4,10 | 6,00 | 10,50 | 0,73 | 0,512 | 3,50 | 3,27 | 7,23 | 0,00 | 3,703 | 0,43 | 3,50 | 2,91 | 3,584 | 0,43 | 0,0858 | E |
| VD-043A | | | | | | | 10,90 | 0,73 | 0,512 | 3,50 | 3,27 | 7,63 | 0,00 | 3,908 | 0,43 | 3,50 | 2,71 | 3,789 | 0,43 | 0,0858 | E |
| VD-044 | | | | | | | 15,70 | 1,00 | 0,326 | 5,50 | 4,34 | 11,36 | 0,00 | 3,703 | 0,38 | 4,70 | 4,57 | 3,584 | 0,38 | 0,1170 | E |
| VD-044A | | | | | | | 16,40 | 1,00 | 0,326 | 5,50 | 4,34 | 12,06 | 0,00 | 3,931 | 0,39 | 7,70 | 5,71 | 2,835 | 0,38 | 0,1170 | E |
| VD-045 | | | | | | | 23,70 | 1,41 | 0,211 | 8,50 | 5,94 | 17,76 | 0,00 | 3,745 | 0,35 | 6,51 | 5,97 | 3,624 | 0,35 | 0,1638 | E |
| VD-045A | | | | | | | 24,70 | 1,41 | 0,211 | 8,50 | 5,94 | 18,76 | 0,00 | 3,956 | 0,36 | 6,51 | 6,47 | 3,835 | 0,36 | 0,1638 | E |
| VD-046 | | | | | | | 33,40 | 1,95 | 0,143 | 12,50 | 8,07 | 25,33 | 22,96 | 3,631 | 0,34 | 8,91 | 10,68 | 3,511 | 0,33 | 0,2262 | E |
| VD-046A | | | | | | | 33,40 | 2,77 | 0,097 | 18,50 | 11,27 | 22,13 | 22,96 | 2,143 | 0,30 | 12,51 | 20,80 | 2,024 | 0,30 | 0,3199 | E |
| VD-046B | | | | | | | 35,80 | 1,95 | 0,143 | 12,50 | 8,07 | 27,73 | 26,43 | 3,975 | 0,34 | 8,91 | 9,49 | 3,855 | 0,34 | 0,2262 | E |
| VD-047 | | | | | | | 51,30 | 2,77 | 0,097 | 18,50 | 11,27 | 40,03 | 45,40 | 3,877 | 0,33 | 12,51 | 14,47 | 3,757 | 0,32 | 0,3199 | E |
| VD-047A | | | | | | | 51,30 | 3,31 | 0,080 | 22,50 | 13,41 | 37,89 | 45,40 | 3,018 | 0,31 | 14,91 | 22,90 | 2,898 | 0,31 | 0,3823 | E |
| VD-047B | | | | | | | 52,40 | 2,77 | 0,097 | 18,50 | 11,27 | 41,13 | 46,65 | 3,984 | 0,33 | 12,51 | 13,93 | 3,864 | 0,33 | 0,3199 | E |
| VD-047C | | 4,60 | 5,00 | 0,23 | 3,80 | 5,60 | 8,70 | 0,58 | 0,658 | 3,50 | 3,22 | 5,48 | 0,00 | 3,605 | 0,44 | 3,43 | 2,74 | 3,465 | 0,44 | 0,0790 | F |
| VD-047D | | | | | | | 13,70 | 0,81 | 0,418 | 5,50 | 4,26 | 9,44 | 0,00 | 3,951 | 0,40 | 4,58 | 3,90 | 3,816 | 0,40 | 0,1077 | F |
| VD-047E | | | | | | | 21,20 | 1,13 | 0,271 | 8,50 | 5,81 | 15,39 | 0,00 | 4,166 | 0,37 | 6,32 | 5,62 | 4,029 | 0,37 | 0,1507 | F |
| VD-047F | | | | | | | 31,20 | 1,57 | 0,184 | 12,50 | 7,89 | 23,31 | 21,83 | 4,291 | 0,35 | 8,64 | 7,94 | 4,153 | 0,35 | 0,2081 | F |
| VD-047G | | | | | | | 46,20 | 2,22 | 0,124 | 18,50 | 11,01 | 35,19 | 40,64 | 4,378 | 0,34 | 12,11 | 11,45 | 4,241 | 0,34 | 0,2943 | F |
| VD-048 | | 4,00 | 4,40 | 0,20 | 3,20 | 4,90 | 7,50 | 0,42 | 1,000 | 3,50 | 3,15 | 4,35 | 0,00 | 4,350 | 0,49 | 3,33 | 1,91 | 4,170 | 0,48 | 0,0687 | E |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-042F-02 | 0,32 | 1,60 | 1,92 | 0,08 | 1,00 | 2,20 | 4,40 | 0,16 | 4,742 | 5,50 | 3,12 | 1,28 | 0,00 | 6,060 | 0,88 | 3,24 | 0,46 | 5,501 | 0,87 | 0,0240 | B |
| D-042F-03 | | | | | | | 6,30 | 0,23 | 3,068 | 8,50 | 4,21 | 2,09 | 0,00 | 6,400 | 0,81 | 4,40 | 0,68 | 5,830 | 0,80 | 0,0336 | B |
| D-042F-04 | | | | | | | 8,70 | 0,32 | 2,086 | 12,50 | 5,67 | 3,03 | 3,78 | 6,322 | 0,77 | 5,95 | 1,01 | 5,738 | 0,76 | 0,0463 | B |
| D-042F-05 | | | | | | | 12,54 | 0,45 | 1,410 | 18,50 | 7,85 | 4,69 | 9,92 | 6,606 | 0,74 | 8,26 | 1,43 | 6,034 | 0,73 | 0,0655 | B |
| D-042F-08 | 0,40 | 6,60 | 7,00 | 0,35 | 5,70 | 7,90 | 10,50 | 0,90 | 0,518 | 1,75 | 2,46 | 8,04 | 0,00 | 4,170 | 0,38 | 2,63 | 1,77 | 4,080 | 0,51 | 0,0772 | B |
| D-042F-09 | | | | | | | 15,50 | 1,10 | 0,330 | 2,75 | 3,06 | 12,44 | 0,00 | 4,104 | 0,36 | 3,34 | 2,85 | 4,011 | 0,44 | 0,0978 | B |
| D-042F-10 | | | | | | | 20,50 | 1,40 | 0,242 | 3,75 | 3,66 | 16,84 | 0,00 | 4,073 | 0,33 | 4,04 | 3,93 | 3,982 | 0,40 | 0,1184 | B |
| D-042G | | | | | | | 25,20 | 1,59 | 0,202 | 4,50 | 4,12 | 21,08 | 0,00 | 4,250 | 0,38 | 4,57 | 4,52 | 4,159 | 0,38 | 0,1339 | B |
| D-042H | | | | | | | 35,80 | 2,09 | 0,140 | 6,50 | 5,32 | 30,48 | 15,29 | 4,254 | 0,36 | 5,98 | 6,51 | 4,162 | 0,35 | 0,1751 | B |
| D-042J | | | | | | | 57,00 | 3,09 | 0,086 | 10,50 | 7,74 | 49,26 | 47,65 | 4,256 | 0,33 | 8,80 | 10,65 | 4,164 | 0,33 | 0,2575 | B |
| D-042J-01 | | 5,60 | 6,00 | 0,25 | 4,80 | 6,60 | 12,90 | 0,85 | 0,424 | 3,50 | 3,35 | 9,55 | 0,00 | 4,051 | 0,42 | 3,63 | 3,17 | 3,933 | 0,42 | 0,0961 | B |
| D-042J-02 | | | | | | | 19,80 | 1,17 | 0,270 | 5,50 | 4,47 | 15,33 | 0,00 | 4,140 | 0,38 | 4,90 | 4,86 | 4,023 | 0,38 | 0,1311 | B |
| D-042J-03 | | | | | | | 30,20 | 1,65 | 0,175 | 8,50 | 6,14 | 24,06 | 12,46 | 4,204 | 0,35 | 6,81 | 7,38 | 4,087 | 0,35 | 0,1835 | B |
| D-042J-04 | | | | | | | 44,10 | 2,29 | 0,119 | 12,50 | 8,37 | 35,73 | 35,17 | 4,245 | 0,34 | 9,36 | 10,73 | 4,127 | 0,33 | 0,2534 | B |
| D-042J-05 | | | | | | | 64,70 | 3,24 | 0,080 | 18,50 | 11,72 | 52,98 | 59,06 | 4,253 | 0,32 | 13,17 | 15,93 | 4,136 | 0,32 | 0,3582 | B |
| D-043 | | 5,00 | 5,40 | 0,25 | 4,10 | 6,00 | 10,50 | 0,62 | 0,596 | 3,50 | 3,27 | 7,23 | 0,00 | 4,311 | 0,44 | 3,50 | 2,60 | 4,173 | 0,44 | 0,0858 | B |
| D-043A | | | | | | | 10,90 | 0,62 | 0,596 | 3,50 | 3,27 | 7,63 | 0,00 | 4,549 | 0,44 | 3,50 | 2,47 | 4,411 | 0,44 | 0,0858 | B |
| D-044 | | | | | | | 15,70 | 0,86 | 0,379 | 5,50 | 4,34 | 11,36 | 0,00 | 4,311 | 0,39 | 4,70 | 4,09 | 4,173 | 0,39 | 0,1170 | B |
| D-044A | | | | | | | 16,40 | 0,86 | 0,379 | 5,50 | 4,34 | 12,06 | 0,00 | 4,577 | 0,40 | 4,70 | 3,85 | 4,438 | 0,39 | 0,1170 | B |
| D-045 | | | | | | | 23,70 | 1,21 | 0,245 | 8,50 | 5,94 | 17,76 | 0,00 | 4,360 | 0,36 | 6,51 | 6,27 | 4,219 | 0,36 | 0,1638 | B |
| D-045A | | | | | | | 24,70 | 1,21 | 0,245 | 8,50 | 5,94 | 18,76 | 0,00 | 4,606 | 0,37 | 6,51 | 5,92 | 4,465 | 0,37 | 0,1638 | B |
| D-046 | | | | | | | 33,40 | 1,68 | 0,167 | 12,50 | 8,07 | 25,33 | 23,31 | 4,228 | 0,34 | 8,91 | 9,47 | 4,088 | 0,34 | 0,2262 | B |
| D-046A | | | | | | | 33,40 | 2,38 | 0,113 | 18,50 | 11,27 | 22,13 | 23,31 | 2,495 | 0,31 | 12,51 | 19,30 | 2,356 | 0,30 | 0,3199 | B |
| D-046B | | | | | | | 35,80 | 1,68 | 0,167 | 12,50 | 8,07 | 27,73 | 26,71 | 4,628 | 0,35 | 8,91 | 8,64 | 4,488 | 0,35 | 0,2262 | B |
| D-047 | | | | | | | 51,30 | 2,38 | 0,113 | 18,50 | 11,27 | 40,03 | 45,54 | 4,514 | 0,34 | 12,51 | 13,12 | 4,375 | 0,33 | 0,3199 | B |
| D-047A | | | | | | | 51,30 | 2,84 | 0,093 | 22,50 | 13,41 | 37,89 | 45,54 | 3,514 | 0,32 | 14,91 | 19,67 | 3,374 | 0,33 | 0,3823 | B |
| D-047B | | | | | | | 52,40 | 2,38 | 0,113 | 18,50 | 11,27 | 41,13 | 46,78 | 4,638 | 0,34 | 12,51 | 12,74 | 4,499 | 0,34 | 0,3199 | B |
| D-047C | | 4,60 | 5,00 | 0,25 | 3,80 | 5,60 | 8,70 | 0,50 | 0,766 | 3,50 | 3,22 | 5,48 | 0,00 | 4,197 | 0,45 | 3,43 | 2,39 | 4,034 | 0,45 | 0,0790 | B |
| D-047D | | | | | | | 13,70 | 0,69 | 0,487 | 5,50 | 4,26 | 9,44 | 0,00 | 4,601 | 0,41 | 4,58 | 3,47 | 4,443 | 0,41 | 0,1077 | B |
| D-047E | | | | | | | 21,20 | 0,97 | 0,315 | 8,50 | 5,81 | 15,39 | 0,00 | 4,850 | 0,38 | 6,32 | 5,09 | 4,690 | 0,38 | 0,1507 | B |
| D-047F | | | | | | | 31,20 | 1,35 | 0,214 | 12,50 | 7,89 | 23,31 | 22,13 | 4,996 | 0,36 | 8,64 | 7,27 | 4,836 | 0,36 | 0,2081 | B |
| D-047G | | | | | | | 46,20 | 1,91 | 0,145 | 18,50 | 11,01 | 35,19 | 40,77 | 5,097 | 0,35 | 12,11 | 10,48 | 4,937 | 0,35 | 0,2943 | B |
| D-048 | | 4,00 | 4,40 | 0,20 | 3,20 | 4,90 | 7,50 | 0,36 | 1,164 | 3,50 | 3,15 | 4,35 | 0,00 | 5,065 | 0,50 | 3,33 | 1,69 | 4,855 | 0,49 | 0,0687 | B |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-048A | 0,40 | 4,00 | 4,40 | 0,20 | 3,20 | 4,90 | 7,90 | 0,36 | 1,164 | 3,50 | 3,15 | 4,75 | 0,00 | 5,530 | 0,50 | 3,33 | 1,55 | 5,321 | 0,50 | 0,0687 | B |
| D-049 | | | | | | | 11,20 | 0,49 | 0,741 | 5,50 | 4,15 | 7,05 | 0,00 | 5,223 | 0,45 | 4,43 | 2,58 | 5,016 | 0,44 | 0,0936 | B |
| D-049A | | | | | | | 11,70 | 0,49 | 0,741 | 5,50 | 4,15 | 7,55 | 0,00 | 5,594 | 0,45 | 4,43 | 2,41 | 5,386 | 0,45 | 0,0936 | B |
| D-050 | | | | | | | 16,60 | 0,70 | 0,479 | 8,50 | 5,65 | 10,95 | 0,00 | 5,250 | 0,41 | 6,08 | 3,98 | 5,043 | 0,41 | 0,1311 | B |
| D-050A | | | | | | | 17,50 | 0,70 | 0,479 | 8,50 | 5,65 | 11,85 | 0,00 | 5,681 | 0,42 | 6,08 | 3,67 | 5,475 | 0,42 | 0,1311 | B |
| D-051 | | | | | | | 24,10 | 0,96 | 0,326 | 12,50 | 7,65 | 16,45 | 14,45 | 5,363 | 0,40 | 8,28 | 5,72 | 5,157 | 0,39 | 0,1810 | B |
| D-051A | | | | | | | 24,10 | 1,37 | 0,220 | 18,50 | 10,65 | 13,45 | 14,45 | 2,963 | 0,35 | 11,58 | 12,23 | 2,758 | 0,34 | 0,2559 | B |
| D-051B | | | | | | | 25,10 | 0,96 | 0,326 | 12,50 | 7,65 | 17,45 | 16,14 | 5,689 | 0,40 | 8,28 | 5,38 | 5,483 | 0,40 | 0,1810 | B |
| D-052 | | | | | | | 35,50 | 1,37 | 0,220 | 18,50 | 10,65 | 24,85 | 30,02 | 5,474 | 0,38 | 11,58 | 8,31 | 5,269 | 0,38 | 0,2559 | B |
| D-052A | | | | | | | 35,50 | 1,63 | 0,181 | 22,50 | 12,65 | 22,85 | 30,02 | 4,138 | 0,36 | 13,78 | 12,63 | 3,934 | 0,36 | 0,3058 | B |
| D-052B | | | | | | | 36,60 | 1,37 | 0,220 | 18,50 | 10,65 | 25,95 | 31,32 | 5,716 | 0,39 | 11,58 | 7,93 | 5,511 | 0,38 | 0,2559 | B |
| D-052C | | 3,60 | 4,00 | 0,20 | 2,80 | 4,50 | 6,40 | 0,29 | 1,597 | 3,50 | 3,11 | 3,29 | 0,00 | 5,254 | 0,54 | 3,27 | 1,42 | 4,999 | 0,54 | 0,0618 | B |
| D-052D | | | | | | | 9,60 | 0,40 | 1,016 | 5,50 | 4,09 | 5,51 | 0,00 | 5,603 | 0,49 | 4,33 | 2,11 | 5,356 | 0,49 | 0,0843 | B |
| D-052E | | | | | | | 14,40 | 0,56 | 0,658 | 8,50 | 5,55 | 8,85 | 0,00 | 5,818 | 0,46 | 5,93 | 3,15 | 5,570 | 0,45 | 0,1180 | B |
| D-052F | | | | | | | 20,80 | 0,78 | 0,447 | 12,50 | 7,51 | 13,29 | 11,33 | 5,944 | 0,44 | 8,06 | 4,53 | 5,697 | 0,43 | 0,1629 | B |
| D-052G | | | | | | | 30,40 | 1,10 | 0,302 | 18,50 | 10,44 | 19,96 | 25,16 | 6,031 | 0,42 | 11,26 | 6,61 | 5,783 | 0,42 | 0,2303 | B |
| D-053 | | 3,20 | 3,60 | 0,15 | 2,50 | 4,00 | 5,60 | 0,23 | 2,274 | 3,50 | 3,07 | 2,53 | 0,00 | 5,743 | 0,63 | 3,21 | 1,12 | 5,435 | 0,62 | 0,0549 | B |
| D-053A | | | | | | | 6,00 | 0,23 | 2,274 | 3,50 | 3,07 | 2,93 | 0,00 | 6,653 | 0,64 | 3,21 | 0,98 | 6,344 | 0,64 | 0,0549 | B |
| D-054 | | | | | | | 8,30 | 0,32 | 1,447 | 5,50 | 4,03 | 4,27 | 0,00 | 6,177 | 0,57 | 4,25 | 1,65 | 5,861 | 0,56 | 0,0749 | B |
| D-054A | | | | | | | 8,70 | 0,32 | 1,447 | 5,50 | 4,03 | 4,67 | 0,00 | 6,756 | 0,57 | 4,25 | 1,51 | 6,440 | 0,57 | 0,0749 | B |
| D-055 | | | | | | | 12,20 | 0,46 | 0,936 | 8,50 | 5,47 | 6,73 | 0,00 | 6,305 | 0,52 | 5,80 | 2,50 | 5,993 | 0,52 | 0,1049 | B |
| D-055A | | | | | | | 12,80 | 0,46 | 0,936 | 8,50 | 5,47 | 7,33 | 0,00 | 6,867 | 0,53 | 5,80 | 2,30 | 6,554 | 0,53 | 0,1049 | B |
| D-056 | | | | | | | 17,40 | 0,63 | 0,637 | 12,50 | 7,38 | 10,02 | 7,53 | 6,380 | 0,50 | 7,87 | 3,64 | 6,068 | 0,50 | 0,1448 | B |
| D-056A | | | | | | | 17,40 | 0,89 | 0,430 | 18,50 | 10,25 | 7,15 | 7,53 | 3,076 | 0,43 | 10,98 | 6,42 | 2,762 | 0,43 | 0,2047 | B |
| D-056B | | | | | | | 18,30 | 0,63 | 0,637 | 12,50 | 7,38 | 10,92 | 9,68 | 6,953 | 0,51 | 7,87 | 3,33 | 6,641 | 0,50 | 0,1448 | B |
| D-057 | | | | | | | 25,20 | 0,89 | 0,430 | 18,50 | 10,25 | 14,95 | 20,10 | 6,432 | 0,48 | 10,97 | 5,35 | 6,122 | 0,48 | 0,2047 | B |
| D-057A | | | | | | | 25,20 | 1,07 | 0,354 | 22,50 | 12,16 | 13,04 | 20,10 | 4,611 | 0,45 | 13,05 | 8,27 | 4,298 | 0,44 | 0,2447 | B |
| D-057B | | | | | | | 26,50 | 0,89 | 0,430 | 18,50 | 10,25 | 16,25 | 21,72 | 6,991 | 0,49 | 10,98 | 4,90 | 6,677 | 0,49 | 0,2047 | B |
| D-057C | | 2,80 | 3,20 | 0,15 | 2,10 | 3,50 | 15,00 | 0,52 | 0,950 | 12,50 | 7,27 | 7,73 | 5,95 | 7,349 | 0,61 | 7,70 | 2,66 | 6,938 | 0,60 | 0,1267 | B |
| D-057D | | | | | | | 18,00 | 0,63 | 0,766 | 15,50 | 8,68 | 9,32 | 11,99 | 7,147 | 0,59 | 9,21 | 3,40 | 6,737 | 0,59 | 0,1529 | B |
| D-057E | | | | | | | 21,00 | 0,74 | 0,642 | 18,50 | 10,08 | 10,92 | 16,23 | 7,010 | 0,58 | 10,73 | 4,13 | 6,595 | 0,58 | 0,1791 | B |
| D-058 | | 2,70 | 3,10 | 0,15 | 1,90 | 3,40 | 12,00 | 0,43 | 1,262 | 10,50 | 6,31 | 5,69 | 0,00 | 7,184 | 0,66 | 6,66 | 2,18 | 6,739 | 0,65 | 0,1053 | B |
| D-059 | | 2,50 | 2,90 | 0,10 | 1,80 | 3,20 | 4,30 | 0,17 | 4,769 | 3,50 | 3,02 | 1,28 | 0,00 | 6,095 | 0,92 | 3,13 | 0,73 | 5,580 | 0,91 | 0,0429 | B |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-048A | 0,40 | 4,00 | 4,40 | 0,20 | 3,20 | 4,90 | 7,90 | 0,42 | 1,000 | 3,50 | 3,15 | 4,75 | 0,00 | 4,750 | 0,49 | 3,33 | 1,72 | 4,570 | 0,49 | 0,0687 | E |
| VD-049 | | | | | | | 11,20 | 0,58 | 0,636 | 5,50 | 4,15 | 7,05 | 0,00 | 4,486 | 0,44 | 4,43 | 2,90 | 4,308 | 0,43 | 0,0936 | E |
| VD-049A | | | | | | | 11,70 | 0,58 | 0,636 | 5,50 | 4,15 | 7,55 | 0,00 | 4,805 | 0,44 | 4,43 | 2,65 | 4,626 | 0,44 | 0,0936 | E |
| VD-050 | | | | | | | 16,60 | 0,81 | 0,412 | 8,50 | 5,65 | 10,95 | 0,00 | 4,509 | 0,40 | 6,08 | 4,45 | 4,332 | 0,40 | 0,1311 | E |
| VD-050A | | | | | | | 17,50 | 0,81 | 0,412 | 8,50 | 5,65 | 11,85 | 0,00 | 4,879 | 0,41 | 6,08 | 4,00 | 4,702 | 0,41 | 0,1311 | E |
| VD-051 | | | | | | | 24,10 | 1,12 | 0,280 | 12,50 | 7,65 | 16,45 | 14,02 | 4,606 | 0,38 | 8,28 | 6,37 | 4,430 | 0,38 | 0,1810 | E |
| VD-051A | | | | | | | 24,10 | 1,59 | 0,189 | 18,50 | 10,65 | 13,45 | 14,02 | 2,545 | 0,34 | 11,58 | 12,50 | 2,369 | 0,34 | 0,2559 | E |
| VD-051B | | | | | | | 25,10 | 1,12 | 0,280 | 12,50 | 7,65 | 17,45 | 15,79 | 4,886 | 0,38 | 8,28 | 5,88 | 4,710 | 0,39 | 0,1810 | E |
| VD-052 | | | | | | | 35,50 | 1,59 | 0,189 | 18,50 | 10,65 | 24,85 | 29,88 | 4,701 | 0,37 | 11,58 | 9,19 | 4,525 | 0,37 | 0,2559 | E |
| VD-052A | | | | | | | 35,50 | 1,90 | 0,156 | 22,50 | 12,65 | 22,85 | 29,88 | 3,554 | 0,35 | 13,78 | 14,79 | 3,379 | 0,35 | 0,3058 | E |
| VD-052B | | | | | | | 36,60 | 1,59 | 0,189 | 18,50 | 10,65 | 25,95 | 31,19 | 4,909 | 0,38 | 11,58 | 8,65 | 4,734 | 0,37 | 0,2559 | E |
| VD-052C | | 3,60 | 4,00 | 0,20 | 2,80 | 4,50 | 6,40 | 0,34 | 1,372 | 3,50 | 3,11 | 3,29 | 0,00 | 4,513 | 0,53 | 3,27 | 1,63 | 4,294 | 0,53 | 0,0618 | F |
| VD-052D | | | | | | | 9,60 | 0,46 | 0,873 | 5,50 | 4,09 | 5,51 | 0,00 | 4,812 | 0,48 | 4,33 | 2,38 | 4,600 | 0,48 | 0,0843 | F |
| VD-052E | | | | | | | 14,40 | 0,65 | 0,565 | 8,50 | 5,55 | 8,85 | 0,00 | 4,997 | 0,45 | 5,93 | 3,52 | 4,784 | 0,44 | 0,1180 | F |
| VD-052F | | | | | | | 20,80 | 0,90 | 0,384 | 12,50 | 7,51 | 13,29 | 10,83 | 5,105 | 0,42 | 8,06 | 5,04 | 4,893 | 0,42 | 0,1629 | F |
| VD-052G | | | | | | | 30,40 | 1,28 | 0,260 | 18,50 | 10,44 | 19,96 | 25,02 | 5,180 | 0,41 | 11,26 | 7,29 | 4,967 | 0,41 | 0,2303 | F |
| VD-053 | | 3,20 | 3,60 | 0,15 | 2,50 | 4,00 | 5,60 | 0,27 | 1,953 | 3,50 | 3,07 | 2,53 | 0,00 | 4,933 | 0,61 | 3,21 | 1,28 | 4,668 | 0,61 | 0,0549 | E |
| VD-053A | | | | | | | 6,00 | 0,27 | 1,953 | 3,50 | 3,07 | 2,93 | 0,00 | 5,714 | 0,63 | 3,21 | 1,08 | 5,449 | 0,62 | 0,0549 | E |
| VD-054 | | | | | | | 8,30 | 0,38 | 1,243 | 5,50 | 4,03 | 4,27 | 0,00 | 5,306 | 0,55 | 4,25 | 1,87 | 5,034 | 0,55 | 0,0749 | E |
| VD-054A | | | | | | | 8,70 | 0,80 | 1,243 | 5,50 | 4,03 | 4,67 | 0,00 | 5,803 | 0,56 | 4,25 | 1,67 | 5,531 | 0,56 | 0,0749 | E |
| VD-055 | | | | | | | 12,20 | 0,53 | 0,804 | 8,50 | 5,47 | 6,73 | 0,00 | 5,415 | 0,51 | 5,80 | 2,82 | 5,147 | 0,51 | 0,1049 | E |
| VD-055A | | | | | | | 12,80 | 0,53 | 0,804 | 8,50 | 5,47 | 7,33 | 0,00 | 5,898 | 0,52 | 5,80 | 2,52 | 5,630 | 0,51 | 0,1049 | E |
| VD-056 | | | | | | | 17,40 | 0,74 | 0,547 | 12,50 | 7,38 | 10,02 | 6,63 | 5,480 | 0,49 | 7,87 | 4,08 | 5,212 | 0,48 | 0,1448 | E |
| VD-056A | | | | | | | 17,40 | 1,04 | 0,370 | 18,50 | 10,25 | 7,15 | 6,63 | 2,642 | 0,43 | 10,97 | 6,43 | 2,376 | 0,42 | 0,2047 | E |
| VD-056B | | | | | | | 18,30 | 0,74 | 0,547 | 12,50 | 7,38 | 10,92 | 9,20 | 5,972 | 0,49 | 7,87 | 3,64 | 5,704 | 0,49 | 0,1448 | E |
| VD-057 | | | | | | | 25,20 | 1,04 | 0,370 | 18,50 | 10,25 | 14,95 | 19,96 | 5,524 | 0,47 | 10,98 | 5,98 | 5,254 | 0,46 | 0,2047 | E |
| VD-057A | | | | | | | 25,20 | 1,24 | 0,304 | 22,50 | 12,16 | 13,04 | 19,96 | 3,961 | 0,44 | 13,05 | 9,83 | 3,691 | 0,43 | 0,2447 | E |
| VD-057B | | | | | | | 26,50 | 1,04 | 0,370 | 18,50 | 10,25 | 16,25 | 21,59 | 6,004 | 0,48 | 10,98 | 5,33 | 5,735 | 0,47 | 0,2047 | E |
| VD-057C | | 2,80 | 3,20 | 0,15 | 2,10 | 3,50 | 15,00 | 0,61 | 0,816 | 12,50 | 7,27 | 7,73 | 4,80 | 6,312 | 0,59 | 7,70 | 2,97 | 5,959 | 0,59 | 0,1267 | E |
| VD-057D | | | | | | | 18,00 | 0,74 | 0,658 | 15,50 | 8,68 | 9,32 | 11,76 | 6,138 | 0,58 | 9,21 | 3,82 | 5,787 | 0,57 | 0,1529 | E |
| VD-057E | | | | | | | 21,00 | 0,86 | 0,552 | 18,50 | 10,08 | 10,92 | 16,09 | 6,021 | 0,57 | 10,73 | 4,66 | 5,665 | 0,56 | 0,1791 | E |
| VD-058 | | 2,70 | 3,10 | 0,15 | 1,90 | 3,40 | 12,00 | 0,50 | 1,084 | 10,50 | 6,31 | 5,69 | 0,00 | 6,170 | 0,64 | 6,66 | 2,46 | 5,788 | 0,63 | 0,1053 | E |
| VD-059 | | 2,50 | 2,90 | 0,10 | 1,80 | 3,20 | 4,30 | 0,20 | 4,096 | 3,50 | 3,02 | 1,28 | 0,00 | 5,235 | 0,91 | 3,13 | 0,86 | 4,792 | 0,90 | 0,0429 | E |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-059A | 0,40 | 2,50 | 2,90 | 0,10 | 1,80 | 3,20 | 4,70 | 0,20 | 4,096 | 3,50 | 3,02 | 1,68 | 0,00 | 6,873 | 0,93 | 3,13 | 0,66 | 6,431 | 0,92 | 0,0429 | E |
| VD-060 | | | | | | | 6,30 | 0,27 | 2,607 | 5,50 | 3,95 | 2,35 | 0,00 | 6,128 | 0,82 | 4,12 | 1,18 | 5,682 | 0,81 | 0,0585 | F |
| VD-060A | | | | | | | 6,70 | 0,27 | 2,607 | 5,50 | 3,95 | 2,75 | 0,00 | 7,171 | 0,83 | 4,12 | 0,98 | 6,725 | 0,82 | 0,0585 | F |
| VD-061 | | | | | | | 9,00 | 0,39 | 1,687 | 8,50 | 5,34 | 3,66 | 0,00 | 6,174 | 0,75 | 5,61 | 1,81 | 5,718 | 0,74 | 0,0819 | F |
| VD-061A | | | | | | | 9,60 | 0,39 | 1,687 | 8,50 | 5,34 | 4,26 | 0,00 | 7,186 | 0,76 | 5,61 | 1,51 | 6,729 | 0,76 | 0,0819 | E |
| VD-062 | | | | | | | 12,90 | 0,54 | 1,147 | 12,50 | 7,19 | 5,71 | 0,00 | 6,545 | 0,72 | 7,59 | 2,50 | 6,090 | 0,71 | 0,1131 | E |
| VD-062A | | | | | | | 12,90 | 0,76 | 0,775 | 18,50 | 9,97 | 2,93 | 0,00 | 2,268 | 0,62 | 10,56 | 2,34 | 1,813 | 0,62 | 0,1599 | E |
| VD-062B | | | | | | | 13,60 | 0,54 | 1,147 | 12,50 | 7,19 | 6,41 | 5,20 | 7,348 | 0,73 | 7,59 | 2,16 | 6,893 | 0,72 | 0,1131 | E |
| VD-063 | | | | | | | 18,50 | 0,76 | 0,775 | 18,50 | 9,97 | 8,53 | 14,03 | 6,607 | 0,69 | 10,56 | 3,66 | 6,153 | 0,68 | 0,1599 | E |
| VD-063A | | | | | | | 18,50 | 0,91 | 0,637 | 22,50 | 11,83 | 6,67 | 14,03 | 4,252 | 0,64 | 12,54 | 5,96 | 3,797 | 0,64 | 0,1911 | E |
| VD-063B | | | | | | | 19,50 | 0,76 | 0,775 | 18,50 | 9,97 | 9,53 | 15,35 | 7,382 | 0,70 | 10,56 | 3,14 | 6,928 | 0,69 | 0,1599 | E |
| VD-063C | | 2,00 | 2,40 | 0,10 | 1,30 | 2,70 | 3,90 | 0,16 | 8,000 | 3,50 | 2,99 | 0,91 | 0,00 | 7,260 | 1,43 | 3,09 | 0,47 | 6,480 | 1,41 | 0,0343 | E |
| VD-063D | | | | | | | 5,50 | 0,22 | 5,091 | 5,50 | 3,90 | 1,60 | 0,00 | 8,133 | 1,27 | 4,05 | 0,65 | 7,382 | 1,26 | 0,0468 | E |
| VD-063E | | | | | | | 7,80 | 0,31 | 3,294 | 8,50 | 5,27 | 2,53 | 0,00 | 8,342 | 1,17 | 5,50 | 0,98 | 7,576 | 1,16 | 0,0655 | E |
| VD-063F | | | | | | | 10,90 | 0,44 | 2,240 | 12,50 | 7,09 | 3,81 | 4,23 | 8,540 | 1,11 | 7,43 | 1,40 | 7,773 | 1,10 | 0,0905 | E |
| VD-063G | | | | | | | 15,60 | 0,62 | 1,514 | 18,50 | 9,82 | 5,78 | 12,28 | 8,752 | 1,07 | 10,33 | 2,00 | 7,976 | 1,06 | 0,1279 | E |
| VD-063H | | 1,80 | 2,20 | 0,10 | 1,10 | 2,50 | 13,00 | 0,34 | 3,073 | 12,50 | 8,20 | 4,80 | 9,67 | 14,749 | 1,51 | 9,65 | 0,79 | 10,294 | 1,28 | 0,0814 | E |
| VD-063H-01 | | 1,30 | 1,70 | 0,10 | 0,70 | 1,90 | 3,00 | 0,14 | 29,131 | 3,50 | 2,96 | 0,04 | 0,00 | 1,102 | 0,35 | 2,90 | 0,10 | 2,913 | 2,23 | 0,0223 | E |
| VD-063H-02 | | | | | | | 4,20 | 0,16 | 18,538 | 5,50 | 3,85 | 0,35 | 0,00 | 6,398 | 0,51 | 3,98 | 0,22 | 4,078 | 2,39 | 0,0304 | E |
| VD-063H-03 | | | | | | | 6,20 | 0,20 | 11,995 | 8,50 | 5,19 | 1,01 | 0,00 | 12,069 | 0,72 | 5,39 | 0,37 | 9,716 | 2,61 | 0,0426 | E |
| VD-063H-04 | | | | | | | 8,60 | 0,22 | 8,157 | 12,50 | 6,98 | 1,62 | 5,84 | 13,220 | 0,74 | 7,27 | 0,48 | 10,848 | 2,62 | 0,0588 | E |
| VD-063H-05 | | | | | | | 12,40 | 0,30 | 5,511 | 18,50 | 9,66 | 2,74 | 10,73 | 15,116 | 0,81 | 10,10 | 0,54 | 12,676 | 2,69 | 0,0832 | E |
| VD-063H-08 | 0,50 | 11,00 | 11,50 | 0,40 | 9,90 | 12,30 | 8,50 | 2,20 | 0,183 | 2,25 | 3,05 | 5,45 | 0,00 | 0,995 | 0,50 | 3,52 | 4,95 | 0,909 | 0,50 | 0,2280 | F |
| VD-063H-09 | | | | | | | 10,50 | 2,70 | 0,149 | 2,75 | 3,51 | 6,99 | 0,00 | 1,044 | 0,45 | 4,08 | 6,40 | 0,959 | 0,48 | 0,2548 | F |
| VD-063H-10 | | | | | | | 14,50 | 0,80 | 0,117 | 3,50 | 4,20 | 10,30 | 0,00 | 1,210 | 0,44 | 4,93 | 9,57 | 1,123 | 0,42 | 0,2950 | F |
| VD-063H-11 | | | | | | | 22,40 | 1,80 | 0,075 | 5,50 | 6,02 | 16,38 | 0,00 | 1,224 | 0,42 | 7,16 | 15,24 | 1,138 | 0,42 | 0,4023 | F |
| VD-063H-12 | | | | | | | 33,80 | 2,10 | 0,048 | 8,50 | 8,76 | 25,04 | 0,00 | 1,210 | 0,39 | 10,52 | 23,28 | 1,125 | 0,39 | 0,5632 | F |
| VD-063H-13 | | | | | | | 49,40 | 2,80 | 0,033 | 12,50 | 12,41 | 36,99 | 0,00 | 1,216 | 0,37 | 14,99 | 34,41 | 1,131 | 0,37 | 0,7777 | F |
| VD-063H-14 | | | | | | | 74,30 | 4,00 | 0,022 | 18,50 | 17,89 | 56,41 | 51,75 | 1,253 | 0,36 | 21,71 | 52,59 | 1,168 | 0,36 | 1,0995 | F |
| VD-063H-20 | | 8,00 | 8,50 | 0,35 | 6,90 | 9,60 | 8,00 | 1,10 | 0,475 | 2,25 | 2,67 | 5,33 | 0,00 | 2,530 | 0,60 | 2,94 | 5,05 | 2,402 | 0,65 | 0,1658 | F |
| VD-063H-21 | | | | | | | 13,00 | 1,30 | 0,388 | 2,75 | 3,04 | 9,96 | 0,00 | 3,869 | 0,60 | 3,37 | 5,35 | 3,740 | 0,61 | 0,1853 | F |
| VD-063H-22 | | | | | | | 18,00 | 1,40 | 0,329 | 3,25 | 3,41 | 14,59 | 0,00 | 4,795 | 0,60 | 3,80 | 5,50 | 4,667 | 0,60 | 0,2048 | F |
| VD-063J | | | | | | | 23,40 | 1,64 | 0,305 | 3,50 | 3,60 | 19,80 | 0,00 | 6,043 | 0,60 | 4,85 | 4,17 | 5,661 | 0,60 | 0,2145 | F |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-059A | 0,40 | 2,50 | 2,90 | 0,10 | 1,80 | 3,20 | 4,70 | 0,17 | 4,769 | 3,50 | 3,02 | 1,68 | 0,00 | 8,002 | 0,95 | 3,13 | 0,59 | 7,487 | 0,89 | 0,0429 | B |
| D-060 | | | | | | | 6,30 | 0,24 | 3,035 | 5,50 | 3,95 | 2,35 | 0,00 | 7,135 | 0,83 | 4,12 | 1,03 | 6,616 | 0,82 | 0,0585 | B |
| D-060A | | | | | | | 6,70 | 0,24 | 3,035 | 5,50 | 3,95 | 2,75 | 0,00 | 8,349 | 0,85 | 4,12 | 0,89 | 7,830 | 0,84 | 0,0585 | B |
| D-061 | | | | | | | 9,00 | 0,33 | 1,964 | 8,50 | 5,34 | 3,66 | 0,00 | 7,189 | 0,77 | 5,61 | 1,58 | 6,657 | 0,76 | 0,0819 | B |
| D-061A | | | | | | | 9,60 | 0,33 | 1,964 | 8,50 | 5,34 | 4,26 | 0,00 | 8,367 | 0,78 | 5,61 | 1,37 | 7,835 | 0,78 | 0,0819 | B |
| D-062 | | | | | | | 12,90 | 0,46 | 1,335 | 12,50 | 7,19 | 5,71 | 2,56 | 7,621 | 0,73 | 7,59 | 2,21 | 7,090 | 0,72 | 0,1131 | B |
| D-062A | | | | | | | 12,90 | 0,65 | 0,902 | 18,50 | 9,97 | 2,93 | 2,56 | 2,640 | 0,63 | 10,56 | 2,34 | 2,111 | 0,62 | 0,1599 | B |
| D-062B | | | | | | | 13,60 | 0,46 | 1,335 | 12,50 | 7,19 | 6,41 | 5,93 | 8,555 | 0,75 | 7,59 | 1,97 | 8,025 | 0,74 | 0,1131 | B |
| D-063 | | | | | | | 18,50 | 0,65 | 0,902 | 18,50 | 9,97 | 8,53 | 14,16 | 7,693 | 0,71 | 10,56 | 3,24 | 7,164 | 0,70 | 0,1599 | B |
| D-063A | | | | | | | 18,50 | 0,78 | 0,742 | 22,50 | 11,83 | 6,67 | 14,16 | 4,950 | 0,65 | 12,54 | 5,21 | 4,421 | 0,65 | 0,1911 | B |
| D-063B | | | | | | | 19,50 | 0,65 | 0,902 | 18,50 | 9,97 | 9,53 | 15,46 | 8,595 | 0,72 | 10,56 | 2,90 | 8,066 | 0,71 | 0,1599 | B |
| D-063C | | 2,00 | 2,40 | 0,10 | 1,30 | 2,70 | 3,90 | 0,14 | 9,314 | 3,50 | 2,99 | 0,91 | 0,00 | 8,453 | 1,45 | 3,09 | 0,41 | 7,545 | 1,43 | 0,0343 | B |
| D-063D | | | | | | | 5,50 | 0,19 | 5,927 | 5,50 | 3,90 | 1,60 | 0,00 | 9,469 | 1,30 | 4,05 | 0,58 | 8,595 | 1,28 | 0,0468 | B |
| D-063E | | | | | | | 7,80 | 0,27 | 3,835 | 8,50 | 5,27 | 2,53 | 0,00 | 9,713 | 1,19 | 5,50 | 0,87 | 8,821 | 1,18 | 0,0655 | B |
| D-063F | | | | | | | 10,90 | 0,37 | 2,608 | 12,50 | 7,09 | 3,81 | 4,80 | 9,943 | 1,13 | 7,43 | 1,25 | 9,050 | 1,01 | 0,0905 | B |
| D-063G | | | | | | | 15,60 | 0,53 | 1,762 | 18,50 | 9,82 | 5,78 | 12,37 | 10,190 | 1,09 | 10,33 | 1,81 | 9,287 | 1,08 | 0,1279 | B |
| D-063H | | 1,80 | 2,20 | 0,10 | 1,10 | 2,50 | 13,00 | 0,34 | 3,578 | 12,50 | 8,02 | 4,98 | 9,77 | 17,816 | 1,52 | 8,90 | 0,52 | 14,668 | 1,45 | 0,0814 | B |
| D-063H-01 | | 1,30 | 1,70 | 0,10 | 0,70 | 1,90 | 3,00 | 0,14 | 33,916 | 3,50 | 2,96 | 0,04 | 0,00 | 1,283 | 0,40 | 2,84 | 0,16 | 5,427 | 0,27 | 0,0223 | B |
| D-063H-02 | | | | | | | 4,20 | 0,16 | 21,583 | 5,50 | 3,85 | 0,35 | 0,00 | 7,449 | 0,59 | 3,98 | 0,22 | 4,748 | 0,45 | 0,0304 | B |
| D-063H-03 | | | | | | | 6,20 | 0,20 | 13,966 | 8,50 | 5,19 | 1,01 | 0,00 | 14,051 | 0,84 | 5,39 | 0,33 | 11,312 | 0,71 | 0,0426 | B |
| D-063H-04 | | | | | | | 8,60 | 0,22 | 9,497 | 12,50 | 6,98 | 1,62 | 5,90 | 15,392 | 0,86 | 7,27 | 0,43 | 12,630 | 0,72 | 0,0588 | B |
| D-063H-05 | | | | | | | 12,40 | 0,30 | 6,417 | 18,50 | 9,66 | 2,74 | 10,77 | 17,599 | 0,94 | 10,09 | 0,54 | 14,822 | 0,80 | 0,0832 | B |
| D-063H-08 | 0,50 | 11,00 | 11,50 | 0,40 | 9,90 | 12,30 | 8,50 | 2,25 | 0,213 | 2,25 | 3,05 | 5,45 | 0,00 | 1,159 | 0,50 | 3,52 | 4,90 | 1,059 | 0,50 | 0,2280 | B |
| D-063H-09 | | | | | | | 10,50 | 2,55 | 0,174 | 2,75 | 3,51 | 6,99 | 0,00 | 1,216 | 0,46 | 4,08 | 6,00 | 1,117 | 0,47 | 0,2548 | B |
| D-063H-10 | | | | | | | 14,50 | 0,80 | 0,137 | 3,50 | 4,20 | 10,30 | 0,00 | 1,408 | 0,48 | 4,93 | 9,50 | 1,308 | 0,48 | 0,2950 | B |
| D-063H-11 | | | | | | | 22,40 | 1,80 | 0,087 | 5,50 | 6,02 | 16,38 | 0,00 | 1,425 | 0,43 | 7,16 | 15,24 | 1,326 | 0,43 | 0,4023 | B |
| D-063H-12 | | | | | | | 33,80 | 2,10 | 0,056 | 8,50 | 8,76 | 25,04 | 0,00 | 1,409 | 0,40 | 10,52 | 23,28 | 1,310 | 0,40 | 0,5632 | B |
| D-063H-13 | | | | | | | 49,40 | 2,80 | 0,038 | 12,50 | 12,41 | 36,99 | 0,00 | 1,416 | 0,38 | 14,99 | 34,41 | 1,317 | 0,38 | 0,7777 | B |
| D-063H-14 | | | | | | | 74,30 | 4,00 | 0,026 | 18,50 | 17,89 | 56,41 | 52,40 | 1,459 | 0,36 | 21,71 | 52,00 | 1,360 | 0,36 | 1,0995 | B |
| D-063H-20 | | 8,00 | 8,50 | 0,35 | 6,90 | 9,60 | 8,00 | 1,08 | 0,553 | 2,25 | 2,67 | 5,33 | 0,00 | 2,946 | 0,64 | 2,94 | 5,01 | 2,797 | 0,64 | 0,1658 | B |
| D-063H-21 | | | | | | | 13,00 | 1,23 | 0,452 | 2,75 | 3,04 | 9,96 | 0,00 | 4,504 | 0,62 | 3,39 | 4,94 | 4,346 | 0,62 | 0,1853 | B |
| D-063H-22 | | | | | | | 18,00 | 1,37 | 0,383 | 3,25 | 3,41 | 14,59 | 0,00 | 5,583 | 0,61 | 3,80 | 4,73 | 5,434 | 0,61 | 0,2048 | B |
| D-063J | | | | | | | 23,40 | 1,44 | 0,355 | 3,50 | 3,60 | 19,80 | 0,00 | 7,036 | 0,62 | 4,02 | 3,90 | 6,886 | 0,61 | 0,2145 | B |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-063K | 0,50 | 8,00 | 8,50 | 0,35 | 6,90 | 9,60 | 35,80 | 1,98 | 0,226 | 5,50 | 5,08 | 30,72 | 0,00 | 6,946 | 0,55 | 5,75 | 6,30 | 6,795 | 0,55 | 0,2926 | B | | | | |
| D-063L | | | | | | | 60,50 | 3,06 | 0,131 | 9,50 | 8,05 | 52,45 | 47,03 | 6,866 | 0,50 | 9,20 | 11,15 | 6,715 | 0,50 | 0,4486 | B | | | | |
| D-063M | | | | | | | 97,60 | 4,67 | 0,080 | 15,50 | 12,50 | 85,10 | 90,02 | 6,828 | 0,48 | 20,50 | 20,03 | 6,186 | 0,47 | 0,6826 | B | | | | |
| D-063N | 7,10 | 7,60 | 0,35 | 6,10 | 8,40 | 15,00 | 1,03 | 0,508 | 3,50 | 3,45 | 11,55 | 0,00 | 5,868 | 0,61 | 3,81 | 4,34 | 5,688 | 0,61 | 0,1904 | B | | | | | |
| D-0630 | | | | | | 23,00 | 1,43 | 0,323 | 5,50 | 4,86 | 18,14 | 0,00 | 5,868 | 0,55 | 5,41 | 6,99 | 5,690 | 0,54 | 0,2596 | B | | | | | |
| D-063P | | | | | | 35,00 | 2,01 | 0,209 | 8,50 | 6,96 | 28,04 | 0,00 | 5,868 | 0,51 | 7,82 | 10,54 | 5,689 | 0,51 | 0,3635 | B | | | | | |
| D-063Q | 7,00 | 7,50 | 0,30 | 6,00 | 8,40 | 55,00 | 2,98 | 0,132 | 13,50 | 10,47 | 44,53 | 43,40 | 5,868 | 0,48 | 11,83 | 16,69 | 5,689 | 0,48 | 0,5366 | B | | | | | |
| D-063Q-03 | | | | | | 8,00 | 0,75 | 0,825 | 2,25 | 2,57 | 5,43 | 0,00 | 4,480 | 0,69 | 2,79 | 3,32 | 4,298 | 0,68 | 0,1451 | B | | | | | |
| D-063Q-04 | | | | | | 12,00 | 0,85 | 0,675 | 2,75 | 2,92 | 9,08 | 0,00 | 6,129 | 0,67 | 3,19 | 3,21 | 5,947 | 0,66 | 0,1621 | B | | | | | |
| D-063Q-01 | 6,30 | 6,80 | 0,25 | 5,40 | 7,50 | 19,00 | 0,99 | 0,530 | 3,50 | 3,44 | 15,56 | 0,00 | 8,253 | 0,65 | 3,78 | 2,78 | 8,072 | 0,65 | 0,1877 | B | | | | | |
| D-063R | | | | | | 8,00 | 0,56 | 1,132 | 2,25 | 2,51 | 5,49 | 0,00 | 6,213 | 0,73 | 2,70 | 2,27 | 5,998 | 0,73 | 0,1306 | B | | | | | |
| D-063S | | | | | | 11,00 | 0,64 | 0,926 | 2,75 | 2,84 | 8,16 | 0,00 | 7,556 | 0,70 | 3,07 | 2,28 | 7,343 | 0,70 | 0,1459 | B | | | | | |
| D-064 | 6,00 | 6,50 | 0,25 | 5,00 | 7,00 | 13,50 | 0,75 | 0,728 | 3,50 | 3,34 | 10,16 | 0,00 | 7,391 | 0,65 | 3,64 | 2,98 | 7,174 | 0,65 | 0,1690 | B | | | | | |
| D-065 | | | | | | 20,00 | 1,03 | 0,463 | 5,50 | 4,68 | 15,32 | 0,00 | 7,093 | 0,58 | 5,15 | 4,90 | 6,875 | 0,58 | 0,2304 | B | | | | | |
| D-066 | | | | | | 30,00 | 1,45 | 0,300 | 8,50 | 6,69 | 23,31 | 0,00 | 6,984 | 0,54 | 7,41 | 7,69 | 6,767 | 0,54 | 0,3225 | B | | | | | |
| D-067 | | | | | | 44,00 | 2,01 | 0,204 | 12,50 | 9,36 | 34,64 | 32,12 | 7,056 | 0,51 | 10,42 | 11,18 | 6,841 | 0,51 | 0,4454 | B | | | | | |
| D-067A | | | | | | 44,00 | 2,84 | 0,138 | 18,50 | 13,38 | 30,62 | 32,12 | 4,215 | 0,40 | 14,94 | 23,66 | 4,000 | 0,45 | 0,6297 | B | | | | | |
| D-068 | | | | | | 65,00 | 2,84 | 0,138 | 18,50 | 13,38 | 51,62 | 57,79 | 7,105 | 0,50 | 14,94 | 16,40 | 6,890 | 0,49 | 0,6297 | B | | | | | |
| D-068A | | | | | | 65,00 | 3,39 | 0,113 | 22,50 | 16,05 | 48,95 | 57,79 | 5,539 | 0,47 | 17,96 | 24,80 | 5,324 | 0,46 | 0,7526 | B | | | | | |
| D-068A-17 | | | | | | 5,50 | 6,00 | 0,25 | 4,50 | 6,50 | 7,50 | 0,53 | 1,179 | 2,50 | 2,65 | 4,85 | 0,00 | 5,719 | 0,71 | 2,84 | 2,50 | 5,495 | 0,70 | 0,1317 | B |
| D-068A-01 | | | | | | | | | | | 9,80 | 0,65 | 0,842 | 3,50 | 3,30 | 6,50 | 0,00 | 5,472 | 0,63 | 3,58 | 3,61 | 5,239 | 0,63 | 0,1609 | B |
| D-068A-02 | | | | | | | | | | | 15,40 | 0,90 | 0,536 | 5,50 | 4,62 | 10,78 | 0,00 | 5,778 | 0,57 | 5,05 | 5,48 | 5,547 | 0,57 | 0,2194 | B |
| D-068A-03 | | | | | | | | | | | 23,80 | 1,27 | 0,347 | 8,50 | 6,59 | 17,21 | 0,00 | 5,967 | 0,53 | 7,26 | 8,27 | 5,736 | 0,53 | 0,3072 | B |
| D-068A-04 | | | | | | | | | | | 35,00 | 1,76 | 0,236 | 12,50 | 9,23 | 25,78 | 19,54 | 6,078 | 0,51 | 10,21 | 12,00 | 5,846 | 0,50 | 0,4242 | B |
| D-068A-05 | | | | | | 51,80 | 2,49 | 0,159 | 18,50 | 13,17 | 38,63 | 43,30 | 6,155 | 0,49 | 14,63 | 17,63 | 5,923 | 0,49 | 0,5997 | B | | | | | |
| D-068A-10 | | | | | | 5,10 | 5,60 | 0,25 | 4,20 | 6,20 | 6,60 | 0,52 | 1,093 | 3,50 | 3,24 | 3,36 | 0,00 | 3,671 | 0,63 | 3,49 | 3,10 | 3,401 | 0,62 | 0,1475 | B |
| D-068A-11 | | | | | | | | | | | 12,30 | 0,82 | 0,589 | 6,50 | 5,16 | 7,14 | 0,00 | 4,201 | 0,55 | 5,62 | 6,59 | 3,933 | 0,54 | 0,2280 | B |
| D-068A-12 | | | | | | | | | | | 15,00 | 0,62 | 0,850 | 4,50 | 3,88 | 11,12 | 0,00 | 9,454 | 0,67 | 4,20 | 2,51 | 9,185 | 0,67 | 0,1743 | B |
| D-068A-13 | 19,90 | 1,21 | 0,364 | 10,50 | 7,73 | | | | | | 12,17 | 0,00 | 4,436 | 0,51 | 8,47 | 10,43 | 4,166 | 0,51 | 0,3352 | B | | | | | |
| D-068A-14 | 23,70 | 1,41 | 0,306 | 12,50 | 9,01 | | | | | | 14,69 | 0,00 | 4,498 | 0,50 | 9,89 | 12,34 | 4,228 | 0,50 | 0,3889 | B | | | | | |
| D-068A-15 | 27,50 | 1,61 | 0,264 | 14,50 | 10,29 | | | | | | 17,21 | 0,00 | 4,542 | 0,49 | 11,31 | 14,25 | 4,273 | 0,49 | 0,4425 | B | | | | | |
| D-068A-16 | 33,00 | 1,21 | 0,364 | 10,50 | 7,73 | | | | | | 25,27 | 19,62 | 9,211 | 0,58 | 8,47 | 6,08 | 8,941 | 0,58 | 0,3352 | B | | | | | |
| D-069 | 25,00 | 0,81 | 0,600 | 8,00 | 6,02 | 18,98 | 0,00 | 11,385 | 0,66 | 6,54 | 3,05 | 11,076 | 0,65 | 0,2487 | B | | | | | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-063K | 0,50 | 8,00 | 8,50 | 0,35 | 6,90 | 9,60 | 35,80 | 2,31 | 0,194 | 5,50 | 5,08 | 30,72 | 0,00 | 5,966 | 0,54 | 6,68 | 6,58 | 5,655 | 0,54 | 0,2926 | F |
| VD-063L | | | | | | | 60,50 | 3,56 | 0,112 | 9,50 | 8,05 | 52,45 | 46,64 | 5,897 | 0,49 | 10,00 | 11,34 | 5,678 | 0,49 | 0,4486 | F |
| VD-063M | | | | | | | 97,60 | 5,43 | 0,069 | 15,50 | 12,50 | 85,10 | 89,85 | 5,864 | 0,46 | 16,40 | 18,88 | 5,596 | 0,46 | 0,6826 | F |
| VD-063N | 7,10 | 7,60 | 0,35 | 6,10 | 8,40 | 15,00 | 1,20 | 0,437 | 3,50 | 3,45 | 11,55 | 0,00 | 5,040 | 0,60 | 3,80 | 4,86 | 4,889 | 0,60 | 0,1904 | F | |
| VD-0630 | | | | | | 23,00 | 1,66 | 0,278 | 5,50 | 4,86 | 18,14 | 0,00 | 5,040 | 0,54 | 5,92 | 7,90 | 4,745 | 0,54 | 0,2596 | F | |
| VD-063P | | | | | | 35,00 | 2,34 | 0,180 | 8,50 | 6,96 | 28,04 | 0,00 | 5,040 | 0,50 | 7,82 | 11,81 | 4,886 | 0,49 | 0,3635 | F | |
| VD-063Q | 7,00 | 7,50 | 0,30 | 6,00 | 8,40 | 55,00 | 3,47 | 0,113 | 13,50 | 10,47 | 44,53 | 43,10 | 5,040 | 0,47 | 11,83 | 18,83 | 4,886 | 0,47 | 0,5366 | F | |
| VD-063Q-03 | | | | | | 8,00 | 0,80 | 0,709 | 2,25 | 2,57 | 5,43 | 0,00 | 3,848 | 0,70 | 2,79 | 3,52 | 3,692 | 0,70 | 0,1451 | F | |
| VD-063Q-04 | | | | | | 12,00 | 0,90 | 0,580 | 2,75 | 2,92 | 9,08 | 0,00 | 5,264 | 0,60 | 3,19 | 3,60 | 5,108 | 0,65 | 0,1621 | F | |
| VD-063Q-01 | 6,30 | 6,80 | 0,25 | 5,40 | 7,50 | 19,00 | 1,16 | 0,456 | 3,50 | 3,44 | 15,56 | 0,00 | 7,088 | 0,63 | 5,00 | 3,17 | 6,378 | 0,63 | 0,1877 | F | |
| VD-063R | | | | | | 8,00 | 0,70 | 0,972 | 2,25 | 2,51 | 5,49 | 0,00 | 5,336 | 0,70 | 2,70 | 2,50 | 5,152 | 0,75 | 0,1306 | F | |
| VD-063S | | | | | | 11,00 | 0,80 | 0,795 | 2,75 | 2,84 | 8,16 | 0,00 | 6,490 | 0,70 | 3,07 | 2,50 | 6,307 | 0,70 | 0,1459 | F | |
| VD-064 | 6,00 | 6,50 | 0,25 | 5,00 | 7,00 | 13,50 | 0,87 | 0,625 | 3,50 | 3,34 | 10,16 | 0,00 | 6,348 | 0,64 | 3,63 | 3,22 | 6,168 | 0,63 | 0,1690 | F | |
| VD-065 | | | | | | 20,00 | 1,20 | 0,398 | 5,50 | 4,68 | 15,32 | 0,00 | 6,092 | 0,57 | 5,15 | 5,35 | 5,905 | 0,56 | 0,2304 | F | |
| VD-066 | | | | | | 30,00 | 1,69 | 0,257 | 8,50 | 6,69 | 23,31 | 0,00 | 5,999 | 0,52 | 7,41 | 8,51 | 5,813 | 0,52 | 0,3225 | F | |
| VD-067 | | | | | | 44,00 | 2,33 | 0,175 | 12,50 | 9,36 | 34,64 | 31,74 | 6,060 | 0,50 | 10,42 | 12,32 | 5,875 | 0,50 | 0,4454 | F | |
| VD-067A | | | | | | 44,00 | 3,31 | 0,118 | 18,50 | 13,38 | 30,62 | 31,74 | 3,620 | 0,45 | 14,95 | 28,49 | 3,434 | 0,44 | 0,6297 | F | |
| VD-068 | | | | | | 65,00 | 3,31 | 0,118 | 18,50 | 13,38 | 51,62 | 57,62 | 6,103 | 0,48 | 14,95 | 18,11 | 5,917 | 0,48 | 0,6297 | F | |
| VD-068A | | | | | | 65,00 | 3,95 | 0,097 | 22,50 | 16,05 | 48,95 | 57,62 | 4,758 | 0,46 | 17,95 | 28,86 | 4,573 | 0,45 | 0,7526 | F | |
| VD-068A-17 | | | | | | 7,50 | 0,60 | 1,013 | 2,50 | 2,65 | 4,85 | 0,00 | 4,912 | 0,70 | 2,84 | 2,70 | 4,719 | 0,70 | 0,1317 | F | |
| VD-068A-01 | | | | | | 9,80 | 0,76 | 0,723 | 3,50 | 3,30 | 6,50 | 0,00 | 4,700 | 0,62 | 3,58 | 4,24 | 4,499 | 0,62 | 0,1609 | F | |
| VD-068A-02 | | | | | | 15,40 | 1,05 | 0,460 | 5,50 | 4,62 | 10,78 | 0,00 | 4,963 | 0,56 | 5,06 | 6,38 | 4,760 | 0,56 | 0,2194 | F | |
| VD-068A-03 | 23,80 | 1,48 | 0,298 | 8,50 | 6,59 | 17,21 | 0,00 | 5,125 | 0,52 | 7,26 | 9,57 | 4,927 | 0,51 | 0,3072 | F | | | | | | |
| VD-068A-04 | 35,00 | 2,05 | 0,203 | 12,50 | 9,23 | 25,78 | 18,76 | 5,221 | 0,49 | 10,21 | 13,82 | 5,021 | 0,49 | 0,4242 | F | | | | | | |
| VD-068A-05 | 51,80 | 2,90 | 0,137 | 18,50 | 13,17 | 38,63 | 43,08 | 5,286 | 0,48 | 14,63 | 20,24 | 5,087 | 0,47 | 0,5997 | F | | | | | | |
| VD-068A-10 | 5,50 | 6,00 | 0,25 | 4,50 | 6,50 | 6,60 | 0,61 | 0,939 | 3,50 | 3,24 | 3,36 | 0,00 | 3,153 | 0,62 | 3,49 | 3,11 | 2,921 | 0,62 | 0,1475 | F | |
| VD-068A-11 | | | | | | 12,30 | 0,96 | 0,506 | 6,50 | 5,16 | 7,14 | 0,00 | 3,608 | 0,54 | 5,62 | 6,60 | 3,378 | 0,53 | 0,2280 | F | |
| VD-068A-12 | | | | | | 15,00 | 0,73 | 0,730 | 4,50 | 3,88 | 11,12 | 0,00 | 8,120 | 0,65 | 4,20 | 2,48 | 7,889 | 0,65 | 0,1743 | F | |
| VD-068A-13 | | | | | | 19,90 | 1,41 | 0,313 | 10,50 | 7,73 | 12,17 | 0,00 | 3,810 | 0,50 | 8,47 | 11,40 | 3,578 | 0,50 | 0,3352 | F | |
| VD-068A-14 | | | | | | 23,70 | 1,64 | 0,263 | 12,50 | 9,01 | 14,69 | 0,00 | 3,863 | 0,49 | 9,89 | 13,70 | 3,631 | 0,49 | 0,3889 | F | |
| VD-068A-15 | | | | | | 27,50 | 1,87 | 0,227 | 14,50 | 10,29 | 17,21 | 0,00 | 3,901 | 0,48 | 11,31 | 13,52 | 3,670 | 0,48 | 0,4425 | F | |
| VD-068A-16 | | | | | | 33,00 | 1,41 | 0,313 | 10,50 | 7,73 | 25,27 | 19,02 | 7,911 | 0,56 | 8,47 | 6,12 | 7,679 | 0,57 | 0,3352 | F | |
| VD-069 | 5,10 | 5,60 | 0,25 | 4,20 | 6,20 | 25,00 | 0,94 | 0,515 | 8,00 | 6,02 | 18,98 | 0,00 | 9,779 | 0,64 | 8,55 | 3,71 | 8,477 | 0,63 | 0,2487 | F | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-069A | 0,50 | 5,00 | 5,50 | 0,25 | 4,10 | 6,10 | 7,50 | 0,40 | 1,750 | 2,50 | 2,56 | 4,94 | 0,00 | 8,645 | 0,80 | 2,72 | 1,20 | 8,365 | 0,85 | 0,1097 | F |
| VD-070 | | | | | | | 9,40 | 0,49 | 1,250 | 3,50 | 3,19 | 6,21 | 0,00 | 7,766 | 0,73 | 3,41 | 2,01 | 7,488 | 0,72 | 0,1341 | F |
| VD-070A | | | | | | | 11,10 | 0,49 | 1,250 | 3,50 | 3,19 | 7,91 | 0,00 | 9,891 | 0,76 | 4,20 | 1,56 | 8,625 | 0,75 | 0,1341 | F |
| VD-071 | | | | | | | 14,00 | 0,67 | 0,795 | 5,50 | 4,44 | 9,56 | 0,00 | 7,607 | 0,65 | 4,79 | 3,26 | 7,326 | 0,65 | 0,1828 | F |
| VD-071A | | | | | | | 16,40 | 0,67 | 0,795 | 5,50 | 4,44 | 11,96 | 0,00 | 9,516 | 0,68 | 5,60 | 2,47 | 8,591 | 0,67 | 0,1828 | F |
| VD-072 | | | | | | | 20,50 | 0,95 | 0,515 | 8,50 | 6,31 | 14,19 | 0,00 | 7,302 | 0,60 | 6,84 | 5,31 | 7,031 | 0,59 | 0,2560 | F |
| VD-072A | | | | | | | 27,10 | 1,04 | 0,461 | 9,50 | 6,94 | 20,16 | 10,12 | 9,285 | 0,62 | 8,50 | 4,28 | 8,566 | 0,61 | 0,2804 | F |
| VD-073 | | | | | | | 30,00 | 1,31 | 0,350 | 12,50 | 8,81 | 21,19 | 17,29 | 7,416 | 0,57 | 9,59 | 7,65 | 7,144 | 0,57 | 0,3535 | F |
| VD-073A | | | | | | | 30,00 | 1,86 | 0,236 | 18,50 | 12,56 | 17,44 | 17,29 | 4,124 | 0,50 | 13,72 | 16,28 | 3,850 | 0,50 | 0,4998 | F |
| VD-074 | | | | | | | 44,50 | 1,86 | 0,236 | 18,50 | 12,56 | 31,94 | 37,50 | 7,553 | 0,55 | 13,72 | 11,07 | 7,279 | 0,55 | 0,4998 | F |
| VD-074A | | | | | | | 44,50 | 2,22 | 0,194 | 22,50 | 15,06 | 29,44 | 37,50 | 5,724 | 0,52 | 16,47 | 18,12 | 5,450 | 0,51 | 0,5973 | F |
| VD-074B | | 4,80 | 5,30 | 0,25 | 3,90 | 5,80 | 8,00 | 0,45 | 1,413 | 3,50 | 3,17 | 4,83 | 0,00 | 6,828 | 0,73 | 3,38 | 2,27 | 6,527 | 0,73 | 0,1287 | F |
| VD-074C | | | | | | | 12,00 | 0,62 | 0,899 | 5,50 | 4,41 | 7,59 | 0,00 | 6,828 | 0,66 | 4,74 | 3,57 | 6,527 | 0,65 | 0,1755 | F |
| VD-074D | | | | | | | 19,00 | 0,87 | 0,582 | 8,50 | 6,26 | 12,74 | 0,00 | 7,410 | 0,62 | 6,77 | 5,01 | 7,115 | 0,61 | 0,2457 | F |
| VD-075 | | | | | | | 28,00 | 1,08 | 0,450 | 11,00 | 7,81 | 20,19 | 15,01 | 9,076 | 0,62 | 8,47 | 4,64 | 8,780 | 0,62 | 0,3043 | F |
| VD-075A | | | | | | | 29,00 | 1,29 | 0,366 | 13,50 | 9,36 | 19,64 | 16,97 | 7,195 | 0,58 | 10,17 | 8,27 | 6,897 | 0,57 | 0,3628 | F |
| VD-075A-01 | | 4,50 | 5,00 | 0,25 | 3,40 | 5,60 | 6,00 | 0,30 | 2,401 | 2,50 | 2,53 | 3,47 | 0,00 | 8,330 | 0,90 | 2,67 | 1,20 | 7,994 | 0,90 | 0,0987 | F |
| VD-075B | | | | | | | 8,00 | 0,39 | 1,715 | 3,50 | 3,14 | 4,86 | 0,00 | 8,337 | 0,80 | 3,33 | 1,66 | 8,008 | 0,81 | 0,1207 | F |
| VD-075C | | | | | | | 12,00 | 0,54 | 1,091 | 5,50 | 4,36 | 7,64 | 0,00 | 8,337 | 0,72 | 4,67 | 2,61 | 7,998 | 0,71 | 0,1646 | F |
| VD-075D | | | | | | | 17,00 | 0,76 | 0,706 | 8,50 | 6,19 | 10,81 | 0,00 | 7,631 | 0,65 | 6,66 | 4,52 | 7,300 | 0,65 | 0,2304 | F |
| VD-075E | | | | | | | 26,00 | 1,06 | 0,480 | 12,50 | 8,63 | 17,37 | 13,53 | 8,337 | 0,63 | 9,32 | 5,92 | 8,008 | 0,63 | 0,3182 | F |
| VD-075F | | | | | | | 37,00 | 1,49 | 0,324 | 18,50 | 12,30 | 24,70 | 30,04 | 8,013 | 0,61 | 13,33 | 9,28 | 7,679 | 0,60 | 0,4498 | F |
| VD-076 | | 4,00 | 4,50 | 0,15 | 3,10 | 4,90 | 7,00 | 0,32 | 2,441 | 3,50 | 3,09 | 3,91 | 0,00 | 9,539 | 0,92 | 3,26 | 1,23 | 9,131 | 0,92 | 0,1073 | F |
| VD-077 | | | | | | | 10,00 | 0,44 | 1,554 | 5,50 | 4,29 | 5,71 | 0,00 | 8,873 | 0,82 | 4,56 | 2,15 | 8,452 | 0,81 | 0,1463 | F |
| VD-078 | | | | | | | 15,00 | 0,62 | 1,005 | 8,50 | 6,08 | 8,92 | 0,00 | 8,964 | 0,76 | 6,50 | 3,28 | 8,545 | 0,75 | 0,2048 | F |
| VD-078A | | | | | | | 20,00 | 0,68 | 0,899 | 9,50 | 6,68 | 13,32 | 0,00 | 11,980 | 0,79 | 8,40 | 2,62 | 10,434 | 0,79 | 0,2243 | F |
| VD-079 | | | | | | | 21,50 | 0,86 | 0,684 | 12,50 | 8,48 | 13,03 | 7,35 | 8,904 | 0,72 | 9,10 | 4,86 | 8,477 | 0,71 | 0,2828 | F |
| VD-079A | | | | | | | 21,50 | 1,22 | 0,462 | 18,50 | 12,06 | 9,44 | 0,00 | 4,359 | 0,63 | 12,97 | 8,53 | 3,940 | 0,62 | 0,3998 | F |
| VD-080 | | | | | | | 31,00 | 1,22 | 0,462 | 18,50 | 12,06 | 18,94 | 24,30 | 8,747 | 0,69 | 12,97 | 7,36 | 8,328 | 0,69 | 0,3998 | F |
| VD-080A | | | | | | | 31,00 | 1,45 | 0,380 | 22,50 | 14,46 | 16,55 | 24,30 | 6,283 | 0,65 | 15,57 | 12,16 | 5,860 | 0,64 | 0,4778 | F |
| VD-080A-01 | | 3,50 | 4,00 | 0,15 | 2,70 | 4,40 | 5,00 | 0,30 | 4,638 | 2,75 | 2,61 | 2,39 | 0,00 | 11,085 | 1,20 | 2,73 | 0,70 | 10,529 | 1,25 | 0,0811 | F |
| VD-080A-02 | | | | | | | 7,00 | 0,40 | 2,319 | 5,50 | 4,23 | 2,77 | 0,00 | 6,424 | 0,90 | 4,47 | 2,05 | 5,867 | 1,00 | 0,1280 | F |
| VD-080B | | | | | | | 10,40 | 0,51 | 1,501 | 8,50 | 5,99 | 4,41 | 0,00 | 6,622 | 0,87 | 6,36 | 3,60 | 6,062 | 0,86 | 0,1792 | F |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-069A | 0,50 | 5,00 | 5,50 | 0,25 | 4,10 | 6,10 | 7,50 | 0,34 | 2,038 | 2,50 | 2,56 | 4,94 | 0,00 | 10,065 | 0,84 | 2,72 | 1,15 | 9,739 | 0,83 | 0,1097 | B | | | | |
| D-070 | | | | | | | 9,40 | 0,42 | 1,455 | 3,50 | 3,19 | 6,21 | 0,00 | 9,041 | 0,75 | 3,41 | 1,85 | 8,718 | 0,74 | 0,1341 | B | | | | |
| D-070A | | | | | | | 11,10 | 0,42 | 1,455 | 3,50 | 3,19 | 7,91 | 0,00 | 11,516 | 0,78 | 3,41 | 1,30 | 11,192 | 0,78 | 0,1341 | B | | | | |
| D-071 | | | | | | | 14,00 | 0,58 | 0,926 | 5,50 | 4,44 | 9,56 | 0,00 | 8,856 | 0,67 | 4,79 | 2,97 | 8,530 | 0,66 | 0,1828 | B | | | | |
| D-071A | | | | | | | 16,40 | 0,58 | 0,926 | 5,50 | 4,44 | 11,96 | 0,00 | 11,079 | 0,70 | 4,78 | 2,20 | 10,762 | 0,70 | 0,1828 | B | | | | |
| D-072 | | | | | | | 20,50 | 0,81 | 0,599 | 8,50 | 6,31 | 14,19 | 0,00 | 8,502 | 0,62 | 6,84 | 4,79 | 8,186 | 0,61 | 0,2560 | B | | | | |
| D-072A | | | | | | | 27,10 | 0,89 | 0,536 | 9,50 | 6,94 | 20,16 | 11,52 | 10,811 | 0,64 | 7,53 | 3,99 | 10,493 | 0,64 | 0,2804 | B | | | | |
| D-073 | | | | | | | 30,00 | 1,13 | 0,408 | 12,50 | 8,81 | 21,19 | 17,84 | 8,634 | 0,59 | 9,59 | 6,93 | 8,317 | 0,58 | 0,3535 | B | | | | |
| D-073A | | | | | | | 30,00 | 1,60 | 0,275 | 18,50 | 12,56 | 17,44 | 17,84 | 4,801 | 0,51 | 13,72 | 15,07 | 4,483 | 0,51 | 0,4998 | B | | | | |
| D-074 | | | | | | | 44,50 | 1,60 | 0,275 | 18,50 | 12,56 | 31,94 | 37,68 | 8,794 | 0,57 | 13,72 | 10,08 | 8,475 | 0,57 | 0,4998 | B | | | | |
| D-074A | | | | | | | 44,50 | 1,91 | 0,226 | 22,50 | 15,06 | 29,44 | 37,68 | 6,664 | 0,53 | 16,47 | 15,50 | 6,346 | 0,53 | 0,5973 | B | | | | |
| D-074B | 4,80 | 5,30 | 0,25 | 3,90 | 5,80 | 8,00 | 0,38 | 1,645 | 3,50 | 3,17 | 4,83 | 0,00 | 7,950 | 0,75 | 3,38 | 1,99 | 7,600 | 0,75 | 0,1287 | B | | | | | |
| D-074C | | | | | | 12,00 | 0,53 | 1,047 | 5,50 | 4,41 | 7,59 | 0,00 | 7,950 | 0,67 | 4,74 | 3,13 | 7,600 | 0,67 | 0,1755 | B | | | | | |
| D-074D | | | | | | 19,00 | 0,75 | 0,677 | 8,50 | 6,26 | 12,74 | 0,00 | 8,628 | 0,63 | 6,77 | 4,49 | 8,284 | 0,63 | 0,2457 | B | | | | | |
| D-075 | | | | | | 28,00 | 0,93 | 0,523 | 11,00 | 7,81 | 20,19 | 15,63 | 10,567 | 0,64 | 8,47 | 4,67 | 10,222 | 0,64 | 0,3043 | B | | | | | |
| D-075A | | | | | | 29,00 | 1,10 | 0,426 | 13,50 | 9,36 | 19,64 | 17,48 | 8,377 | 0,60 | 10,17 | 7,35 | 8,030 | 0,59 | 0,3628 | B | | | | | |
| D-075A-01 | 4,50 | 5,00 | 0,25 | 3,40 | 5,60 | 6,00 | 0,27 | 2,795 | 2,50 | 2,53 | 3,47 | 0,00 | 9,698 | 0,90 | 2,67 | 1,08 | 9,307 | 0,90 | 0,0987 | B | | | | | |
| D-075B | | | | | | 8,00 | 0,34 | 1,996 | 3,50 | 3,14 | 4,86 | 0,00 | 9,707 | 0,82 | 3,33 | 1,51 | 9,323 | 0,81 | 0,1207 | B | | | | | |
| D-075C | | | | | | 12,00 | 0,47 | 1,270 | 5,50 | 4,36 | 7,64 | 0,00 | 9,707 | 0,74 | 4,67 | 2,38 | 9,312 | 0,73 | 0,1646 | B | | | | | |
| D-075D | | | | | | 17,00 | 0,65 | 0,822 | 8,50 | 6,19 | 10,81 | 0,00 | 8,885 | 0,67 | 6,66 | 4,02 | 8,500 | 0,67 | 0,2304 | B | | | | | |
| D-075E | | | | | | 26,00 | 0,91 | 0,559 | 12,50 | 8,63 | 17,37 | 14,16 | 9,707 | 0,65 | 9,32 | 5,41 | 9,324 | 0,65 | 0,3182 | B | | | | | |
| D-075F | | | | | | 37,00 | 1,28 | 0,378 | 18,50 | 12,30 | 24,70 | 30,22 | 9,329 | 0,62 | 13,33 | 8,34 | 8,940 | 0,62 | 0,4498 | B | | | | | |
| D-076 | 4,00 | 4,50 | 0,15 | 3,10 | 4,90 | 7,00 | 0,27 | 2,842 | 3,50 | 3,09 | 3,91 | 0,00 | 11,106 | 0,95 | 3,26 | 1,13 | 10,631 | 0,94 | 0,1073 | B | | | | | |
| D-077 | | | | | | 10,00 | 0,38 | 1,809 | 5,50 | 4,29 | 5,71 | 0,00 | 10,330 | 0,84 | 4,56 | 1,93 | 9,840 | 0,83 | 0,1463 | B | | | | | |
| D-078 | | | | | | 15,00 | 0,53 | 1,170 | 8,50 | 6,08 | 8,92 | 0,00 | 10,437 | 0,78 | 6,50 | 2,96 | 9,949 | 0,77 | 0,2048 | B | | | | | |
| D-078A | | | | | | 20,00 | 0,58 | 1,047 | 9,50 | 6,68 | 13,32 | 0,00 | 13,948 | 0,82 | 7,15 | 2,21 | 13,457 | 0,81 | 0,2243 | B | | | | | |
| D-079 | | | | | | 21,50 | 0,74 | 0,796 | 12,50 | 8,48 | 13,03 | 8,68 | 10,367 | 0,74 | 9,10 | 4,38 | 9,869 | 0,74 | 0,2828 | B | | | | | |
| D-079A | | | | | | 21,50 | 1,05 | 0,538 | 18,50 | 12,06 | 9,44 | 8,68 | 5,075 | 0,64 | 12,97 | 8,53 | 4,587 | 0,63 | 0,3998 | B | | | | | |
| D-080 | | | | | | 31,00 | 1,05 | 0,538 | 18,50 | 12,06 | 18,94 | 24,48 | 10,184 | 0,71 | 12,97 | 6,59 | 9,696 | 0,71 | 0,3998 | B | | | | | |
| D-080A | | | | | | 31,00 | 1,25 | 0,442 | 22,50 | 14,46 | 16,55 | 24,48 | 7,316 | 0,66 | 15,57 | 10,26 | 6,823 | 0,65 | 0,4778 | B | | | | | |
| D-080A-01 | | | | | | 3,50 | 4,00 | 0,15 | 2,70 | 4,40 | 5,00 | 0,19 | 5,400 | 2,75 | 2,61 | 2,39 | 0,00 | 12,907 | 1,24 | 2,73 | 0,64 | 12,258 | 1,23 | 0,0811 | B |
| D-080A-02 | | | | | | | | | | | 7,00 | 0,31 | 2,700 | 5,50 | 4,23 | 2,77 | 0,00 | 7,479 | 0,96 | 4,47 | 1,98 | 6,831 | 0,95 | 0,1280 | B |
| D-080B | 10,40 | 0,44 | 1,747 | 8,50 | 5,99 | | | | | | 4,41 | 0,00 | 7,709 | 0,89 | 6,36 | 3,01 | 7,058 | 0,88 | 0,1792 | B | | | | | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-080B-02 | 0,50 | 3,50 | 4,00 | 0,15 | 2,70 | 4,40 | 15,00 | 0,44 | 1,747 | 8,50 | 5,99 | 9,01 | 0,00 | 15,746 | 1,01 | 6,36 | 1,46 | 15,095 | 1,00 | 0,1792 | B |
| D-080B-04 | | | | | | | 22,00 | 0,61 | 1,188 | 12,50 | 8,33 | 13,67 | 14,19 | 16,235 | 0,97 | 8,88 | 2,00 | 15,587 | 0,96 | 0,2475 | B |
| D-080C | | | | | | | 24,00 | 0,70 | 1,024 | 14,50 | 9,51 | 14,49 | 17,22 | 14,843 | 0,94 | 10,14 | 2,81 | 14,195 | 0,93 | 0,2816 | B |
| D-080D | | | | | | | 31,00 | 0,91 | 0,762 | 19,50 | 12,44 | 18,56 | 26,20 | 14,133 | 0,90 | 13,29 | 4,11 | 13,487 | 0,89 | 0,3669 | B |
| D-080E | 3,30 | 3,80 | 0,15 | 2,50 | 4,20 | 5,00 | 0,21 | 5,062 | 3,50 | 3,04 | 1,96 | 0,00 | 9,925 | 1,22 | 3,19 | 0,97 | 9,163 | 1,21 | 0,0885 | B | |
| D-080F | | | | | | 8,00 | 0,29 | 3,221 | 5,50 | 4,20 | 3,80 | 0,00 | 12,226 | 1,13 | 4,43 | 1,27 | 11,500 | 1,12 | 0,1207 | B | |
| D-080G | | | | | | 12,00 | 0,41 | 2,084 | 8,50 | 5,95 | 6,05 | 0,00 | 12,605 | 1,05 | 6,30 | 1,91 | 11,881 | 1,04 | 0,1690 | B | |
| D-080H | | | | | | 18,00 | 0,61 | 1,312 | 13,50 | 8,87 | 9,13 | 7,92 | 11,988 | 0,98 | 9,43 | 3,19 | 11,247 | 0,97 | 0,2494 | B | |
| D-081 | 3,20 | 3,70 | 0,15 | 2,40 | 4,10 | 5,50 | 0,20 | 5,552 | 3,50 | 3,03 | 2,47 | 0,00 | 13,699 | 1,34 | 3,17 | 0,69 | 12,936 | 1,33 | 0,0858 | B | |
| D-082 | | | | | | 7,90 | 0,28 | 3,533 | 5,50 | 4,19 | 3,71 | 0,00 | 13,093 | 1,20 | 4,42 | 1,14 | 12,295 | 1,18 | 0,1170 | B | |
| D-083 | | | | | | 11,50 | 0,40 | 2,286 | 8,50 | 5,94 | 5,56 | 0,00 | 12,719 | 1,10 | 6,29 | 1,82 | 11,910 | 1,09 | 0,1638 | B | |
| D-084 | | | | | | 16,00 | 0,55 | 1,554 | 12,50 | 8,26 | 7,74 | 0,00 | 12,033 | 1,04 | 8,77 | 2,83 | 11,239 | 1,03 | 0,2262 | B | |
| D-084A | | | | | | 16,00 | 0,78 | 1,050 | 18,50 | 11,74 | 4,26 | 0,00 | 4,471 | 0,89 | 12,49 | 3,50 | 3,687 | 0,87 | 0,3199 | B | |
| D-085 | | | | | | 23,50 | 0,78 | 1,050 | 18,50 | 11,74 | 11,76 | 17,89 | 12,348 | 1,00 | 12,49 | 4,08 | 11,564 | 0,99 | 0,3199 | B | |
| D-085A | | | | | | 23,50 | 0,93 | 0,864 | 22,50 | 14,07 | 9,43 | 17,89 | 8,147 | 0,93 | 14,98 | 6,63 | 7,358 | 0,92 | 0,3823 | B | |
| D-085B | | | | | | 3,00 | 3,50 | 0,15 | 2,20 | 3,90 | 6,00 | 0,19 | 6,738 | 3,50 | 3,02 | 2,98 | 0,00 | 20,082 | 1,59 | 3,35 | 0,38 |
| D-085C | 8,40 | 0,26 | 4,288 | 5,50 | 4,17 | | | | | | 4,23 | 0,00 | 18,122 | 1,41 | 4,39 | 0,66 | 17,194 | 1,39 | 0,1097 | B | |
| D-085D | 13,40 | 0,41 | 2,482 | 9,50 | 6,48 | | | | | | 6,92 | 0,00 | 17,174 | 1,27 | 6,85 | 1,28 | 16,259 | 1,26 | 0,1682 | B | |
| D-085E | 20,70 | 0,62 | 1,521 | 15,50 | 9,94 | | | | | | 10,76 | 14,94 | 16,365 | 1,19 | 10,54 | 2,28 | 15,458 | 1,18 | 0,2560 | B | |
| D-085F | 2,70 | 3,20 | 0,15 | 1,90 | 3,60 | 17,00 | 0,43 | 2,813 | 11,50 | 8,98 | 8,02 | 10,99 | 22,560 | 1,62 | 9,95 | 0,94 | 19,831 | 1,60 | 0,1777 | B | |
| D-085G | | | | | | 20,00 | 0,53 | 2,231 | 14,50 | 9,89 | 10,11 | 15,32 | 22,555 | 1,54 | 12,00 | 1,50 | 17,848 | 1,53 | 0,2172 | B | |
| D-085H | | | | | | 24,00 | 0,63 | 1,848 | 17,50 | 11,80 | 12,20 | 20,31 | 22,552 | 1,52 | 13,25 | 1,43 | 19,871 | 1,51 | 0,2567 | B | |
| D-086 | 2,50 | 3,00 | 0,10 | 1,70 | 3,30 | 4,40 | 0,16 | 11,643 | 3,50 | 2,99 | 1,41 | 0,00 | 16,409 | 2,14 | 3,11 | 0,41 | 15,019 | 2,12 | 0,0670 | B | |
| D-087 | | | | | | 6,10 | 0,22 | 7,409 | 5,50 | 4,13 | 1,97 | 0,00 | 14,610 | 1,88 | 4,32 | 0,73 | 13,188 | 1,86 | 0,0914 | B | |
| D-088 | | | | | | 8,70 | 0,32 | 4,794 | 8,50 | 5,83 | 2,87 | 0,00 | 13,738 | 1,72 | 6,12 | 1,19 | 12,369 | 1,70 | 0,1280 | B | |
| D-089 | | | | | | 12,00 | 0,44 | 3,260 | 12,50 | 8,11 | 3,89 | 0,00 | 12,683 | 1,61 | 8,54 | 1,87 | 11,280 | 1,59 | 0,1768 | B | |
| D-090 | | | | | | 17,50 | 0,62 | 2,203 | 18,50 | 11,52 | 5,98 | 12,80 | 13,168 | 1,56 | 12,16 | 2,69 | 11,762 | 1,54 | 0,2499 | B | |
| D-090AB | 2,30 | 2,80 | 0,10 | 1,50 | 3,10 | 4,00 | 0,15 | 14,952 | 3,50 | 2,98 | 1,02 | 0,00 | 15,243 | 2,49 | 3,10 | 0,40 | 13,457 | 2,47 | 0,0617 | B | |
| D-090AC | | | | | | 5,50 | 0,21 | 9,515 | 5,50 | 4,11 | 1,39 | 0,00 | 13,204 | 2,19 | 4,29 | 0,70 | 11,513 | 2,16 | 0,0841 | B | |
| D-090AD | | | | | | 8,00 | 0,29 | 6,157 | 8,50 | 5,81 | 2,19 | 0,00 | 13,484 | 2,01 | 6,09 | 1,06 | 11,759 | 1,99 | 0,1178 | B | |
| D-090AE | | | | | | 13,00 | 0,44 | 3,876 | 13,50 | 8,64 | 4,36 | 6,65 | 16,904 | 1,94 | 9,09 | 1,39 | 15,157 | 1,92 | 0,1738 | B | |
| D-090A | 2,00 | 2,50 | 0,10 | 1,20 | 2,80 | 3,80 | 0,13 | 22,740 | 3,50 | 2,97 | 0,83 | 0,00 | 18,942 | 3,35 | 3,08 | 0,26 | 16,373 | 3,32 | 0,0536 | B | |
| D-090B | | | | | | 5,50 | 0,19 | 14,471 | 5,50 | 4,09 | 1,41 | 0,00 | 20,389 | 3,00 | 4,26 | 0,38 | 17,944 | 2,97 | 0,0731 | B | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | |
| VD-080B-02 | 0,50 | 3,50 | 4,00 | 0,15 | 2,70 | 4,40 | 15,00 | 0,51 | 1,501 | 8,50 | 5,99 | 9,01 | 0,00 | 13,524 | 0,97 | 7,30 | 1,78 | 11,555 | 0,97 | 0,1792 | F | |
| VD-080B-04 | | | | | | | 22,00 | 0,71 | 1,020 | 12,50 | 8,33 | 13,67 | 13,88 | 13,945 | 0,94 | 10,60 | 2,59 | 11,633 | 0,93 | 0,2475 | F | |
| VD-080C | | | | | | | 24,00 | 0,81 | 0,880 | 14,50 | 9,51 | 14,49 | 16,99 | 12,748 | 0,90 | 10,80 | 3,01 | 11,612 | 0,90 | 0,2816 | F | |
| VD-080D | | | | | | | 31,00 | 1,06 | 0,654 | 19,50 | 12,44 | 18,56 | 26,07 | 12,139 | 0,87 | 13,29 | 4,07 | 11,584 | 0,87 | 0,3669 | F | |
| VD-080E | 3,30 | 3,80 | 0,15 | 2,50 | 4,20 | 5,00 | 0,25 | 4,348 | 3,50 | 3,04 | 1,96 | 0,00 | 8,525 | 1,20 | 3,19 | 1,13 | 7,870 | 1,19 | 0,0885 | F | | |
| VD-080F | | | | | | 8,00 | 0,34 | 2,767 | 5,50 | 4,20 | 3,80 | 0,00 | 10,501 | 1,10 | 4,43 | 1,42 | 9,878 | 1,09 | 0,1207 | F | | |
| VD-080G | | | | | | 12,00 | 0,48 | 1,790 | 8,50 | 5,95 | 6,05 | 0,00 | 10,827 | 1,02 | 6,30 | 2,10 | 10,205 | 1,01 | 0,1690 | F | | |
| VD-080H | | | | | | 18,00 | 0,71 | 1,127 | 13,50 | 8,87 | 9,13 | 7,92 | 10,296 | 0,95 | 9,43 | 3,57 | 9,660 | 0,95 | 0,2494 | F | | |
| VD-081 | 3,20 | 3,70 | 0,15 | 2,40 | 4,10 | 5,50 | 0,24 | 4,768 | 3,50 | 3,03 | 2,47 | 0,00 | 11,766 | 1,31 | 3,17 | 0,74 | 11,110 | 1,30 | 0,0858 | F | | |
| VD-082 | | | | | | 7,90 | 0,33 | 3,034 | 5,50 | 4,19 | 3,71 | 0,00 | 11,246 | 1,17 | 4,41 | 1,25 | 10,590 | 1,16 | 0,1170 | F | | |
| VD-083 | | | | | | 11,50 | 0,46 | 1,963 | 8,50 | 5,94 | 5,56 | 0,00 | 10,924 | 1,07 | 6,29 | 2,02 | 10,230 | 1,06 | 0,1638 | F | | |
| VD-084 | | | | | | 16,00 | 0,64 | 1,335 | 12,50 | 8,26 | 7,74 | 0,00 | 10,335 | 1,01 | 8,77 | 3,18 | 9,653 | 1,00 | 0,2262 | F | | |
| VD-084A | | | | | | 16,00 | 0,91 | 0,902 | 18,50 | 11,74 | 4,26 | 0,00 | 3,840 | 0,88 | 12,49 | 3,51 | 3,166 | 0,87 | 0,3199 | F | | |
| VD-085 | | | | | | 23,50 | 0,91 | 0,902 | 18,50 | 11,74 | 11,76 | 17,72 | 10,606 | 0,98 | 12,49 | 4,56 | 9,932 | 0,97 | 0,3199 | F | | |
| VD-085A | | | | | | 23,50 | 1,09 | 0,742 | 22,50 | 14,07 | 9,43 | 17,72 | 6,997 | 0,91 | 14,98 | 7,95 | 6,320 | 0,90 | 0,3823 | F | | |
| VD-085B | | | | | | 3,00 | 3,50 | 0,15 | 2,20 | 3,90 | 6,00 | 0,22 | 5,787 | 3,50 | 3,10 | 2,90 | 0,00 | 16,782 | 1,55 | 3,80 | 0,55 | 12,731 |
| VD-085C | 8,40 | 0,31 | 3,683 | 5,50 | 4,17 | | | | | | 4,23 | 0,00 | 15,565 | 1,37 | 4,85 | 0,82 | 13,073 | 1,36 | 0,1097 | F | | |
| VD-085D | 13,40 | 0,48 | 2,132 | 9,50 | 6,48 | | | | | | 6,92 | 0,00 | 14,751 | 1,23 | 7,25 | 1,41 | 13,112 | 1,22 | 0,1682 | F | | |
| VD-085E | 20,70 | 0,73 | 1,307 | 15,50 | 9,94 | | | | | | 10,76 | 14,75 | 14,056 | 1,16 | 10,80 | 2,37 | 12,937 | 1,15 | 0,2560 | F | | |
| VD-085F | 2,70 | 3,20 | 0,15 | 1,90 | 3,60 | 17,00 | 0,51 | 2,416 | 11,50 | 9,25 | 7,75 | 10,76 | 18,724 | 1,46 | 11,20 | 1,39 | 14,013 | 1,40 | 0,1777 | F | | |
| VD-085G | | | | | | 20,00 | 0,62 | 1,916 | 14,50 | 10,18 | 9,82 | 15,18 | 18,817 | 1,49 | 12,65 | 1,73 | 14,084 | 1,39 | 0,2172 | F | | |
| VD-085H | | | | | | 24,00 | 0,73 | 1,588 | 17,50 | 12,15 | 11,85 | 20,22 | 18,814 | 1,47 | 15,00 | 2,03 | 14,289 | 1,35 | 0,2567 | F | | |
| VD-086 | 2,50 | 3,00 | 0,10 | 1,70 | 3,30 | 4,40 | 0,19 | 10,000 | 3,50 | 2,99 | 1,41 | 0,00 | 14,094 | 2,10 | 3,11 | 0,45 | 12,900 | 2,08 | 0,0670 | F | | |
| VD-087 | | | | | | 6,10 | 0,26 | 6,364 | 5,50 | 4,13 | 1,97 | 0,00 | 12,548 | 1,85 | 4,32 | 0,83 | 11,327 | 1,83 | 0,0914 | F | | |
| VD-088 | | | | | | 8,70 | 0,37 | 4,118 | 8,50 | 5,83 | 2,87 | 0,00 | 11,800 | 1,69 | 6,12 | 1,37 | 10,624 | 1,67 | 0,1280 | F | | |
| VD-089 | | | | | | 12,00 | 0,51 | 2,800 | 12,50 | 8,11 | 3,89 | 0,00 | 10,894 | 1,59 | 8,54 | 2,18 | 9,688 | 1,57 | 0,1768 | F | | |
| VD-090 | | | | | | 17,50 | 0,72 | 1,892 | 18,50 | 11,52 | 5,98 | 12,65 | 11,310 | 1,53 | 12,16 | 3,12 | 10,103 | 1,51 | 0,2499 | F | | |
| VD-090AB | 2,30 | 2,80 | 0,10 | 1,50 | 3,10 | 4,00 | 0,18 | 12,842 | 3,50 | 2,98 | 1,02 | 0,00 | 13,092 | 2,46 | 3,10 | 0,46 | 11,558 | 2,44 | 0,0617 | F | | |
| VD-090AC | | | | | | 5,50 | 0,24 | 8,172 | 5,50 | 4,11 | 1,39 | 0,00 | 11,341 | 2,16 | 4,29 | 0,82 | 9,888 | 2,14 | 0,0841 | F | | |
| VD-090AD | | | | | | 8,00 | 0,34 | 5,288 | 8,50 | 5,81 | 2,19 | 0,00 | 11,581 | 1,99 | 6,09 | 1,24 | 10,100 | 1,96 | 0,1178 | F | | |
| VD-090AE | | | | | | 13,00 | 0,51 | 3,329 | 13,50 | 8,64 | 4,36 | 0,00 | 14,519 | 1,91 | 9,09 | 1,54 | 13,018 | 1,88 | 0,1738 | F | | |
| VD-090A | 2,00 | 2,50 | 0,10 | 1,20 | 2,80 | 3,80 | 0,16 | 19,531 | 3,50 | 2,97 | 0,83 | 0,00 | 16,270 | 3,31 | 3,08 | 0,30 | 14,063 | 3,28 | 0,0536 | F | | |
| VD-090B | | | | | | 5,50 | 0,22 | 12,429 | 5,50 | 4,09 | 1,41 | 0,00 | 17,512 | 2,96 | 4,26 | 0,41 | 15,412 | 2,93 | 0,0731 | F | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-090C | 0,50 | 2,00 | 2,50 | 0,10 | 1,20 | 2,80 | 8,70 | 0,33 | 7,196 | 9,50 | 6,34 | 2,36 | 0,00 | 16,989 | 2,66 | 6,63 | 0,75 | 14,895 | 2,63 | 0,1121 | F |
| VD-090D | | | | | | | 13,70 | 0,51 | 4,410 | 15,50 | 9,71 | 3,99 | 9,69 | 17,593 | 2,52 | 10,19 | 1,15 | 15,480 | 2,48 | 0,1707 | F |
| VD-090E-01 | 0,55 | 8,45 | 9,00 | 0,35 | 7,30 | 10,00 | 12,50 | 1,10 | 0,590 | 2,25 | 2,90 | 9,60 | 0,00 | 5,662 | 0,80 | 3,18 | 4,00 | 5,497 | 0,80 | 0,2119 | F |
| VD-090E-02 | | | | | | | 18,50 | 1,20 | 0,483 | 2,75 | 3,30 | 15,20 | 0,00 | 7,335 | 0,80 | 3,80 | 3,40 | 7,094 | 0,80 | 0,2368 | F |
| VD-090E | | | | | | | 23,90 | 1,60 | 0,379 | 3,50 | 3,90 | 20,00 | 0,00 | 7,584 | 0,72 | 5,15 | 4,22 | 7,109 | 0,72 | 0,2742 | F |
| VD-090F | | | | | | | 36,50 | 2,21 | 0,241 | 5,50 | 5,50 | 31,00 | 0,00 | 7,480 | 0,65 | 7,05 | 6,65 | 7,106 | 0,64 | 0,3739 | F |
| VD-090G | | | | | | | 61,60 | 3,41 | 0,140 | 9,50 | 8,70 | 52,90 | 46,17 | 7,390 | 0,59 | 11,20 | 11,63 | 7,040 | 0,58 | 0,5733 | F |
| VD-090H | | | | | | | 99,20 | 5,20 | 0,086 | 15,50 | 13,50 | 85,70 | 90,65 | 7,338 | 0,56 | 17,20 | 19,00 | 7,021 | 0,55 | 0,8724 | F |
| VD-090H-01 | | 5,45 | 6,00 | 0,25 | 4,50 | 6,60 | 8,00 | 0,40 | 2,198 | 2,25 | 2,64 | 5,36 | 0,00 | 11,783 | 1,00 | 3,20 | 1,10 | 10,552 | 1,05 | 0,1367 | F |
| VD-090J | | | | | | | 12,00 | 0,51 | 1,413 | 3,50 | 3,50 | 8,50 | 0,00 | 12,011 | 0,90 | 4,65 | 1,73 | 10,387 | 0,90 | 0,1768 | F |
| VD-090K | | | | | | | 17,70 | 0,71 | 0,899 | 5,50 | 4,87 | 12,83 | 0,00 | 11,535 | 0,81 | 6,25 | 2,76 | 10,297 | 0,80 | 0,2412 | F |
| VD-090L | | | | | | | 29,20 | 1,09 | 0,521 | 9,50 | 7,62 | 21,58 | 9,55 | 11,237 | 0,74 | 9,10 | 4,60 | 10,465 | 0,73 | 0,3698 | F |
| VD-090M | | | | | | | 46,50 | 1,66 | 0,319 | 15,50 | 11,73 | 34,77 | 38,46 | 11,094 | 0,70 | 13,52 | 7,43 | 10,524 | 0,69 | 0,5627 | F |
| VD-090M-03 | | 4,45 | 5,00 | 0,25 | 3,50 | 5,50 | 8,00 | 0,40 | 2,019 | 4,50 | 4,10 | 3,90 | 0,00 | 7,875 | 1,00 | 4,31 | 2,60 | 7,451 | 1,00 | 0,1707 | F |
| VD-090M-04 | | | | | | | 12,00 | 0,50 | 1,398 | 6,50 | 5,40 | 6,60 | 0,00 | 9,226 | 0,90 | 5,74 | 3,30 | 8,751 | 0,90 | 0,2232 | F |
| VD-090M-05 | | | | | | | 18,00 | 0,70 | 1,069 | 8,50 | 6,70 | 11,30 | 0,00 | 12,079 | 0,90 | 7,16 | 3,00 | 11,587 | 0,90 | 0,2757 | F |
| VD-090M-01 | | | | | | | 23,00 | 0,94 | 0,727 | 12,50 | 9,34 | 13,66 | 0,00 | 9,931 | 0,83 | 10,02 | 5,98 | 9,435 | 0,82 | 0,3807 | F |
| VD-090M-02 | | | | | | | 39,00 | 1,52 | 0,423 | 21,50 | 15,27 | 23,73 | 32,65 | 10,029 | 0,79 | 16,44 | 10,30 | 9,534 | 0,78 | 0,6170 | F |
| VD-090N | | 2,95 | 3,50 | 0,15 | 2,10 | 3,90 | 6,00 | 0,21 | 8,911 | 3,50 | 3,50 | 2,50 | 0,00 | 22,277 | 2,27 | 4,12 | 0,47 | 16,753 | 2,20 | 0,0957 | F |
| VD-090O | | | | | | | 8,40 | 0,30 | 5,671 | 5,50 | 4,56 | 3,84 | 0,00 | 21,786 | 2,01 | 5,35 | 0,70 | 17,295 | 1,99 | 0,1305 | F |
| VD-090P | | | | | | | 13,10 | 0,46 | 3,283 | 9,50 | 7,07 | 6,03 | 0,00 | 19,787 | 1,80 | 7,85 | 1,22 | 17,236 | 1,78 | 0,2002 | F |
| VD-090Q | | | | | | | 20,20 | 0,70 | 2,012 | 15,50 | 10,85 | 9,35 | 14,28 | 18,823 | 1,69 | 11,70 | 2,02 | 17,103 | 1,67 | 0,3046 | F |
| VD-090R | | 2,25 | 2,80 | 0,10 | 1,40 | 3,10 | 4,30 | 0,17 | 20,084 | 3,50 | 3,27 | 1,03 | 0,00 | 20,770 | 3,75 | 3,39 | 0,31 | 18,276 | 3,71 | 0,0730 | F |
| VD-090S | | | | | | | 6,10 | 0,24 | 12,781 | 5,50 | 4,50 | 1,60 | 0,00 | 20,405 | 3,32 | 4,70 | 0,50 | 17,893 | 3,29 | 0,0996 | F |
| VD-090T | | | | | | | 9,70 | 0,36 | 7,399 | 9,50 | 6,98 | 2,72 | 0,00 | 20,136 | 3,00 | 7,31 | 0,87 | 17,684 | 2,96 | 0,1527 | F |
| VD-090U | | | | | | | 15,30 | 0,56 | 4,535 | 15,50 | 10,69 | 4,61 | 10,74 | 20,900 | 2,84 | 11,24 | 1,34 | 18,412 | 2,80 | 0,2323 | F |
| VD-090U-05 | 0,60 | 10,00 | 10,60 | 0,35 | 8,70 | 11,40 | 8,50 | 1,50 | 0,504 | 2,25 | 3,25 | 5,25 | 0,00 | 2,646 | 0,90 | 3,60 | 4,90 | 2,470 | 0,84 | 0,2984 | G |
| VD-090U-10 | | | | | | | 10,80 | 2,12 | 0,324 | 3,50 | 4,39 | 6,42 | 0,00 | 2,078 | 0,72 | 4,94 | 5,86 | 1,899 | 0,71 | 0,3862 | G |
| VD-090U-11 | | | | | | | 17,00 | 2,92 | 0,206 | 5,50 | 6,21 | 10,80 | 0,00 | 2,226 | 0,64 | 7,07 | 9,93 | 2,047 | 0,63 | 0,5266 | G |
| VD-090U-12 | | | | | | | 26,30 | 4,12 | 0,133 | 8,50 | 8,94 | 17,37 | 0,00 | 2,317 | 0,58 | 10,26 | 16,04 | 2,140 | 0,58 | 0,7372 | G |
| VD-090U-13 | | | | | | | 38,30 | 5,71 | 0,091 | 12,50 | 12,58 | 25,73 | 0,00 | 2,334 | 0,55 | 14,52 | 23,78 | 2,157 | 0,55 | 1,0181 | G |
| VD-090U-14 | | | | | | | 53,00 | 6,89 | 0,073 | 15,50 | 15,31 | 37,70 | 12,80 | 2,758 | 0,55 | 17,72 | 35,25 | 2,581 | 0,54 | 1,2287 | G |
| VD-090U-20 | | 6,40 | 7,00 | 0,30 | 5,20 | 7,70 | 6,70 | 0,64 | 1,236 | 3,50 | 3,87 | 2,83 | 0,00 | 3,500 | 0,85 | 4,16 | 2,54 | 3,139 | 0,84 | 0,2472 | G |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|--------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-090C | 0,50 | 2,00 | 2,50 | 0,10 | 1,20 | 2,80 | 8,70 | 0,29 | 8,378 | 9,50 | 6,34 | 2,36 | 0,00 | 19,780 | 2,71 | 6,63 | 0,68 | 17,342 | 2,67 | 0,1121 | B | | | | | |
| D-090D | | | | | | | 13,70 | 0,44 | 5,135 | 15,50 | 9,71 | 3,99 | 9,82 | 20,483 | 2,56 | 10,19 | 1,06 | 18,023 | 2,52 | 0,1707 | B | | | | | |
| D-090E-01 | 0,55 | 8,45 | 9,00 | 0,35 | 7,30 | 10,00 | 12,50 | 1,04 | 0,687 | 2,25 | 2,90 | 9,60 | 0,00 | 6,592 | 0,81 | 3,18 | 3,61 | 6,400 | 0,91 | 0,2119 | B | | | | | |
| D-090E-02 | | | | | | | 18,50 | 1,17 | 0,562 | 2,75 | 3,30 | 15,20 | 0,00 | 8,540 | 0,79 | 3,64 | 3,25 | 8,349 | 0,78 | 0,2368 | B | | | | | |
| D-090E | | | | | | | 23,90 | 1,37 | 0,441 | 3,50 | 3,90 | 20,00 | 0,00 | 8,829 | 0,74 | 6,30 | 4,56 | 7,769 | 0,74 | 0,2742 | B | | | | | |
| D-090F | | | | | | | 36,50 | 1,90 | 0,281 | 5,50 | 5,50 | 31,00 | 0,00 | 8,709 | 0,66 | 8,90 | 7,17 | 7,753 | 0,66 | 0,3739 | B | | | | | |
| D-090G | | | | | | | 61,60 | 2,93 | 0,163 | 9,50 | 8,70 | 52,90 | 46,63 | 8,604 | 0,61 | 14,00 | 12,38 | 7,742 | 0,60 | 0,5733 | B | | | | | |
| D-090H | | | | | | | 99,20 | 4,47 | 0,100 | 15,50 | 13,50 | 85,70 | 90,84 | 8,543 | 0,57 | 22,00 | 20,34 | 7,695 | 0,57 | 0,8724 | C | | | | | |
| D-090H-01 | | | | | | | 5,45 | 6,00 | 0,25 | 4,50 | 6,60 | 8,00 | 0,33 | 2,559 | 2,25 | 2,64 | 5,36 | 0,00 | 13,719 | 1,06 | 2,80 | 0,90 | 13,309 | 1,00 | 0,1367 | B |
| D-090J | | | | | | | | | | | | 12,00 | 0,44 | 1,645 | 3,50 | 3,50 | 8,50 | 0,00 | 13,984 | 0,93 | 5,00 | 1,81 | 11,518 | 0,93 | 0,1768 | B |
| D-090K | 17,70 | 0,61 | 1,047 | 5,50 | 4,87 | 12,83 | | | | | | 0,00 | 13,430 | 0,84 | 6,90 | 2,91 | 11,308 | 0,83 | 0,2412 | B | | | | | | |
| D-090L | 29,20 | 0,94 | 0,606 | 9,50 | 7,62 | 21,58 | | | | | | 11,52 | 13,083 | 0,76 | 10,30 | 4,94 | 11,457 | 0,76 | 0,3698 | B | | | | | | |
| D-090M | 46,50 | 1,43 | 0,372 | 15,50 | 11,73 | 34,77 | | | | | | 38,66 | 12,917 | 0,72 | 15,40 | 7,96 | 11,555 | 0,72 | 0,5627 | C | | | | | | |
| D-090M-03 | 4,45 | 5,00 | 0,25 | 3,50 | 5,50 | 8,00 | | | | | | 0,36 | 2,351 | 4,50 | 4,07 | 3,93 | 0,00 | 9,239 | 0,97 | 4,31 | 2,24 | 8,675 | 0,97 | 0,1707 | C | |
| D-090M-04 | | | | | | 12,00 | | | | | | 0,47 | 1,628 | 6,50 | 5,38 | 6,62 | 0,00 | 10,774 | 0,92 | 5,74 | 2,92 | 10,188 | 0,92 | 0,2232 | C | |
| D-090M-05 | | | | | | 18,00 | | | | | | 0,58 | 1,245 | 8,50 | 6,70 | 11,30 | 0,00 | 14,064 | 0,93 | 7,16 | 2,90 | 13,491 | 0,92 | 0,2757 | C | |
| D-090M-01 | | | | | | 23,00 | 0,80 | 0,846 | 12,50 | 9,34 | 13,66 | 5,22 | 11,563 | 0,85 | 10,02 | 5,28 | 10,985 | 0,84 | 0,3807 | C | | | | | | |
| D-090M-02 | | | | | | 39,00 | 1,30 | 0,492 | 21,50 | 15,27 | 23,73 | 32,81 | 11,677 | 0,82 | 16,44 | 9,01 | 11,100 | 0,81 | 0,6170 | C | | | | | | |
| D-090N | 2,95 | 3,50 | 0,15 | 2,10 | 3,90 | 6,00 | 0,18 | 10,375 | 3,50 | 3,37 | 2,63 | 0,00 | 27,286 | 2,33 | 4,20 | 0,49 | 18,675 | 2,31 | 0,0957 | B | | | | | | |
| D-090O | | | | | | 8,40 | 0,25 | 6,602 | 5,50 | 4,56 | 3,84 | 0,00 | 25,365 | 2,06 | 5,70 | 0,81 | 17,826 | 2,04 | 0,1305 | B | | | | | | |
| D-090P | | | | | | 13,10 | 0,39 | 3,822 | 9,50 | 7,07 | 6,03 | 0,00 | 23,037 | 1,85 | 8,20 | 1,31 | 18,729 | 1,83 | 0,2002 | B | | | | | | |
| D-090Q | | | | | | 20,20 | 0,60 | 2,343 | 15,50 | 10,85 | 9,35 | 14,47 | 21,915 | 1,73 | 12,50 | 2,24 | 18,039 | 1,71 | 0,3046 | B | | | | | | |
| D-090R | | | | | | 2,25 | 2,80 | 0,10 | 1,40 | 3,10 | 4,30 | 0,15 | 23,383 | 3,50 | 3,27 | 1,03 | 0,00 | 24,182 | 3,80 | 3,39 | 0,28 | 21,279 | 3,79 | 0,0730 | B | |
| D-090S | 6,10 | 0,20 | 14,880 | 5,50 | 4,50 | | | | | | 1,60 | 0,00 | 23,757 | 3,37 | 4,70 | 0,45 | 20,832 | 3,33 | 0,0996 | B | | | | | | |
| D-090T | 9,70 | 0,31 | 8,615 | 9,50 | 6,98 | | | | | | 2,72 | 0,00 | 23,444 | 3,05 | 7,31 | 0,79 | 20,589 | 3,01 | 0,1527 | B | | | | | | |
| D-090U | 15,30 | 0,41 | 5,280 | 15,50 | 10,69 | | | | | | 4,61 | 10,88 | 24,333 | 2,89 | 11,24 | 1,23 | 21,437 | 2,84 | 0,2323 | B | | | | | | |
| D-090U-05 | 0,60 | 10,00 | 10,60 | 0,35 | 8,70 | | | | | | 11,40 | 8,50 | 1,37 | 0,587 | 2,25 | 3,25 | 5,25 | 0,00 | 3,081 | 0,85 | 3,60 | 4,90 | 2,875 | 0,85 | 0,2984 | B |
| D-090U-10 | | | | | | | | | | | | 10,80 | 1,82 | 0,377 | 3,50 | 4,39 | 6,42 | 0,00 | 2,420 | 0,72 | 4,94 | 5,86 | 2,211 | 0,72 | 0,3862 | B |
| D-090U-11 | | | | | | 17,00 | 2,51 | 0,240 | 5,50 | 6,21 | | 10,80 | 0,00 | 2,591 | 0,64 | 7,07 | 9,93 | 2,384 | 0,64 | 0,5266 | C | | | | | |
| D-090U-12 | | | | | | 26,30 | 3,54 | 0,155 | 8,50 | 8,94 | | 17,37 | 0,00 | 2,697 | 0,59 | 10,26 | 16,04 | 2,491 | 0,59 | 0,7372 | C | | | | | |
| D-090U-13 | | | | | | 38,30 | 4,90 | 0,106 | 12,50 | 12,58 | | 25,73 | 0,00 | 2,717 | 0,56 | 14,52 | 23,78 | 2,512 | 0,55 | 1,0181 | D | | | | | |
| D-090U-14 | | | | | | 53,00 | 5,91 | 0,085 | 15,50 | 15,31 | | 37,70 | 19,11 | 3,211 | 0,55 | 17,72 | 35,28 | 3,005 | 0,55 | 1,2287 | D | | | | | |
| D-090U-20 | | | | | | 6,40 | 7,00 | 0,30 | 5,20 | 7,70 | | 6,70 | 0,55 | 1,439 | 3,50 | 3,87 | 2,83 | 0,00 | 4,075 | 0,86 | 4,16 | 2,54 | 3,655 | 0,85 | 0,2472 | C |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|-------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | |
| D-090U-21 | 0,60 | 6,40 | 7,00 | 0,30 | 5,20 | 7,70 | 10,50 | 0,76 | 0,916 | 5,50 | 5,39 | 5,11 | 0,00 | 4,676 | 0,77 | 5,84 | 4,66 | 4,267 | 0,76 | 0,3370 | C | | | | | | |
| D-090U-22 | | | | | | | 16,20 | 1,07 | 0,593 | 8,50 | 7,68 | 8,52 | 0,00 | 5,048 | 0,71 | 8,37 | 7,83 | 4,640 | 0,71 | 0,4718 | C | | | | | | |
| D-090U-23 | | | | | | | 24,00 | 1,49 | 0,403 | 12,50 | 10,73 | 13,27 | 0,00 | 5,347 | 0,68 | 11,75 | 12,25 | 4,936 | 0,67 | 0,6516 | C | | | | | | |
| D-090U-24 | | | | | | | 35,50 | 2,11 | 0,272 | 18,50 | 15,30 | 20,20 | 16,89 | 5,498 | 0,66 | 16,81 | 18,69 | 5,088 | 0,67 | 0,9212 | C | | | | | | |
| D-090V | | 5,10 | 5,70 | 0,25 | 4,10 | 6,20 | 62,00 | 1,63 | 0,424 | 23,50 | 18,24 | 43,76 | 57,15 | 18,535 | 0,97 | 25,40 | 9,63 | 15,502 | 0,96 | 0,9131 | C | | | | | | |
| D-090W | | 5,00 | 5,60 | 0,25 | 4,00 | 6,10 | 18,00 | 0,59 | 1,408 | 7,50 | 6,62 | 11,38 | 0,00 | 16,028 | 1,06 | 7,08 | 3,04 | 15,379 | 1,05 | 0,3335 | B | | | | | | |
| D-090W-06 | 0,63 | 10,97 | 11,60 | 0,40 | 9,70 | 12,60 | 15,00 | 1,59 | 0,540 | 2,25 | 3,46 | 11,54 | 0,00 | 6,235 | 0,95 | 3,86 | 6,37 | 6,019 | 0,90 | 0,3609 | C | | | | | | |
| D-090W-07 | | | | | | | 21,00 | 1,80 | 0,442 | 2,75 | 3,95 | 17,05 | 0,00 | 7,537 | 0,91 | 4,43 | 6,76 | 7,325 | 0,72 | 0,4034 | C | | | | | | |
| D-090W-01 | | | | | | | 26,00 | 2,11 | 0,347 | 3,50 | 4,69 | 21,31 | 0,00 | 7,402 | 0,84 | 5,30 | 7,74 | 7,190 | 0,84 | 0,4671 | C | | | | | | |
| D-090W-02 | | | | | | | 40,00 | 2,91 | 0,221 | 5,50 | 6,65 | 33,35 | 0,00 | 7,372 | 0,75 | 7,61 | 13,77 | 7,159 | 0,75 | 0,6369 | C | | | | | | |
| D-090W-03 | | | | | | | 62,00 | 4,10 | 0,143 | 8,50 | 9,59 | 52,41 | 31,61 | 7,496 | 0,79 | 11,08 | 20,98 | 7,282 | 0,70 | 0,8917 | C | | | | | | |
| D-090W-04 | | | | | | | 98,00 | 5,68 | 0,097 | 12,50 | 13,50 | 84,50 | 83,10 | 8,217 | 0,68 | 15,70 | 28,35 | 8,004 | 0,67 | 1,2313 | D | | | | | | |
| D-090W-10 | | | | | | | | 9,87 | 10,50 | 0,35 | 8,70 | 11,60 | 15,00 | 1,20 | 0,742 | 2,25 | 3,34 | 11,66 | 0,00 | 8,650 | 1,02 | 3,67 | 4,28 | 8,405 | 1,00 | 0,3247 | C |
| D-090W-11 | | | | | | | | | | | | | 20,00 | 1,36 | 0,607 | 2,75 | 3,80 | 16,20 | 0,00 | 9,832 | 0,97 | 4,21 | 4,45 | 9,584 | 0,90 | 0,3629 | C |
| D-090X | | | | | | | | | | | | | 28,10 | 1,59 | 0,477 | 3,50 | 4,50 | 23,60 | 0,00 | 11,256 | 0,93 | 7,00 | 5,45 | 10,062 | 0,93 | 0,4202 | C |
| D-090Y | | | | | | | | | | | | | 42,90 | 2,20 | 0,303 | 5,50 | 6,35 | 36,55 | 0,00 | 11,093 | 0,83 | 9,80 | 8,61 | 10,045 | 0,83 | 0,5730 | C |
| D-090Z | | | | | | | | | | | | | 72,40 | 3,40 | 0,176 | 9,50 | 10,05 | 62,35 | 55,06 | 10,955 | 0,76 | 15,00 | 14,72 | 10,085 | 0,76 | 0,8787 | D |
| D-090AA | | | | | | | 117,00 | 5,18 | 0,108 | 15,50 | 15,60 | 101,40 | 107,30 | 10,919 | 0,72 | 23,50 | 21,03 | 10,068 | 0,72 | 1,3371 | D | | | | | | |
| D-091B | | 8,00 | 8,63 | 0,30 | 6,90 | 9,40 | 10,50 | 0,68 | 1,393 | 2,25 | 3,16 | 7,34 | 0,00 | 10,225 | 1,09 | 3,40 | 2,87 | 9,891 | 1,00 | 0,2632 | B | | | | | | |
| D-091C | | | | | | | 13,50 | 0,76 | 1,140 | 2,75 | 3,58 | 9,92 | 0,00 | 11,307 | 1,04 | 3,88 | 3,13 | 10,965 | 1,00 | 0,2942 | B | | | | | | |
| D-091 | | | | | | | 16,00 | 0,89 | 0,896 | 3,50 | 4,22 | 11,78 | 0,00 | 10,551 | 0,96 | 4,60 | 4,25 | 10,209 | 0,95 | 0,3406 | B | | | | | | |
| D-092 | | | | | | | 24,50 | 1,23 | 0,570 | 5,50 | 5,91 | 18,59 | 0,00 | 10,595 | 0,86 | 6,50 | 6,40 | 10,258 | 0,86 | 0,4645 | B | | | | | | |
| D-093 | | | | | | | 37,00 | 1,74 | 0,369 | 8,50 | 8,45 | 28,55 | 0,00 | 10,530 | 0,80 | 9,37 | 10,41 | 10,189 | 0,79 | 0,6503 | B | | | | | | |
| D-093A | | | | | | | 37,00 | 2,41 | 0,251 | 12,50 | 11,83 | 25,17 | 0,00 | 6,312 | 0,70 | 13,18 | 21,16 | 5,973 | 0,69 | 0,8980 | C | | | | | | |
| D-094 | | | | | | | 55,00 | 2,41 | 0,251 | 12,50 | 11,83 | 43,17 | 39,56 | 10,826 | 0,77 | 13,18 | 14,89 | 10,487 | 0,76 | 0,8980 | B | | | | | | |
| D-094A | | | | | | | 55,00 | 3,41 | 0,169 | 18,50 | 16,90 | 38,10 | 39,56 | 6,455 | 0,67 | 18,89 | 31,06 | 6,118 | 0,67 | 1,2695 | C | | | | | | |
| D-095 | | | | | | | 80,50 | 3,41 | 0,169 | 18,50 | 16,90 | 63,60 | 71,07 | 10,776 | 0,74 | 18,89 | 22,21 | 10,439 | 0,73 | 1,2695 | B | | | | | | |
| D-095A | | | | | | | 80,50 | 4,07 | 0,139 | 22,50 | 20,28 | 60,22 | 71,07 | 8,389 | 0,69 | 22,72 | 32,96 | 8,049 | 0,69 | 1,5173 | C | | | | | | |
| D-095A-10 | | 7,27 | 7,90 | 0,30 | 6,20 | 8,60 | 7,50 | 0,52 | 1,856 | 2,25 | 3,10 | 4,40 | 0,00 | 8,168 | 1,10 | 3,31 | 2,88 | 7,778 | 1,00 | 0,2392 | B | | | | | | |
| D-095A-11 | | | | | | | 10,50 | 0,59 | 1,519 | 2,75 | 3,51 | 6,99 | 0,00 | 10,616 | 1,06 | 3,77 | 2,96 | 10,221 | 1,00 | 0,2673 | B | | | | | | |
| D-095B | | | | | | | 13,00 | 0,70 | 1,193 | 3,50 | 4,13 | 8,87 | 0,00 | 10,590 | 0,99 | 4,46 | 3,77 | 10,191 | 0,98 | 0,3095 | B | | | | | | |
| D-095C | | | | | | | 20,00 | 0,96 | 0,759 | 5,50 | 5,76 | 14,24 | 0,00 | 10,811 | 0,89 | 6,29 | 5,83 | 10,411 | 0,88 | 0,4221 | B | | | | | | |
| D-095D | | | | | | | 31,00 | 1,35 | 0,491 | 8,50 | 8,22 | 22,78 | 0,00 | 11,193 | 0,83 | 9,04 | 8,74 | 10,790 | 0,83 | 0,5909 | B | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|------|------|-------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | |
| VD-090U-21 | 0,60 | 6,40 | 7,00 | 0,30 | 5,20 | 7,70 | 10,50 | 0,89 | 0,787 | 5,50 | 5,39 | 5,11 | 0,00 | 4,017 | 0,76 | 5,84 | 4,66 | 3,665 | 0,75 | 0,3370 | G | | | | | | |
| VD-090U-22 | | | | | | | 16,20 | 1,25 | 0,509 | 8,50 | 7,68 | 8,52 | 0,00 | 4,336 | 0,70 | 8,37 | 7,83 | 3,985 | 0,70 | 0,4718 | G | | | | | | |
| VD-090U-23 | | | | | | | 24,00 | 1,73 | 0,346 | 12,50 | 10,73 | 13,27 | 0,00 | 4,592 | 0,67 | 11,75 | 12,25 | 4,239 | 0,66 | 0,6516 | G | | | | | | |
| VD-090U-24 | | | | | | | 35,50 | 2,45 | 0,234 | 18,50 | 15,30 | 20,20 | 15,60 | 4,722 | 0,64 | 16,80 | 18,70 | 4,373 | 0,64 | 0,9212 | G | | | | | | |
| VD-090V | | 5,10 | 5,70 | 0,25 | 4,10 | 6,20 | 62,00 | 1,90 | 0,364 | 23,50 | 18,24 | 43,76 | 57,04 | 15,920 | 0,93 | 23,10 | 9,02 | 14,151 | 0,92 | 0,9131 | F | | | | | | |
| VD-090W | | 5,00 | 5,60 | 0,25 | 4,00 | 6,10 | 18,00 | 0,68 | 1,210 | 7,50 | 6,62 | 11,38 | 0,00 | 13,767 | 1,03 | 7,08 | 3,24 | 13,209 | 1,02 | 0,3335 | F | | | | | | |
| VD-090W-06 | 0,63 | 10,97 | 11,60 | 0,40 | 9,70 | 12,60 | 15,00 | 1,70 | 0,464 | 2,25 | 3,50 | 11,50 | 0,00 | 5,337 | 0,90 | 3,90 | 6,90 | 5,151 | 0,95 | 0,3609 | F | | | | | | |
| VD-090W-07 | | | | | | | 21,00 | 1,90 | 0,380 | 2,75 | 4,00 | 17,00 | 0,00 | 6,455 | 0,90 | 4,50 | 7,55 | 6,265 | 0,90 | 0,4034 | F | | | | | | |
| VD-090W-01 | | | | | | | 26,00 | 2,46 | 0,298 | 3,50 | 4,69 | 21,31 | 0,00 | 6,358 | 0,83 | 5,30 | 9,81 | 6,175 | 0,83 | 0,4671 | F | | | | | | |
| VD-090W-02 | | | | | | | 40,00 | 3,39 | 0,190 | 5,50 | 6,65 | 33,35 | 0,00 | 6,332 | 0,74 | 7,61 | 15,47 | 6,149 | 0,74 | 0,6369 | F | | | | | | |
| VD-090W-03 | | | | | | | 62,00 | 4,78 | 0,123 | 8,50 | 9,59 | 52,41 | 29,79 | 6,438 | 0,68 | 11,08 | 23,47 | 6,255 | 0,68 | 0,8917 | F | | | | | | |
| VD-090W-04 | | | | | | | 98,00 | 6,61 | 0,084 | 12,50 | 13,50 | 84,50 | 82,72 | 7,058 | 0,66 | 15,70 | 30,66 | 6,874 | 0,66 | 1,2313 | F | | | | | | |
| VD-090W-10 | | | | | | | | 9,87 | 10,50 | 0,35 | 8,70 | 11,60 | 15,00 | 1,20 | 0,637 | 2,25 | 3,40 | 11,60 | 0,00 | 7,391 | 1,00 | 3,70 | 4,80 | 7,200 | 1,00 | 0,3247 | F |
| VD-090W-11 | | | | | | | | | | | | | 20,00 | 1,40 | 0,521 | 2,75 | 3,80 | 16,20 | 0,00 | 8,445 | 1,00 | 4,25 | 4,90 | 8,210 | 0,95 | 0,3629 | F |
| VD-090X | | | | | | | | | | | | | 28,10 | 1,86 | 0,410 | 3,50 | 4,50 | 23,60 | 0,00 | 9,667 | 0,91 | 5,85 | 5,08 | 9,113 | 0,90 | 0,4202 | F |
| VD-090Y | | | | | | | | | | | | | 42,90 | 2,56 | 0,261 | 5,50 | 6,35 | 36,55 | 0,00 | 9,527 | 0,81 | 8,05 | 8,03 | 9,084 | 0,81 | 0,5730 | F |
| VD-090Z | | | | | | | 72,40 | 3,95 | 0,151 | 9,50 | 10,05 | 62,35 | 54,54 | 9,409 | 0,74 | 11,70 | 13,64 | 9,160 | 0,73 | 0,8787 | F | | | | | | |
| VD-090AA | | | | | | | 117,00 | 6,03 | 0,092 | 15,50 | 15,60 | 101,40 | 107,13 | 9,379 | 0,70 | 17,89 | 22,51 | 9,167 | 0,70 | 1,3371 | F | | | | | | |
| VD-091B | | 8,00 | 8,63 | 0,30 | 6,90 | 9,40 | 10,50 | 0,80 | 1,197 | 2,25 | 3,20 | 7,30 | 0,00 | 8,735 | 1,00 | 3,40 | 3,15 | 8,495 | 1,10 | 0,2632 | F | | | | | | |
| VD-091C | | | | | | | 13,50 | 0,90 | 0,979 | 2,75 | 3,60 | 9,90 | 0,00 | 9,692 | 1,00 | 3,90 | 3,40 | 9,398 | 1,05 | 0,2942 | F | | | | | | |
| VD-091 | | | | | | | 16,00 | 1,04 | 0,769 | 3,50 | 4,22 | 11,78 | 0,00 | 9,062 | 0,94 | 4,60 | 4,74 | 8,769 | 0,93 | 0,3406 | F | | | | | | |
| VD-092 | | | | | | | 24,50 | 1,44 | 0,489 | 5,50 | 5,91 | 18,59 | 0,00 | 9,100 | 0,84 | 6,50 | 7,41 | 8,811 | 0,84 | 0,4645 | F | | | | | | |
| VD-093 | | | | | | | 37,00 | 2,02 | 0,317 | 8,50 | 8,45 | 28,55 | 0,00 | 9,044 | 0,78 | 9,37 | 11,52 | 8,751 | 0,77 | 0,6503 | F | | | | | | |
| VD-093A | | | | | | | 37,00 | 2,80 | 0,215 | 12,50 | 11,83 | 25,17 | 0,00 | 5,422 | 0,68 | 13,18 | 23,80 | 5,130 | 0,68 | 0,8980 | F | | | | | | |
| VD-094 | | | | | | | 55,00 | 2,80 | 0,215 | 12,50 | 11,83 | 43,17 | 39,05 | 9,298 | 0,74 | 13,18 | 16,41 | 9,007 | 0,74 | 0,8980 | F | | | | | | |
| VD-094A | | | | | | | 55,00 | 3,97 | 0,146 | 18,50 | 16,90 | 38,10 | 39,05 | 5,544 | 0,66 | 18,89 | 36,10 | 5,255 | 0,66 | 1,2695 | F | | | | | | |
| VD-095 | | | | | | | 80,50 | 3,97 | 0,146 | 18,50 | 16,90 | 63,60 | 70,85 | 9,255 | 0,72 | 18,89 | 24,27 | 8,966 | 0,71 | 1,2695 | F | | | | | | |
| VD-095A | | | | | | | 80,50 | 4,74 | 0,120 | 22,50 | 20,28 | 60,22 | 70,85 | 7,205 | 0,68 | 22,72 | 38,05 | 6,913 | 0,67 | 1,5173 | F | | | | | | |
| VD-095A-10 | | 7,27 | 7,90 | 0,30 | 6,20 | 8,60 | 7,50 | 0,60 | 1,594 | 2,25 | 3,10 | 4,40 | 0,00 | 7,015 | 1,10 | 3,35 | 3,05 | 6,617 | 1,10 | 0,2392 | F | | | | | | |
| VD-095A-11 | | | | | | | 10,50 | 0,70 | 1,304 | 2,75 | 3,55 | 6,95 | 0,00 | 9,066 | 1,00 | 3,80 | 3,25 | 8,740 | 1,05 | 0,2673 | F | | | | | | |
| VD-095B | | | | | | | 13,00 | 0,81 | 1,025 | 3,50 | 4,13 | 8,87 | 0,00 | 9,095 | 0,97 | 4,46 | 4,26 | 8,753 | 0,96 | 0,3095 | F | | | | | | |
| VD-095C | | | | | | | 20,00 | 1,12 | 0,652 | 5,50 | 5,76 | 14,24 | 0,00 | 9,285 | 0,87 | 6,29 | 6,55 | 8,942 | 0,86 | 0,4221 | F | | | | | | |
| VD-095D | | | | | | | 31,00 | 1,57 | 0,422 | 8,50 | 8,22 | 22,78 | 0,00 | 9,614 | 0,81 | 9,04 | 9,74 | 9,268 | 0,80 | 0,5909 | F | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-095E | 0,63 | 7,27 | 7,90 | 0,30 | 6,20 | 8,60 | 49,00 | 2,18 | 0,287 | 12,50 | 11,50 | 37,50 | 34,04 | 10,763 | 0,79 | 12,68 | 12,33 | 10,423 | 0,78 | 0,8160 | F |
| VD-096 | | 6,30 | 6,93 | 0,25 | 5,20 | 7,50 | 11,50 | 0,57 | 1,575 | 3,50 | 4,02 | 7,48 | 0,00 | 11,787 | 1,08 | 4,30 | 2,70 | 11,340 | 1,07 | 0,2682 | F |
| VD-097 | | | | | | | 17,00 | 0,79 | 1,002 | 5,50 | 5,59 | 11,41 | 0,00 | 11,435 | 0,97 | 6,04 | 4,42 | 10,985 | 0,96 | 0,3658 | F |
| VD-098 | | | | | | | 25,50 | 1,12 | 0,649 | 8,50 | 7,95 | 17,55 | 0,00 | 11,379 | 0,89 | 8,63 | 6,86 | 10,941 | 0,89 | 0,5121 | F |
| VD-099 | | | | | | | 36,50 | 1,00 | 0,441 | 12,50 | 11,10 | 25,40 | 19,16 | 11,200 | 0,85 | 12,10 | 10,29 | 10,760 | 0,84 | 0,7071 | F |
| VD-099A | | | | | | | 36,50 | 2,19 | 0,298 | 18,50 | 15,83 | 20,67 | 19,16 | 6,159 | 0,74 | 17,29 | 19,20 | 5,724 | 0,74 | 0,9998 | F |
| VD-100 | | | | | | | 54,00 | 2,19 | 0,298 | 18,50 | 15,83 | 38,17 | 44,76 | 11,374 | 0,82 | 17,29 | 14,94 | 10,939 | 0,82 | 0,9998 | F |
| VD-100A | | | | | | | 54,00 | 2,61 | 0,245 | 22,50 | 18,98 | 35,02 | 44,76 | 8,580 | 0,77 | 20,75 | 23,80 | 8,146 | 0,76 | 1,1948 | G |
| VD-100A-06 | | 5,77 | 6,40 | 0,25 | 4,70 | 7,00 | 12,00 | 0,50 | 1,595 | 4,50 | 4,80 | 7,20 | 0,00 | 11,481 | 1,10 | 5,10 | 3,20 | 11,002 | 1,10 | 0,2903 | G |
| VD-100A-07 | | | | | | | 18,00 | 0,70 | 1,104 | 6,50 | 6,30 | 11,70 | 0,00 | 12,916 | 1,00 | 6,80 | 4,10 | 12,364 | 1,05 | 0,3797 | G |
| VD-100A-08 | | | | | | | 25,00 | 0,80 | 0,844 | 8,50 | 7,85 | 17,15 | 0,00 | 14,477 | 1,00 | 8,50 | 4,40 | 13,929 | 1,00 | 0,4690 | G |
| VD-100A-01 | | | | | | | 33,00 | 1,11 | 0,683 | 10,50 | 9,37 | 23,63 | 16,59 | 16,149 | 1,00 | 11,50 | 4,94 | 14,692 | 0,99 | 0,5583 | G |
| VD-100A-02 | | | | | | | 41,00 | 1,37 | 0,532 | 13,50 | 11,69 | 29,31 | 30,06 | 15,581 | 0,96 | 13,20 | 6,25 | 14,776 | 0,96 | 0,6923 | G |
| VD-100A-03 | | | | | | | 51,00 | 1,55 | 0,463 | 15,50 | 13,95 | 37,05 | 42,86 | 17,151 | 0,98 | 19,30 | 7,30 | 14,675 | 0,97 | 0,7817 | H |
| VD-100A-04 | | | | | | | 63,00 | 2,17 | 0,319 | 22,50 | 18,64 | 44,36 | 56,67 | 14,148 | 0,91 | 20,24 | 12,21 | 13,636 | 0,90 | 1,0943 | H |
| VD-100B | | 5,40 | 6,03 | 0,25 | 4,30 | 6,50 | 45,00 | 2,70 | 0,269 | 32,50 | 26,04 | 18,96 | 36,79 | 5,107 | 0,81 | 28,19 | 16,81 | 4,528 | 0,80 | 1,4422 | G |
| VD-101 | | 5,00 | 5,63 | 0,20 | 4,00 | 6,10 | 8,50 | 0,37 | 3,151 | 3,50 | 3,89 | 4,61 | 0,00 | 14,512 | 1,39 | 4,11 | 1,64 | 13,831 | 1,38 | 0,2129 | E |
| VD-102 | | | | | | | 12,50 | 0,51 | 2,005 | 5,50 | 5,40 | 7,10 | 0,00 | 14,237 | 1,24 | 5,73 | 2,64 | 13,573 | 1,23 | 0,2903 | E |
| VD-103 | | | | | | | 18,50 | 0,72 | 1,297 | 8,50 | 7,66 | 10,84 | 0,00 | 14,067 | 1,15 | 8,17 | 4,15 | 13,401 | 1,14 | 0,4064 | E |
| VD-104 | | | | | | | 26,00 | 1,00 | 0,882 | 12,50 | 10,67 | 15,33 | 0,00 | 13,527 | 1,08 | 11,44 | 6,42 | 12,844 | 1,07 | 0,5612 | E |
| VD-104A | | | | | | | 26,00 | 1,41 | 0,596 | 18,50 | 15,18 | 10,82 | 0,00 | 6,448 | 0,94 | 16,33 | 9,67 | 5,764 | 0,93 | 0,7935 | F |
| VD-105 | | | | | | | 38,50 | 1,41 | 0,596 | 18,50 | 15,18 | 23,32 | 30,05 | 13,899 | 1,05 | 16,33 | 9,19 | 13,215 | 1,04 | 0,7935 | G |
| VD-105A | | | | | | | 38,50 | 1,69 | 0,490 | 22,50 | 18,19 | 20,31 | 30,05 | 9,953 | 0,98 | 19,57 | 15,16 | 9,277 | 0,97 | 0,9483 | G |
| VD-106 | | 4,00 | 4,63 | 0,15 | 3,00 | 5,00 | 6,70 | 0,28 | 6,154 | 3,50 | 3,82 | 2,88 | 0,00 | 17,729 | 1,98 | 4,00 | 1,01 | 16,614 | 1,96 | 0,1703 | F |
| VD-107 | | | | | | | 9,60 | 0,38 | 3,916 | 5,50 | 5,28 | 4,32 | 0,00 | 16,913 | 1,76 | 5,57 | 1,69 | 15,781 | 1,74 | 0,2322 | F |
| VD-108 | | | | | | | 14,00 | 0,54 | 2,534 | 8,50 | 7,47 | 6,53 | 0,00 | 16,535 | 1,62 | 7,90 | 2,67 | 15,456 | 1,60 | 0,3251 | F |
| VD-109 | | | | | | | 20,00 | 0,75 | 1,723 | 12,50 | 10,40 | 9,60 | 0,00 | 16,543 | 1,54 | 11,03 | 3,93 | 15,455 | 1,52 | 0,4490 | F |
| VD-109A | | | | | | | 20,00 | 1,06 | 1,164 | 18,50 | 14,79 | 5,21 | 0,00 | 6,071 | 1,32 | 15,73 | 4,17 | 4,971 | 1,31 | 0,6348 | F |
| VD-110 | | | | | | | 29,00 | 1,06 | 1,164 | 18,50 | 14,79 | 14,21 | 21,64 | 16,548 | 1,48 | 15,73 | 5,52 | 15,449 | 1,46 | 0,6348 | G |
| VD-110A | | | | | | | 29,00 | 1,27 | 0,957 | 22,50 | 17,71 | 11,29 | 21,64 | 10,807 | 1,37 | 18,84 | 10,04 | 9,725 | 1,36 | 0,7586 | G |
| VD-110B | | 3,37 | 4,00 | 0,15 | 2,40 | 4,40 | 5,50 | 0,24 | 10,290 | 3,50 | 3,78 | 1,72 | 0,00 | 17,697 | 2,69 | 3,95 | 0,83 | 15,949 | 2,60 | 0,1435 | F |
| VD-110C | | | | | | | 8,00 | 0,33 | 6,548 | 5,50 | 5,22 | 2,78 | 0,00 | 18,202 | 2,40 | 5,48 | 1,27 | 16,501 | 2,38 | 0,1957 | F |
| VD-110D | | | | | | | 12,00 | 0,46 | 4,237 | 8,50 | 7,38 | 4,62 | 0,00 | 19,574 | 2,23 | 7,77 | 1,79 | 17,923 | 2,21 | 0,2739 | F |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-095E | 0,63 | 7,27 | 7,90 | 0,30 | 6,20 | 8,60 | 49,00 | 1,87 | 0,334 | 12,50 | 11,50 | 37,50 | 34,53 | 12,531 | 0,81 | 12,68 | 11,45 | 12,136 | 0,81 | 0,8160 | C |
| D-096 | | 6,30 | 6,93 | 0,25 | 5,20 | 7,50 | 11,50 | 0,49 | 1,834 | 3,50 | 4,02 | 7,48 | 0,00 | 13,723 | 1,11 | 4,30 | 2,47 | 13,203 | 1,10 | 0,2682 | B |
| D-097 | | | | | | | 17,00 | 0,68 | 1,167 | 5,50 | 5,59 | 11,41 | 0,00 | 13,313 | 0,99 | 6,04 | 4,01 | 12,790 | 0,99 | 0,3658 | B |
| D-098 | | | | | | | 25,50 | 0,96 | 0,755 | 8,50 | 7,95 | 17,55 | 0,00 | 13,249 | 0,92 | 8,63 | 6,22 | 12,738 | 0,91 | 0,5121 | B |
| D-099 | | | | | | | 36,50 | 1,33 | 0,513 | 12,50 | 11,10 | 25,40 | 20,02 | 13,040 | 0,88 | 12,10 | 9,29 | 12,528 | 0,87 | 0,7071 | B |
| D-099A | | | | | | | 36,50 | 1,88 | 0,347 | 18,50 | 15,83 | 20,67 | 20,02 | 7,171 | 0,76 | 17,29 | 19,21 | 6,664 | 0,75 | 0,9998 | C |
| D-100 | | | | | | | 54,00 | 1,88 | 0,347 | 18,50 | 15,83 | 38,17 | 44,99 | 13,243 | 0,85 | 17,29 | 13,53 | 12,736 | 0,84 | 0,9998 | B |
| D-100A | | | | | | | 54,00 | 2,24 | 0,285 | 22,50 | 18,98 | 35,02 | 44,99 | 9,990 | 0,79 | 20,75 | 20,44 | 9,485 | 0,78 | 1,1948 | C |
| D-100A-06 | | 5,77 | 6,40 | 0,25 | 4,70 | 7,00 | 12,00 | 0,49 | 1,856 | 4,50 | 4,74 | 7,26 | 0,00 | 13,478 | 1,11 | 5,06 | 2,89 | 12,884 | 1,00 | 0,2903 | B |
| D-100A-07 | | | | | | | 18,00 | 0,64 | 1,285 | 6,50 | 6,28 | 11,72 | 0,00 | 15,063 | 1,05 | 6,74 | 3,75 | 14,472 | 1,00 | 0,3797 | B |
| D-100A-08 | | | | | | | 25,00 | 0,80 | 0,983 | 8,50 | 7,82 | 17,18 | 0,00 | 16,885 | 1,04 | 8,43 | 4,25 | 16,286 | 1,00 | 0,4690 | B |
| D-100A-01 | | | | | | | 33,00 | 0,95 | 0,796 | 10,50 | 9,37 | 23,63 | 17,46 | 18,802 | 1,04 | 12,90 | 5,38 | 15,992 | 1,03 | 0,5583 | B |
| D-100A-02 | | | | | | | 41,00 | 1,18 | 0,619 | 13,50 | 11,69 | 29,31 | 30,39 | 18,140 | 1,00 | 14,90 | 6,83 | 16,151 | 0,99 | 0,6923 | C |
| D-100A-03 | | | | | | | 51,00 | 1,33 | 0,539 | 15,50 | 13,23 | 37,77 | 43,06 | 20,357 | 1,02 | 21,00 | 7,83 | 16,169 | 1,01 | 0,7817 | C |
| D-100A-04 | | | | | | | 63,00 | 1,87 | 0,371 | 22,50 | 18,64 | 44,36 | 56,81 | 16,472 | 0,94 | 20,24 | 11,66 | 15,877 | 0,93 | 1,0943 | D |
| D-100B | | 5,40 | 6,03 | 0,25 | 4,30 | 6,50 | 45,00 | 2,32 | 0,314 | 32,50 | 26,04 | 18,96 | 37,00 | 5,946 | 0,83 | 28,19 | 16,81 | 5,271 | 0,81 | 1,4422 | C |
| D-101 | | 5,00 | 5,63 | 0,20 | 4,00 | 6,10 | 8,50 | 0,32 | 3,668 | 3,50 | 3,89 | 4,61 | 0,00 | 16,896 | 1,42 | 4,11 | 1,49 | 16,103 | 1,41 | 0,2129 | B |
| D-102 | | | | | | | 12,50 | 0,44 | 2,334 | 5,50 | 5,40 | 7,10 | 0,00 | 16,576 | 1,27 | 5,73 | 2,38 | 15,803 | 1,26 | 0,2903 | B |
| D-103 | | | | | | | 18,50 | 0,62 | 1,510 | 8,50 | 7,66 | 10,84 | 0,00 | 16,378 | 1,18 | 8,17 | 3,73 | 15,603 | 1,17 | 0,4064 | B |
| D-104 | | | | | | | 26,00 | 0,86 | 1,027 | 12,50 | 10,67 | 15,33 | 7,24 | 15,749 | 1,12 | 11,44 | 5,70 | 14,954 | 1,10 | 0,5612 | B |
| D-104A | | | | | | | 26,00 | 1,21 | 0,694 | 18,50 | 15,18 | 10,82 | 7,24 | 7,508 | 0,95 | 16,33 | 9,67 | 6,711 | 0,94 | 0,7935 | C |
| D-105 | | | | | | | 38,50 | 1,21 | 0,694 | 18,50 | 15,18 | 23,32 | 30,28 | 16,182 | 1,08 | 16,33 | 8,31 | 15,386 | 1,07 | 0,7935 | B |
| D-105A | | | | | | | 38,50 | 1,45 | 0,571 | 22,50 | 18,19 | 20,31 | 30,28 | 11,588 | 1,00 | 19,57 | 12,90 | 10,802 | 0,99 | 0,9483 | C |
| D-106 | | 4,00 | 4,63 | 0,15 | 3,00 | 5,00 | 6,70 | 0,24 | 7,164 | 3,50 | 3,82 | 2,88 | 0,00 | 20,642 | 2,02 | 4,00 | 0,91 | 19,344 | 2,00 | 0,1703 | B |
| D-107 | | | | | | | 9,60 | 0,33 | 4,559 | 5,50 | 5,28 | 4,32 | 0,00 | 19,691 | 1,80 | 5,57 | 1,51 | 18,374 | 1,78 | 0,2322 | B |
| D-108 | | | | | | | 14,00 | 0,46 | 2,950 | 8,50 | 7,47 | 6,53 | 0,00 | 19,251 | 1,66 | 7,90 | 2,37 | 17,995 | 1,64 | 0,3251 | B |
| D-109 | | | | | | | 20,00 | 0,64 | 2,006 | 12,50 | 10,40 | 9,60 | 0,00 | 19,261 | 1,58 | 11,03 | 3,49 | 17,994 | 1,56 | 0,4490 | B |
| D-109A | | | | | | | 20,00 | 0,91 | 1,355 | 18,50 | 14,79 | 5,21 | 0,00 | 7,068 | 1,34 | 15,73 | 4,27 | 5,788 | 1,32 | 0,6348 | C |
| D-110 | | | | | | | 29,00 | 0,91 | 1,355 | 18,50 | 14,79 | 14,21 | 21,86 | 19,267 | 1,52 | 15,73 | 5,17 | 17,987 | 1,50 | 0,6348 | B |
| D-110A | | | | | | | 29,00 | 1,09 | 1,114 | 22,50 | 17,71 | 11,29 | 21,86 | 12,583 | 1,40 | 18,84 | 8,35 | 11,323 | 1,38 | 0,7586 | C |
| D-110B | | 3,37 | 4,00 | 0,15 | 2,40 | 4,40 | 5,50 | 0,20 | 11,980 | 3,50 | 3,78 | 1,72 | 0,00 | 20,605 | 2,73 | 3,95 | 0,72 | 18,570 | 2,70 | 0,1435 | B |
| D-110C | | | | | | | 8,00 | 0,28 | 7,624 | 5,50 | 5,22 | 2,78 | 0,00 | 21,193 | 2,45 | 5,48 | 1,11 | 19,212 | 2,42 | 0,1957 | B |
| D-110D | | | | | | | 12,00 | 0,39 | 4,933 | 8,50 | 7,38 | 4,62 | 0,00 | 22,789 | 2,28 | 7,77 | 1,60 | 20,867 | 2,25 | 0,2739 | B |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-110E | 0,63 | 3,37 | 4,00 | 0,15 | 2,40 | 4,40 | 18,00 | 0,58 | 3,106 | 13,50 | 10,98 | 7,02 | 6,98 | 21,803 | 2,13 | 11,59 | 2,65 | 19,910 | 2,11 | 0,4044 | B |
| D-111 | | 3,20 | 3,83 | 0,15 | 2,30 | 4,20 | 5,50 | 0,19 | 13,993 | 3,50 | 3,77 | 1,73 | 0,00 | 24,196 | 3,07 | 3,94 | 0,58 | 21,829 | 3,03 | 0,1362 | B |
| D-112 | | | | | | | 7,80 | 0,27 | 8,905 | 5,50 | 5,21 | 2,59 | 0,00 | 23,102 | 2,72 | 5,45 | 0,95 | 20,926 | 2,69 | 0,1858 | B |
| D-113 | | | | | | | 11,00 | 0,38 | 5,762 | 8,50 | 7,36 | 3,64 | 0,00 | 20,986 | 2,48 | 7,73 | 1,59 | 18,841 | 2,45 | 0,2601 | B |
| D-114 | | | | | | | 15,50 | 0,52 | 3,918 | 12,50 | 10,23 | 5,27 | 0,00 | 20,659 | 2,35 | 10,78 | 2,37 | 18,493 | 2,32 | 0,3592 | B |
| D-115 | | | | | | | 22,50 | 0,74 | 2,647 | 18,50 | 14,53 | 7,97 | 16,53 | 21,095 | 2,27 | 15,35 | 3,46 | 18,928 | 2,23 | 0,5078 | B |
| D-115A | | 2,37 | 3,00 | 0,10 | 1,40 | 3,30 | 4,70 | 0,15 | 34,444 | 3,50 | 3,73 | 0,97 | 0,00 | 33,331 | 4,96 | 3,88 | 0,28 | 28,244 | 4,23 | 0,1009 | B |
| D-115B | | | | | | | 6,60 | 0,24 | 21,919 | 5,50 | 5,15 | 1,45 | 0,00 | 31,891 | 4,77 | 5,36 | 0,45 | 27,180 | 4,07 | 0,1376 | B |
| D-115C | | | | | | | 10,60 | 0,35 | 12,690 | 9,50 | 7,97 | 2,63 | 0,00 | 33,368 | 4,98 | 8,33 | 0,74 | 28,806 | 4,28 | 0,2110 | B |
| D-115D | | | | | | | 16,50 | 0,50 | 7,778 | 15,50 | 12,21 | 4,29 | 12,01 | 33,376 | 5,00 | 12,80 | 1,20 | 28,778 | 4,31 | 0,3211 | B |
| D-115D-01 | 0,70 | 11,30 | 12,00 | 0,40 | 10,00 | 13,30 | 18,00 | 1,41 | 0,753 | 2,25 | 3,75 | 14,25 | 0,00 | 10,736 | 1,22 | 4,13 | 4,90 | 10,450 | 1,26 | 0,4590 | C |
| D-115D-02 | | | | | | | 25,00 | 1,59 | 0,616 | 2,75 | 4,27 | 20,73 | 0,00 | 12,779 | 1,17 | 4,74 | 4,84 | 12,489 | 1,20 | 0,5130 | C |
| D-115E | | | | | | | 32,70 | 1,86 | 0,484 | 3,50 | 5,05 | 27,65 | 0,00 | 13,391 | 1,10 | 7,90 | 6,51 | 12,012 | 1,10 | 0,5940 | C |
| D-115F | | | | | | | 50,00 | 2,57 | 0,308 | 5,50 | 7,14 | 42,86 | 0,00 | 13,210 | 0,99 | 10,90 | 10,18 | 12,051 | 0,99 | 0,8099 | C |
| D-115G | | | | | | | 84,60 | 3,97 | 0,178 | 9,50 | 11,31 | 73,29 | 65,31 | 13,077 | 0,90 | 16,90 | 17,57 | 12,081 | 0,90 | 1,2419 | D |
| D-115H | | | | | | | 136,00 | 6,05 | 0,109 | 15,50 | 17,58 | 118,42 | 125,10 | 12,952 | 0,86 | 24,90 | 28,48 | 12,151 | 0,85 | 1,8899 | E |
| D-115H-01 | | 7,30 | 8,00 | 0,30 | 6,10 | 8,70 | 33,00 | 1,13 | 0,740 | 8,50 | 8,92 | 24,08 | 0,00 | 17,816 | 1,11 | 9,71 | 6,58 | 17,228 | 1,10 | 0,7325 | C |
| D-115H-02 | | | | | | | 41,00 | 1,46 | 0,547 | 11,50 | 11,57 | 29,43 | 20,45 | 16,092 | 1,04 | 12,63 | 9,99 | 15,511 | 1,03 | 0,9418 | C |
| D-115H-03 | | | | | | | 48,00 | 1,57 | 0,503 | 12,50 | 12,45 | 35,55 | 32,89 | 17,881 | 1,06 | 13,60 | 9,62 | 17,304 | 1,05 | 1,0116 | C |
| D-115H-04 | | | | | | | 63,00 | 2,01 | 0,381 | 16,50 | 15,99 | 47,01 | 52,65 | 17,915 | 1,03 | 17,51 | 12,68 | 17,335 | 1,02 | 1,2907 | D |
| D-115H-10 | | 7,10 | 7,80 | 0,30 | 5,90 | 8,40 | 17,00 | 0,86 | 1,051 | 6,50 | 7,11 | 9,89 | 0,00 | 10,401 | 1,06 | 7,69 | 7,35 | 9,789 | 1,05 | 0,5768 | C |
| D-115H-11 | | | | | | | 24,70 | 1,17 | 0,719 | 9,50 | 9,74 | 14,96 | 0,00 | 10,761 | 1,00 | 10,59 | 10,56 | 10,151 | 0,99 | 0,7803 | C |
| D-115H-12 | | | | | | | 32,50 | 1,47 | 0,547 | 12,50 | 12,38 | 20,12 | 0,00 | 11,003 | 0,97 | 13,50 | 13,47 | 10,388 | 0,96 | 0,9839 | C |
| D-115J | | 6,80 | 7,50 | 0,30 | 5,60 | 8,20 | 14,70 | 0,50 | 2,223 | 3,50 | 4,44 | 10,26 | 0,00 | 22,800 | 1,45 | 6,15 | 2,22 | 19,003 | 1,44 | 0,3574 | C |
| D-115K | | | | | | | 21,80 | 0,69 | 1,414 | 5,50 | 6,18 | 15,62 | 0,00 | 22,093 | 1,30 | 8,30 | 3,47 | 19,094 | 1,29 | 0,4874 | C |
| D-115L | | | | | | | 35,80 | 1,06 | 0,819 | 9,50 | 9,66 | 26,14 | 12,02 | 21,408 | 1,19 | 12,80 | 6,11 | 18,834 | 1,18 | 0,7473 | C |
| D-115M | | | | | | | 56,80 | 1,62 | 0,502 | 15,50 | 14,87 | 41,93 | 46,76 | 21,043 | 1,13 | 19,00 | 9,87 | 18,971 | 1,12 | 1,1373 | D |
| D-116 | | 6,00 | 6,70 | 0,25 | 4,90 | 7,30 | 35,00 | 1,01 | 0,944 | 12,00 | 11,57 | 23,43 | 19,54 | 22,114 | 1,29 | 12,45 | 5,79 | 21,280 | 1,28 | 0,8028 | B |
| D-117 | | 5,00 | 5,70 | 0,20 | 3,90 | 6,20 | 48,00 | 1,87 | 0,612 | 32,00 | 27,75 | 20,25 | 41,77 | 12,380 | 1,33 | 29,73 | 18,13 | 11,172 | 1,31 | 1,6247 | D |
| D-117A | | 4,30 | 5,00 | 0,20 | 3,20 | 5,50 | 8,50 | 0,25 | 8,790 | 3,50 | 4,23 | 4,27 | 0,00 | 37,501 | 2,75 | 5,35 | 0,83 | 27,688 | 2,72 | 0,2260 | C |
| D-117B | | | | | | | 12,10 | 0,34 | 5,594 | 5,50 | 5,85 | 6,25 | 0,00 | 34,944 | 2,44 | 7,20 | 1,32 | 27,409 | 2,42 | 0,3082 | C |
| D-117C | | | | | | | 19,00 | 0,53 | 3,238 | 9,50 | 9,09 | 9,91 | 0,00 | 32,088 | 2,19 | 10,40 | 2,23 | 27,850 | 2,17 | 0,4726 | C |
| D-117D | | | | | | | 29,50 | 0,81 | 1,985 | 15,50 | 13,95 | 15,55 | 21,17 | 30,866 | 2,06 | 15,80 | 3,75 | 27,192 | 2,04 | 0,7192 | C |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-110E | 0,63 | 3,37 | 4,00 | 0,15 | 2,40 | 4,40 | 18,00 | 0,68 | 2,668 | 13,50 | 10,98 | 7,02 | 5,50 | 18,726 | 2,09 | 11,59 | 3,00 | 17,100 | 2,06 | 0,4044 | F |
| VD-111 | | 3,20 | 3,83 | 0,15 | 2,30 | 4,20 | 5,50 | 0,23 | 12,019 | 3,50 | 3,77 | 1,73 | 0,00 | 20,782 | 3,02 | 3,94 | 0,65 | 18,749 | 2,99 | 0,1362 | F |
| VD-112 | | | | | | | 7,80 | 0,31 | 7,648 | 5,50 | 5,21 | 2,59 | 0,00 | 19,842 | 2,67 | 5,44 | 1,07 | 18,050 | 2,65 | 0,1858 | F |
| VD-113 | | | | | | | 11,00 | 0,44 | 4,949 | 8,50 | 7,36 | 3,64 | 0,00 | 18,025 | 2,44 | 7,73 | 1,84 | 16,183 | 2,41 | 0,2601 | F |
| VD-114 | | | | | | | 15,50 | 0,61 | 3,365 | 12,50 | 10,23 | 5,27 | 0,00 | 17,744 | 2,31 | 10,78 | 2,75 | 15,884 | 2,28 | 0,3592 | F |
| VD-115 | | | | | | | 22,50 | 0,86 | 2,274 | 18,50 | 14,53 | 7,97 | 16,34 | 18,119 | 2,22 | 15,35 | 3,99 | 16,258 | 2,19 | 0,5078 | F |
| VD-115A | | 2,37 | 3,00 | 0,15 | 1,40 | 3,30 | 4,70 | 0,23 | 29,584 | 3,50 | 3,73 | 0,97 | 0,00 | 28,628 | 4,26 | 3,88 | 0,31 | 24,259 | 3,63 | 0,1009 | F |
| VD-115B | | | | | | | 6,60 | 0,33 | 18,826 | 5,50 | 5,15 | 1,45 | 0,00 | 27,391 | 4,09 | 5,36 | 0,50 | 23,344 | 3,50 | 0,1376 | F |
| VD-115C | | | | | | | 10,60 | 0,53 | 10,899 | 9,50 | 7,97 | 2,63 | 0,00 | 28,659 | 4,28 | 8,35 | 0,82 | 24,524 | 3,67 | 0,2110 | F |
| VD-115D | | | | | | | 16,50 | 0,82 | 6,680 | 15,50 | 12,21 | 4,29 | 11,87 | 28,666 | 4,29 | 12,80 | 1,32 | 24,717 | 3,70 | 0,3211 | F |
| VD-115D-01 | 0,70 | 11,30 | 12,00 | 0,40 | 10,00 | 13,30 | 18,00 | 1,50 | 0,647 | 2,25 | 3,80 | 14,20 | 0,00 | 9,189 | 1,20 | 4,15 | 5,50 | 8,963 | 1,20 | 0,4590 | G |
| VD-115D-02 | | | | | | | 25,00 | 1,70 | 0,529 | 2,75 | 4,30 | 20,70 | 0,00 | 10,960 | 1,10 | 4,80 | 4,90 | 10,695 | 1,20 | 0,5130 | G |
| VD-115E | | | | | | | 32,70 | 2,17 | 0,416 | 3,50 | 5,05 | 27,65 | 0,00 | 11,501 | 1,07 | 6,85 | 5,97 | 10,754 | 1,07 | 0,5940 | G |
| VD-115F | | | | | | | 50,00 | 2,99 | 0,265 | 5,50 | 7,14 | 42,86 | 0,00 | 11,346 | 0,96 | 9,40 | 9,34 | 10,748 | 0,96 | 0,8099 | G |
| VD-115G | | | | | | | 84,60 | 4,62 | 0,153 | 9,50 | 11,31 | 73,29 | 64,74 | 11,232 | 0,88 | 14,25 | 16,27 | 10,782 | 0,87 | 1,2419 | H |
| VD-115H | | | | | | | 136,00 | 7,04 | 0,094 | 15,50 | 17,58 | 118,42 | 124,89 | 11,124 | 0,83 | 21,55 | 26,99 | 10,751 | 0,82 | 1,8899 | J |
| VD-115H-01 | | 7,30 | 8,00 | 0,30 | 6,10 | 8,70 | 33,00 | 1,32 | 0,635 | 8,50 | 8,92 | 24,08 | 0,00 | 15,302 | 1,07 | 9,71 | 6,96 | 14,797 | 1,06 | 0,7325 | G |
| VD-115H-02 | | | | | | | 41,00 | 1,70 | 0,470 | 11,50 | 11,57 | 29,43 | 19,17 | 13,821 | 1,01 | 12,63 | 10,95 | 13,323 | 1,00 | 0,9418 | G |
| VD-115H-03 | | | | | | | 48,00 | 1,83 | 0,432 | 12,50 | 12,45 | 35,55 | 32,36 | 15,358 | 1,02 | 13,60 | 10,15 | 14,862 | 1,01 | 1,0116 | H |
| VD-115H-04 | | | | | | | 63,00 | 2,34 | 0,327 | 16,50 | 15,99 | 47,01 | 52,38 | 15,387 | 1,00 | 17,51 | 13,38 | 14,889 | 0,99 | 1,2907 | H |
| VD-115H-10 | | 7,10 | 7,80 | 0,30 | 5,90 | 8,40 | 17,00 | 1,00 | 0,903 | 6,50 | 7,11 | 9,89 | 0,00 | 8,934 | 1,04 | 7,69 | 8,72 | 8,407 | 1,03 | 0,5768 | G |
| VD-115H-11 | | | | | | | 24,70 | 1,36 | 0,618 | 9,50 | 9,74 | 14,96 | 0,00 | 9,243 | 0,98 | 10,59 | 12,49 | 8,718 | 0,97 | 0,7803 | G |
| VD-115H-12 | | | | | | | 32,50 | 1,72 | 0,470 | 12,50 | 12,38 | 20,12 | 0,00 | 9,450 | 0,95 | 13,50 | 16,21 | 8,922 | 0,94 | 0,9839 | G |
| VD-115J | | 6,80 | 7,50 | 0,30 | 5,60 | 8,20 | 14,70 | 0,58 | 1,909 | 3,50 | 4,50 | 10,20 | 0,00 | 19,472 | 1,40 | 5,85 | 2,04 | 16,895 | 1,20 | 0,3574 | G |
| VD-115K | | | | | | | 21,80 | 0,80 | 1,215 | 5,50 | 6,18 | 15,62 | 0,00 | 18,975 | 1,26 | 7,85 | 3,23 | 16,947 | 1,16 | 0,4874 | G |
| VD-115L | | | | | | | 35,80 | 1,24 | 0,703 | 9,50 | 9,66 | 26,14 | 12,02 | 18,387 | 1,14 | 11,75 | 5,54 | 16,915 | 1,00 | 0,7473 | G |
| VD-115M | | | | | | | 56,80 | 1,88 | 0,431 | 15,50 | 14,87 | 41,93 | 46,49 | 18,074 | 1,08 | 17,45 | 9,25 | 16,962 | 0,99 | 1,1373 | H |
| VD-116 | | 6,00 | 6,70 | 0,25 | 4,90 | 7,30 | 35,00 | 1,18 | 0,811 | 12,00 | 11,57 | 23,43 | 18,76 | 18,994 | 1,24 | 12,46 | 5,99 | 18,269 | 1,23 | 0,8028 | F |
| VD-117 | | 5,00 | 5,70 | 0,20 | 3,90 | 6,20 | 48,00 | 2,17 | 0,525 | 32,00 | 27,75 | 20,25 | 41,62 | 10,633 | 1,30 | 29,73 | 18,20 | 9,596 | 1,29 | 1,6247 | F |
| VD-117A | | 4,30 | 5,00 | 0,20 | 3,20 | 5,50 | 8,50 | 0,20 | 7,550 | 3,50 | 4,45 | 4,05 | 0,00 | 30,576 | 2,67 | 5,25 | 0,79 | 24,536 | 2,20 | 0,2260 | F |
| VD-117B | | | | | | | 12,10 | 0,40 | 4,804 | 5,50 | 5,85 | 6,25 | 0,00 | 30,013 | 2,37 | 6,95 | 1,25 | 24,742 | 2,35 | 0,3082 | F |
| VD-117C | | | | | | | 19,00 | 0,62 | 2,781 | 9,50 | 9,09 | 9,91 | 0,00 | 27,560 | 2,13 | 10,15 | 2,19 | 24,616 | 2,10 | 0,4726 | F |
| VD-117D | | | | | | | 29,50 | 0,94 | 1,705 | 15,50 | 13,95 | 15,55 | 20,90 | 26,510 | 2,00 | 14,95 | 3,44 | 24,804 | 1,98 | 0,7192 | F |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-117E | 0,70 | 2,80 | 3,50 | 0,20 | 1,70 | 3,90 | 5,30 | 0,20 | 27,344 | 3,50 | 4,15 | 1,15 | 0,00 | 31,341 | 5,91 | 4,30 | 0,42 | 27,344 | 5,85 | 0,1472 | F | | | | | |
| VD-117F | | | | | | | 7,60 | 0,27 | 17,401 | 5,50 | 5,73 | 1,87 | 0,00 | 32,584 | 5,26 | 5,97 | 0,63 | 28,363 | 5,20 | 0,2007 | F | | | | | |
| VD-117G | | | | | | | 12,20 | 0,42 | 10,074 | 9,50 | 8,87 | 3,33 | 0,00 | 33,500 | 4,77 | 9,28 | 1,03 | 29,416 | 4,71 | 0,3077 | F | | | | | |
| VD-117H | | | | | | | 19,00 | 0,65 | 6,174 | 15,50 | 13,60 | 5,40 | 13,30 | 33,370 | 4,49 | 14,28 | 1,71 | 29,143 | 4,43 | 0,4683 | F | | | | | |
| VD-117H-10 | 0,75 | 11,25 | 12,00 | 0,40 | 9,80 | 13,30 | 22,00 | 1,50 | 0,778 | 2,50 | 4,20 | 17,80 | 0,00 | 13,848 | 1,37 | 5,05 | 3,90 | 13,183 | 1,30 | 0,5554 | H | | | | | |
| VD-117H-20 | | 9,25 | 10,00 | 0,30 | 7,90 | 10,80 | 25,00 | 1,60 | 0,583 | 6,00 | 7,48 | 17,52 | 0,00 | 10,216 | 1,09 | 8,22 | 11,62 | 9,783 | 1,09 | 0,8118 | H | | | | | |
| VD-117H-21 | | | | | | | 27,00 | 1,30 | 0,777 | 4,50 | 5,98 | 21,02 | 0,00 | 16,338 | 1,25 | 6,70 | 4,82 | 15,780 | 1,25 | 0,6596 | H | | | | | |
| VD-117H-22 | | | | | | | 49,00 | 2,11 | 0,412 | 8,50 | 9,97 | 39,03 | 11,50 | 16,064 | 1,11 | 11,02 | 9,40 | 15,630 | 1,10 | 1,0655 | H | | | | | |
| VD-117H-30 | | 7,25 | 8,00 | 0,40 | 5,90 | 8,80 | 22,00 | 0,83 | 1,321 | 5,50 | 6,62 | 15,38 | 0,00 | 20,321 | 1,40 | 7,20 | 3,54 | 19,550 | 1,39 | 0,5965 | H | | | | | |
| VD-117H-40 | | 6,25 | 7,00 | 0,25 | 4,90 | 7,80 | 14,00 | 0,45 | 3,240 | 3,50 | 5,95 | 8,05 | 0,00 | 26,082 | 1,92 | 7,15 | 1,59 | 22,194 | 1,86 | 0,3771 | H | | | | | |
| VD-117H-41 | | | | | | | 31,00 | 0,29 | 1,334 | 8,50 | 11,55 | 19,45 | 0,00 | 25,949 | 1,60 | 14,40 | 3,94 | 22,146 | 1,56 | 0,7200 | H | | | | | |
| VD-117H-50 | | 5,25 | 6,00 | 0,20 | 4,00 | 6,60 | 15,00 | 0,49 | 3,479 | 5,50 | 6,34 | 8,66 | 0,00 | 30,123 | 2,14 | 7,65 | 1,72 | 25,568 | 2,05 | 0,4320 | H | | | | | |
| VD-117H-51 | | | | | | | 27,00 | 0,81 | 1,822 | 10,50 | 10,74 | 16,26 | 0,00 | 29,626 | 1,93 | 12,95 | 3,29 | 25,601 | 1,90 | 0,7200 | H | | | | | |
| VD-117H-60 | | 4,60 | 5,35 | 0,20 | 3,30 | 5,90 | 20,00 | 0,67 | 2,844 | 10,00 | 10,17 | 9,83 | 0,00 | 27,951 | 2,35 | 10,76 | 2,81 | 26,282 | 2,33 | 0,6056 | H | | | | | |
| VD-117H-70 | | 3,25 | 4,00 | 0,15 | 2,10 | 4,40 | 17,00 | 0,98 | 6,721 | 12,00 | 11,65 | 5,35 | 0,00 | 35,933 | 4,47 | 12,23 | 1,68 | 32,058 | 4,44 | 0,4992 | H | | | | | |
| VD-117J | | 0,80 | 13,20 | 14,00 | 0,40 | 11,80 | 15,40 | 38,30 | 2,52 | 0,445 | 3,50 | 5,82 | 32,48 | 0,00 | 14,459 | 1,34 | 7,40 | 7,07 | 13,757 | 1,34 | 0,9062 | F | | | | |
| VD-117K | | | | | | | | 58,50 | 3,48 | 0,283 | 5,50 | 8,24 | 50,26 | 0,00 | 14,241 | 1,20 | 9,90 | 11,51 | 13,770 | 1,20 | 1,2358 | F | | | | |
| VD-117L | | | | | | | | 99,10 | 5,38 | 0,164 | 9,50 | 13,06 | 86,04 | 76,00 | 14,113 | 1,09 | 15,20 | 20,21 | 13,762 | 1,09 | 1,8948 | G | | | | |
| VD-117M | 160,60 | | | | | | | 8,20 | 0,101 | 15,50 | 20,30 | 140,30 | 147,77 | 14,105 | 1,04 | 24,30 | 32,69 | 13,703 | 1,03 | 2,8834 | H | | | | | |
| VD-117M-05 | 11,20 | | | | | | | 12,00 | 0,35 | 9,80 | 12,90 | 11,00 | 1,10 | 1,134 | 2,25 | 4,11 | 6,89 | 0,00 | 7,812 | 1,50 | 4,50 | 6,50 | 7,370 | 1,50 | 0,5942 | F |
| VD-117M-06 | | | | | | | | | | | | 16,00 | 1,20 | 0,928 | 2,75 | 4,67 | 11,33 | 0,00 | 10,510 | 1,40 | 5,15 | 8,60 | 10,065 | 1,45 | 0,6641 | F |
| VD-117N | | | | | | | | | | | | 23,00 | 1,61 | 0,729 | 3,50 | 5,50 | 17,50 | 0,00 | 12,753 | 1,36 | 6,05 | 8,20 | 12,354 | 1,36 | 0,7689 | F |
| VD-117O | | | | | | | | | | | | 36,00 | 2,22 | 0,464 | 5,50 | 7,73 | 28,27 | 0,00 | 13,111 | 1,23 | 8,60 | 12,89 | 12,709 | 1,22 | 1,0485 | F |
| VD-117P | | | | | | | | | | | | 54,00 | 3,13 | 0,300 | 8,50 | 11,08 | 42,92 | 0,00 | 12,881 | 1,13 | 12,42 | 12,48 | 12,479 | 1,50 | 1,4679 | F |
| VD-117Q | | | | | | | | | | | | 84,00 | 4,63 | 0,189 | 13,50 | 16,66 | 67,34 | 64,37 | 12,726 | 1,07 | 18,79 | 31,65 | 12,322 | 1,06 | 2,1670 | G |
| VD-117R | 10,00 | | | | | | | 10,80 | 0,30 | 8,70 | 11,60 | 13,50 | 0,80 | 1,593 | 2,25 | 4,00 | 9,50 | 0,00 | 15,132 | 1,60 | 4,35 | 4,20 | 14,575 | 1,65 | 0,5305 | F |
| VD-117S | | | | | | | | | | | | 16,50 | 1,00 | 1,303 | 2,75 | 4,55 | 11,95 | 0,00 | 15,574 | 1,60 | 4,95 | 4,80 | 15,053 | 1,55 | 0,5929 | F |
| VD-118 | | | | | | | | | | | | 20,00 | 1,18 | 1,024 | 3,50 | 5,34 | 14,66 | 0,00 | 15,016 | 1,43 | 5,81 | 6,47 | 14,531 | 1,43 | 0,6865 | F |
| VD-119 | | | | | | | | | | | | 30,00 | 1,63 | 0,652 | 5,50 | 7,47 | 22,53 | 0,00 | 14,681 | 1,28 | 8,21 | 10,17 | 14,199 | 1,27 | 0,9362 | F |
| VD-120 | | | | | | | | | | | | 45,58 | 2,29 | 0,422 | 8,50 | 10,67 | 34,91 | 0,00 | 14,718 | 1,19 | 11,81 | 15,73 | 14,239 | 1,18 | 1,3107 | F |
| VD-121 | | | | | | | | | | | | 66,00 | 3,18 | 0,287 | 12,50 | 14,94 | 51,06 | 44,70 | 14,639 | 1,13 | 16,61 | 23,13 | 14,161 | 1,12 | 1,8100 | F |
| VD-121A | | | | | | | | | | | | 66,00 | 4,50 | 0,194 | 18,50 | 21,35 | 44,65 | 44,70 | 8,650 | 1,02 | 23,83 | 34,23 | 8,170 | 0,99 | 2,5589 | G |
| VD-122 | | | | | | | | | | | | 96,50 | 4,50 | 0,194 | 18,50 | 21,35 | 75,15 | 83,82 | 14,559 | 1,09 | 23,83 | 34,23 | 14,078 | 1,08 | 2,5589 | G |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-117E | 0,70 | 2,80 | 3,50 | 0,20 | 1,70 | 3,90 | 5,30 | 0,17 | 31,836 | 3,50 | 4,15 | 1,15 | 0,00 | 36,490 | 5,99 | 4,30 | 0,38 | 31,836 | 5,92 | 0,1472 | C |
| D-117F | | | | | | | 7,60 | 0,24 | 20,259 | 5,50 | 5,73 | 1,87 | 0,00 | 37,937 | 5,34 | 5,97 | 0,57 | 33,023 | 5,27 | 0,2007 | C |
| D-117G | | | | | | | 12,20 | 0,36 | 11,729 | 9,50 | 8,87 | 3,33 | 0,00 | 39,004 | 4,85 | 9,28 | 0,95 | 34,249 | 4,78 | 0,3077 | C |
| D-117H | | | | | | | 19,00 | 0,56 | 7,189 | 15,50 | 13,60 | 5,40 | 13,49 | 38,852 | 4,57 | 14,28 | 1,57 | 33,931 | 4,50 | 0,4683 | C |
| D-117H-10 | 0,75 | 11,25 | 12,00 | 0,40 | 9,80 | 13,30 | 22,00 | 1,29 | 0,906 | 2,50 | 4,20 | 17,80 | 0,00 | 16,123 | 1,30 | 5,70 | 4,26 | 14,761 | 1,40 | 0,5554 | D |
| D-117H-20 | | 9,25 | 10,00 | 0,30 | 7,90 | 10,80 | 25,00 | 2,38 | 0,679 | 6,00 | 7,48 | 17,52 | 0,00 | 11,895 | 1,14 | 8,22 | 9,99 | 11,390 | 1,11 | 0,8118 | D |
| D-117H-21 | | 27,00 | 1,11 | 0,905 | 4,50 | 5,98 | 21,02 | 0,00 | 19,022 | 1,29 | 7,50 | 5,09 | 17,649 | 1,29 | 0,6596 | D | | | | | |
| D-117H-22 | | 49,00 | 1,82 | 0,479 | 8,50 | 9,97 | 39,03 | 17,59 | 18,703 | 1,05 | 12,80 | 9,83 | 17,345 | 1,14 | 1,0655 | D | | | | | |
| D-117H-30 | | 7,25 | 8,00 | 0,40 | 5,90 | 8,80 | 22,00 | 0,71 | 1,538 | 5,50 | 6,62 | 15,38 | 0,00 | 23,660 | 1,50 | 7,85 | 3,74 | 21,762 | 1,44 | 0,5965 | D |
| D-117H-40 | | 6,25 | 7,00 | 0,25 | 4,90 | 7,80 | 14,00 | 0,39 | 3,772 | 3,50 | 5,85 | 8,15 | 0,00 | 30,744 | 2,08 | 7,50 | 1,75 | 24,520 | 1,76 | 0,3771 | D |
| D-117H-41 | | 31,00 | 0,76 | 1,553 | 8,50 | 11,15 | 19,85 | 0,00 | 30,833 | 1,68 | 14,90 | 4,14 | 25,008 | 1,61 | 0,7200 | D | | | | | |
| D-117H-50 | | 5,25 | 6,00 | 0,20 | 4,00 | 6,60 | 15,00 | 0,42 | 4,050 | 5,50 | 6,34 | 8,66 | 0,00 | 35,072 | 2,28 | 7,90 | 1,85 | 28,756 | 2,19 | 0,4320 | D |
| D-117H-51 | | 27,00 | 0,70 | 2,122 | 10,50 | 10,74 | 16,26 | 0,00 | 34,493 | 2,03 | 13,50 | 3,54 | 28,640 | 1,98 | 0,7200 | D | | | | | |
| D-117H-60 | | 4,60 | 5,35 | 0,20 | 3,30 | 5,90 | 20,00 | 0,58 | 3,312 | 10,00 | 10,17 | 9,83 | 0,00 | 32,543 | 2,45 | 10,76 | 2,65 | 30,599 | 2,39 | 0,6056 | D |
| D-117H-70 | | 3,25 | 4,00 | 0,15 | 2,10 | 4,40 | 17,00 | 0,55 | 7,825 | 12,00 | 11,65 | 5,35 | 5,29 | 41,836 | 4,58 | 12,23 | 1,55 | 37,325 | 4,45 | 0,4992 | D |
| D-117J | | 0,80 | 13,20 | 14,00 | 0,40 | 11,80 | 15,40 | 38,30 | 2,17 | 0,518 | 3,50 | 5,82 | 32,48 | 0,00 | 16,835 | 1,38 | 8,50 | 10,94 | 15,447 | 1,37 | 0,9062 |
| D-117K | 58,50 | | | | | | | 2,99 | 0,330 | 5,50 | 8,24 | 50,26 | 0,00 | 16,580 | 1,24 | 11,50 | 17,12 | 15,504 | 1,23 | 1,2358 | C |
| D-117L | 99,10 | | | | | | | 4,62 | 0,191 | 9,50 | 13,06 | 86,04 | 76,65 | 16,431 | 1,13 | 18,70 | 29,85 | 15,355 | 1,12 | 1,8948 | D |
| D-117M | 160,60 | | | | | | | 7,04 | 0,117 | 15,50 | 20,30 | 140,30 | 148,00 | 16,422 | 1,04 | 27,80 | 48,15 | 15,544 | 1,07 | 2,8834 | E |
| D-117M-05 | 11,20 | | 12,00 | 0,35 | 9,80 | 12,90 | 11,00 | 1,04 | 1,320 | 2,25 | 4,11 | 6,89 | 0,00 | 9,095 | 1,51 | 4,46 | 6,40 | 8,633 | 1,60 | 0,5942 | C |
| D-117M-06 | 16,00 | | 1,18 | 1,080 | 2,75 | 4,67 | 11,33 | 0,00 | 12,237 | 1,46 | 5,10 | 8,10 | 11,772 | 1,50 | 0,6641 | C | | | | | |
| D-117N | 23,00 | | 1,38 | 0,849 | 3,50 | 5,50 | 17,50 | 0,00 | 14,848 | 1,40 | 6,05 | 9,24 | 14,384 | 1,39 | 0,7689 | C | | | | | |
| D-117O | 36,00 | | 1,91 | 0,540 | 5,50 | 7,73 | 28,27 | 0,00 | 15,264 | 1,26 | 8,60 | 14,26 | 14,797 | 1,25 | 1,0485 | C | | | | | |
| D-117P | 54,00 | | 2,69 | 0,349 | 8,50 | 11,08 | 42,92 | 0,00 | 14,998 | 1,16 | 12,42 | 22,32 | 14,529 | 1,16 | 1,4679 | C | | | | | |
| D-117Q | 84,00 | | 3,98 | 0,220 | 13,50 | 16,66 | 67,34 | 64,93 | 14,816 | 1,10 | 18,79 | 35,72 | 14,347 | 1,09 | 2,1670 | D | | | | | |
| D-117R | 10,00 | | 10,80 | 0,30 | 8,70 | 11,60 | 13,50 | 0,77 | 1,855 | 2,25 | 4,00 | 9,50 | 0,00 | 17,618 | 1,68 | 4,30 | 4,40 | 17,062 | 1,70 | 0,5305 | C |
| D-117S | 16,50 | | 0,87 | 1,517 | 2,75 | 4,54 | 11,96 | 0,00 | 18,148 | 1,59 | 4,90 | 5,30 | 17,602 | 1,60 | 0,5929 | C | | | | | |
| D-118 | 20,00 | 1,01 | 1,192 | 3,50 | 5,34 | 14,66 | 0,00 | 17,483 | 1,47 | 5,81 | 7,00 | 16,918 | 1,46 | 0,6865 | C | | | | | | |
| D-119 | 30,00 | 1,40 | 0,759 | 5,50 | 7,47 | 22,53 | 0,00 | 17,092 | 1,32 | 8,21 | 11,18 | 16,532 | 1,31 | 0,9362 | C | | | | | | |
| D-120 | 45,58 | 1,97 | 0,491 | 8,50 | 10,67 | 34,91 | 0,00 | 17,136 | 1,22 | 11,81 | 17,24 | 16,578 | 1,22 | 1,3107 | C | | | | | | |
| D-121 | 66,00 | 2,73 | 0,334 | 12,50 | 14,94 | 51,06 | 45,43 | 17,044 | 1,17 | 16,61 | 25,44 | 16,488 | 1,16 | 1,8100 | C | | | | | | |
| D-121A | 66,00 | 3,86 | 0,226 | 18,50 | 21,35 | 44,65 | 45,43 | 10,071 | 1,02 | 23,83 | 42,10 | 9,512 | 1,01 | 2,5589 | D | | | | | | |
| D-122 | 96,50 | 3,86 | 0,226 | 18,50 | 21,35 | 75,15 | 84,12 | 16,951 | 1,13 | 23,83 | 37,77 | 16,391 | 1,12 | 2,5589 | C | | | | | | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|--------|--------|--------|--------|-------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | | |
| D-122A | 0,80 | 10,00 | 10,80 | 0,30 | 8,70 | 11,60 | 96,50 | 4,62 | 0,185 | 22,50 | 25,62 | 70,88 | 84,12 | 13,145 | 1,05 | 28,63 | 53,26 | 12,587 | 1,04 | 3,0582 | D | | | | | | | | | |
| D-122A-01 | | | | | | | 175,00 | 6,69 | 0,125 | 33,50 | 37,36 | 137,64 | 168,56 | 17,144 | 1,09 | 41,84 | 67,77 | 16,587 | 1,08 | 4,4313 | E | | | | | | | | | |
| D-122A-09 | | | | | | | 9,20 | 10,00 | 0,30 | 7,80 | 10,80 | 12,50 | 0,66 | 2,144 | 2,50 | 4,20 | 8,30 | 0,00 | 17,791 | 1,67 | 4,50 | 4,30 | 17,148 | 1,50 | 0,5168 | C | | | | |
| D-122A-10 | | | | | | | | | | | | 17,50 | 0,81 | 1,531 | 3,50 | 5,24 | 12,26 | 0,00 | 18,778 | 1,53 | 5,66 | 5,89 | 18,128 | 1,52 | 0,6316 | C | | | | |
| D-122A-11 | | | | | | | | | | | | 27,50 | 1,12 | 0,974 | 5,50 | 7,31 | 20,19 | 0,00 | 19,669 | 1,39 | 7,96 | 8,94 | 19,038 | 1,38 | 0,8613 | C | | | | |
| D-122A-12 | | | | | | | | | | | | 42,50 | 1,58 | 0,630 | 8,50 | 10,43 | 32,07 | 0,00 | 20,219 | 1,30 | 11,45 | 13,52 | 19,575 | 1,29 | 1,2058 | C | | | | |
| D-122A-13 | | | | | | | | | | | | 62,50 | 2,19 | 0,429 | 12,50 | 14,58 | 47,92 | 44,41 | 20,542 | 1,25 | 16,07 | 19,58 | 19,905 | 1,24 | 1,6652 | D | | | | |
| D-122A-14 | | | | | | | | | | | | 92,50 | 3,10 | 0,290 | 18,50 | 20,82 | 71,68 | 81,65 | 20,764 | 1,21 | 23,03 | 28,41 | 20,123 | 1,20 | 2,3542 | D | | | | |
| D-122B | | 8,50 | 9,30 | 0,30 | 7,20 | 10,00 | 15,50 | 0,73 | 1,699 | 4,00 | 5,66 | 9,84 | 0,00 | 16,712 | 1,51 | 6,09 | 6,41 | 15,985 | 1,50 | 0,6366 | D | | | | | | | | | |
| D-122C | | | | | | | 8,00 | 8,80 | 0,30 | 6,70 | 9,50 | 10,50 | 0,44 | 3,260 | 2,50 | 4,09 | 6,41 | 0,00 | 20,897 | 1,90 | 4,33 | 2,80 | 20,114 | 1,89 | 0,4381 | C | | | | |
| D-123 | | | | | | | | | | | | 14,50 | 0,58 | 2,329 | 3,50 | 5,10 | 9,40 | 0,00 | 21,889 | 1,68 | 5,45 | 4,30 | 21,074 | 1,67 | 0,5492 | C | | | | |
| D-124 | | | | | | | | | | | | 21,50 | 0,80 | 1,482 | 5,50 | 7,10 | 14,40 | 0,00 | 21,338 | 1,51 | 7,65 | 6,88 | 20,523 | 1,50 | 0,7489 | C | | | | |
| D-125 | | | | | | | | | | | | 32,00 | 1,13 | 0,959 | 8,50 | 10,10 | 21,90 | 0,00 | 20,998 | 1,40 | 10,95 | 10,76 | 20,183 | 1,39 | 1,0485 | C | | | | |
| D-126 | | | | | | | | | | | | 47,00 | 1,57 | 0,652 | 12,50 | 14,10 | 32,90 | 26,69 | 21,451 | 1,34 | 15,35 | 15,58 | 20,636 | 1,33 | 1,4480 | C | | | | |
| D-126A | 47,00 | | | | | | | | | | | 2,22 | 0,441 | 18,50 | 20,10 | 26,90 | 26,69 | 11,851 | 1,16 | 21,95 | 25,05 | 11,036 | 1,14 | 2,0471 | D | | | | | |
| D-127 | 68,00 | | | | | | | | | | | 2,22 | 0,441 | 18,50 | 20,10 | 47,90 | 56,44 | 21,102 | 1,29 | 21,95 | 23,32 | 20,287 | 1,28 | 2,0471 | C | | | | | |
| D-127A | 68,00 | | | | | | | | | | | 2,65 | 0,362 | 22,50 | 24,10 | 43,90 | 56,44 | 15,902 | 1,20 | 26,35 | 33,44 | 15,087 | 1,19 | 2,4466 | D | | | | | |
| D-127B | 7,50 | | | | | | | | | | | 8,30 | 0,30 | 6,20 | 8,90 | 13,00 | 0,51 | 2,826 | 3,50 | 5,05 | 7,95 | 0,00 | 22,469 | 1,77 | 5,38 | 3,84 | 21,534 | 1,68 | 0,5149 | C |
| D-127C | | | | | | | | | | | | | | | | 19,00 | 0,70 | 1,798 | 5,50 | 7,02 | 11,98 | 0,00 | 21,544 | 1,58 | 7,53 | 6,21 | 20,627 | 1,57 | 0,7021 | C |
| D-127D | | | | | | | | | | | | | | | | 29,00 | 0,99 | 1,164 | 8,50 | 9,98 | 19,02 | 0,00 | 22,137 | 1,48 | 10,77 | 9,41 | 21,213 | 1,47 | 0,9830 | C |
| D-127E | | | | | | | | | | | | | | | | 45,00 | 1,46 | 0,733 | 13,50 | 14,90 | 30,10 | 26,75 | 22,051 | 1,40 | 16,15 | 14,99 | 21,138 | 1,39 | 1,4511 | C |
| D-127E-09 | 7,20 | | | | | | | | | | | 8,00 | 0,30 | 5,80 | 8,80 | 10,00 | 0,38 | 4,472 | 2,50 | 4,04 | 5,96 | 0,00 | 26,652 | 2,09 | 4,26 | 2,20 | 25,669 | 2,07 | 0,4044 | C |
| D-127E-01 | | 12,80 | 0,47 | 3,194 | 3,50 | 5,02 | | | | | | | | | | 7,78 | 0,00 | 24,850 | 1,87 | 5,33 | 3,35 | 23,861 | 1,85 | 0,4943 | C | | | | | |
| D-127E-02 | | 19,20 | 0,65 | 2,033 | 5,50 | 6,97 | 12,23 | 0,00 | 24,850 | 1,69 | 7,46 | | | | | 5,26 | 23,864 | 1,67 | 0,6741 | C | | | | | | | | | | |
| D-127E-03 | | 22,00 | 0,69 | 1,863 | 6,00 | 7,46 | 14,54 | 0,00 | 27,086 | 1,70 | 7,99 | | | | | 5,31 | 26,105 | 1,69 | 0,7190 | C | | | | | | | | | | |
| D-127E-04 | | 28,80 | 0,91 | 1,315 | 8,50 | 9,91 | 18,89 | 0,00 | 24,850 | 1,57 | 10,67 | | | | | 8,13 | 23,846 | 1,55 | 0,9437 | D | | | | | | | | | | |
| D-127E-05 | | 41,60 | 1,26 | 0,894 | 12,50 | 13,82 | 27,79 | 22,65 | 24,850 | 1,50 | 14,92 | | | | | 11,95 | 23,862 | 1,48 | 1,3032 | D | | | | | | | | | | |
| D-127E-06 | 60,80 | 1,78 | 0,604 | 18,50 | 19,68 | 41,12 | 50,31 | 24,850 | 1,45 | 21,32 | 17,69 | 23,858 | 1,44 | 1,8424 | E | | | | | | | | | | | | | | | |
| D-128 | 6,30 | 7,10 | 0,20 | 5,10 | 7,60 | 10,50 | 0,37 | 4,768 | 3,50 | 4,94 | 5,56 | 0,00 | 26,508 | 2,17 | 5,21 | 2,62 | 25,223 | 2,15 | 0,4325 | C | | | | | | | | | | |
| D-129 | | | | | | 15,50 | 0,51 | 3,034 | 5,50 | 6,85 | 8,65 | 0,00 | 26,248 | 1,95 | 7,28 | 4,15 | 24,941 | 1,93 | 0,5898 | C | | | | | | | | | | |
| D-130 | | | | | | 23,00 | 0,72 | 1,963 | 8,50 | 9,71 | 13,29 | 0,00 | 26,087 | 1,81 | 10,36 | 6,43 | 24,816 | 1,79 | 0,8257 | C | | | | | | | | | | |
| D-131 | | | | | | 33,00 | 1,00 | 1,335 | 12,50 | 13,53 | 19,47 | 10,48 | 25,993 | 1,73 | 15,40 | 9,81 | 23,497 | 1,71 | 1,1403 | C | | | | | | | | | | |
| D-131A | | | | | | 33,00 | 1,42 | 0,902 | 18,50 | 19,26 | 13,74 | 10,48 | 12,397 | 1,46 | 20,69 | 12,31 | 11,104 | 1,44 | 1,6121 | D | | | | | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------|-------------|-------------------------------|-------|--------|------|--------|---|
| | | | | | | | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn | | | | | |
| VD-122A | 0,80 | 10,00 | 10,80 | 0,30 | 8,70 | 11,60 | 96,50 | 5,37 | 0,159 | 22,50 | 25,62 | 70,88 | 83,82 | 11,291 | 1,03 | 28,63 | 41,63 | 10,811 | 1,02 | 3,0582 | H | | | | | |
| VD-122A-01 | | | | | | | 175,00 | 7,79 | 0,107 | 33,50 | 37,36 | 137,64 | 168,43 | 14,725 | 1,05 | 41,84 | 61,99 | 14,246 | 1,05 | 4,4313 | H | | | | | |
| VD-122A-09 | | | | | | | 9,20 | 10,00 | 0,30 | 7,80 | 10,80 | 12,50 | 0,70 | 1,841 | 2,50 | 4,20 | 8,30 | 0,00 | 15,281 | 1,60 | 4,55 | 4,75 | 14,636 | 1,65 | 0,5168 | G |
| VD-122A-10 | | | | | | | | | | | | 17,50 | 0,95 | 1,315 | 3,50 | 5,24 | 12,26 | 0,00 | 16,128 | 1,49 | 5,66 | 5,46 | 15,570 | 1,48 | 0,6316 | G |
| VD-122A-11 | | | | | | | | | | | | 27,50 | 1,31 | 0,837 | 5,50 | 7,31 | 20,19 | 0,00 | 16,893 | 1,35 | 7,96 | 7,94 | 16,352 | 1,34 | 0,8613 | G |
| VD-122A-12 | | | | | | | | | | | | 42,50 | 1,84 | 0,541 | 8,50 | 10,43 | 32,07 | 0,00 | 17,366 | 1,26 | 11,45 | 10,56 | 16,813 | 1,25 | 1,2058 | G |
| VD-122A-13 | | | | | | | | | | | | 62,50 | 2,55 | 0,368 | 12,50 | 14,58 | 47,92 | 43,81 | 17,643 | 1,20 | 16,07 | 15,16 | 17,096 | 1,20 | 1,6652 | G |
| VD-122A-14 | | | | | | | | | | | | 92,50 | 3,61 | 0,249 | 18,50 | 20,82 | 71,68 | 81,39 | 17,834 | 1,17 | 23,03 | 22,03 | 17,283 | 1,16 | 2,3542 | G |
| VD-122B | | 8,50 | 9,30 | 0,30 | 7,20 | 10,00 | 15,50 | 0,85 | 1,459 | 4,00 | 5,66 | 9,84 | 0,00 | 14,354 | 1,47 | 6,09 | 5,31 | 13,729 | 1,46 | 0,6366 | H | | | | | |
| VD-122C | | 8,00 | 8,80 | 0,30 | 6,70 | 9,50 | 10,50 | 0,50 | 2,800 | 2,50 | 4,10 | 6,40 | 0,00 | 17,920 | 1,80 | 4,35 | 2,80 | 17,220 | 1,85 | 0,4381 | H | | | | | |
| VD-123 | | 0,80 | 8,00 | 8,80 | 0,30 | 6,70 | 9,50 | 14,50 | 0,68 | 2,000 | 3,50 | 5,10 | 9,40 | 0,00 | 18,800 | 1,64 | 5,45 | 3,86 | 18,100 | 1,63 | 0,5492 | G | | | | |
| VD-124 | | | | | | | | 21,50 | 0,94 | 1,273 | 5,50 | 7,10 | 14,40 | 0,00 | 18,327 | 1,47 | 7,65 | 4,70 | 17,627 | 1,46 | 0,7489 | G | | | | |
| VD-125 | | | | | | | | 32,00 | 1,32 | 0,824 | 8,50 | 10,10 | 21,90 | 0,00 | 18,035 | 1,36 | 10,95 | 10,04 | 17,335 | 1,34 | 1,0485 | G | | | | |
| VD-126 | | | | | | | | 47,00 | 1,82 | 0,560 | 12,50 | 14,10 | 32,90 | 25,70 | 18,424 | 1,30 | 15,35 | 14,16 | 17,724 | 1,29 | 1,4480 | G | | | | |
| VD-126A | 47,00 | | | | | | | 2,58 | 0,378 | 18,50 | 20,10 | 26,90 | 25,70 | 10,178 | 1,13 | 21,95 | 21,86 | 9,478 | 1,12 | 2,0471 | H | | | | | |
| VD-127 | 68,00 | | | | | | | 2,58 | 0,378 | 18,50 | 20,10 | 47,90 | 56,14 | 18,124 | 1,25 | 21,95 | 21,86 | 17,424 | 1,24 | 2,0471 | H | | | | | |
| VD-127A | 68,00 | | | | | | | 3,09 | 0,311 | 22,50 | 24,10 | 43,90 | 56,14 | 13,658 | 1,17 | 26,35 | 26,59 | 12,958 | 1,16 | 2,4466 | H | | | | | |
| VD-127B | 7,50 | | | | | | | 8,30 | 0,30 | 6,20 | 8,90 | 13,00 | 0,59 | 2,427 | 3,50 | 5,05 | 7,95 | 0,00 | 19,299 | 1,72 | 5,38 | 3,51 | 18,496 | 1,71 | 0,5149 | G |
| VD-127C | | | | | | | | | | | | 19,00 | 0,82 | 1,545 | 5,50 | 7,02 | 11,98 | 0,00 | 18,504 | 1,54 | 7,53 | 5,69 | 17,717 | 1,53 | 0,7021 | G |
| VD-127D | | | | | | | | | | | | 29,00 | 1,15 | 0,999 | 8,50 | 9,98 | 19,02 | 0,00 | 19,013 | 1,43 | 10,77 | 8,79 | 18,220 | 1,42 | 0,9830 | G |
| VD-127E | | | | | | | | | | | | 45,00 | 1,70 | 0,629 | 13,50 | 14,90 | 30,10 | 25,93 | 18,939 | 1,35 | 16,15 | 13,97 | 18,155 | 1,34 | 1,4511 | H |
| VD-127E-09 | 7,20 | | | | | | | 8,00 | 0,30 | 5,80 | 8,80 | 10,00 | 0,40 | 3,841 | 2,50 | 4,05 | 5,95 | 0,00 | 22,853 | 2,00 | 4,30 | 1,95 | 21,893 | 2,05 | 0,4044 | G |
| VD-127E-01 | | | | | | | | | | | | 12,80 | 0,55 | 2,743 | 3,50 | 5,02 | 7,78 | 0,00 | 21,344 | 1,82 | 5,33 | 2,64 | 20,494 | 1,80 | 0,4943 | G |
| VD-127E-02 | | | | | | | | | | | | 19,20 | 0,75 | 1,746 | 5,50 | 6,97 | 12,23 | 0,00 | 21,344 | 1,63 | 7,46 | 4,14 | 20,496 | 1,62 | 0,6741 | G |
| VD-127E-03 | | 22,00 | 0,80 | 1,600 | 6,00 | 7,46 | 14,54 | | | | | 0,00 | 23,264 | 1,65 | 7,99 | 3,95 | 22,421 | 1,63 | 0,7190 | G | | | | | | |
| VD-127E-04 | | 28,80 | 1,06 | 1,130 | 8,50 | 9,91 | 18,89 | | | | | 0,00 | 21,344 | 1,52 | 10,67 | 6,41 | 20,481 | 1,50 | 0,9437 | G | | | | | | |
| VD-127E-05 | | 41,60 | 1,47 | 0,768 | 12,50 | 13,82 | 27,79 | | | | | 21,65 | 21,344 | 1,45 | 14,92 | 9,42 | 20,495 | 1,43 | 1,3032 | H | | | | | | |
| VD-127E-06 | 60,80 | 2,08 | 0,519 | 18,50 | 19,68 | 41,12 | 50,03 | 21,344 | 1,40 | 21,32 | 13,95 | 20,492 | 1,39 | 1,8424 | H | | | | | | | | | | | |
| VD-128 | 6,30 | 7,10 | 0,20 | 5,10 | 7,60 | 10,50 | 0,43 | 4,095 | 3,50 | 4,94 | 5,56 | 0,00 | 22,768 | 2,12 | 5,21 | 2,38 | 21,664 | 2,10 | 0,4325 | G | | | | | | |
| VD-129 | | | | | | 15,50 | 0,60 | 2,606 | 5,50 | 6,85 | 8,65 | 0,00 | 22,544 | 1,90 | 7,28 | 3,80 | 21,422 | 1,88 | 0,5898 | G | | | | | | |
| VD-130 | | | | | | 23,00 | 0,84 | 1,686 | 8,50 | 9,71 | 13,29 | 0,00 | 22,406 | 1,76 | 10,36 | 5,90 | 21,314 | 1,74 | 0,8257 | G | | | | | | |
| VD-131 | | | | | | 33,00 | 1,17 | 1,147 | 12,50 | 13,53 | 19,47 | 0,00 | 22,325 | 1,67 | 15,40 | 9,03 | 20,181 | 1,65 | 1,1403 | G | | | | | | |
| VD-131A | | | | | | 33,00 | 1,65 | 0,775 | 18,50 | 19,26 | 13,74 | 0,00 | 10,648 | 1,44 | 20,69 | 12,31 | 9,537 | 1,42 | 1,6121 | G | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-132 | 0,80 | 6,30 | 7,10 | 0,20 | 5,10 | 7,60 | 48,00 | 1,65 | 0,775 | 18,50 | 19,26 | 28,74 | 37,20 | 22,270 | 1,61 | 20,69 | 12,95 | 21,159 | 1,60 | 1,6121 | H | | | | |
| VD-132A | | | | | | | 48,00 | 1,97 | 0,637 | 22,50 | 23,07 | 24,93 | 37,20 | 15,878 | 1,49 | 24,81 | 16,26 | 14,773 | 1,48 | 1,9267 | H | | | | |
| VD-132A-01 | | | | | | | 65,00 | 2,54 | 0,486 | 29,50 | 29,76 | 35,24 | 57,62 | 17,124 | 1,49 | 32,04 | 21,32 | 16,014 | 1,47 | 2,4771 | H | | | | |
| VD-132A-10 | | 5,60 | 6,40 | 0,20 | 4,40 | 6,90 | 10,50 | 0,40 | 5,831 | 3,50 | 4,90 | 5,60 | 0,00 | 32,653 | 2,60 | 5,55 | 1,30 | 28,863 | 2,60 | 0,3845 | G | | | | |
| VD-132A-11 | | | | | | | 16,50 | 0,50 | 3,711 | 5,50 | 7,10 | 9,40 | 0,00 | 34,879 | 2,40 | 8,75 | 2,10 | 28,757 | 2,40 | 0,5243 | G | | | | |
| VD-132A-12 | | | | | | | 21,50 | 0,70 | 2,401 | 8,50 | 9,60 | 11,90 | 0,00 | 28,571 | 2,20 | 10,20 | 3,60 | 27,131 | 2,10 | 0,7340 | G | | | | |
| VD-132B | | | | | | | 28,00 | 0,99 | 1,633 | 12,50 | 13,34 | 14,67 | 0,00 | 23,943 | 1,98 | 14,21 | 7,05 | 22,514 | 1,95 | 1,0136 | G | | | | |
| VD-132C | | | | | | | 36,00 | 1,20 | 1,317 | 15,50 | 16,15 | 19,85 | 23,52 | 26,134 | 1,97 | 17,23 | 6,99 | 24,714 | 1,95 | 1,2233 | G | | | | |
| VD-132D | | | | | | | 43,00 | 1,40 | 1,103 | 18,50 | 18,97 | 24,03 | 33,50 | 26,511 | 1,94 | 20,26 | 8,18 | 25,085 | 1,92 | 1,4330 | G | | | | |
| VD-132E | | | | | | | 59,00 | 1,88 | 0,800 | 25,50 | 25,54 | 33,46 | 52,60 | 26,779 | 1,91 | 27,31 | 11,12 | 25,362 | 1,89 | 1,9223 | H | | | | |
| VD-133 | 5,00 | 5,80 | 0,20 | 3,80 | 6,30 | 8,30 | 0,32 | 8,192 | 3,50 | 4,84 | 3,46 | 0,00 | 28,311 | 3,07 | 5,06 | 1,27 | 26,542 | 3,05 | 0,3433 | G | | | | | |
| VD-134 | | | | | | 12,00 | 0,45 | 5,213 | 5,50 | 6,70 | 5,30 | 0,00 | 27,641 | 2,74 | 7,05 | 2,29 | 25,805 | 2,71 | 0,4681 | G | | | | | |
| VD-135 | | | | | | 17,50 | 0,63 | 3,373 | 8,50 | 9,48 | 8,02 | 0,00 | 27,058 | 2,52 | 10,02 | 3,64 | 25,231 | 2,50 | 0,6553 | G | | | | | |
| VD-136 | | | | | | 24,50 | 0,87 | 2,294 | 12,50 | 13,19 | 11,31 | 0,00 | 25,952 | 2,38 | 13,99 | 5,56 | 24,107 | 2,36 | 0,9050 | G | | | | | |
| VD-136A | | | | | | 24,50 | 1,23 | 1,550 | 18,50 | 18,75 | 5,75 | 0,00 | 8,916 | 2,04 | 19,93 | 4,50 | 7,083 | 2,01 | 1,2795 | H | | | | | |
| VD-137 | | | | | | 36,00 | 1,23 | 1,550 | 18,50 | 18,75 | 17,25 | 26,71 | 26,739 | 2,31 | 19,93 | 8,24 | 24,906 | 2,28 | 1,2795 | H | | | | | |
| VD-137A | | | | | | 36,00 | 1,47 | 1,274 | 22,50 | 22,45 | 13,55 | 26,71 | 17,261 | 2,13 | 23,88 | 10,02 | 15,445 | 2,11 | 1,5291 | H | | | | | |
| VD-138 | | | | | | 4,00 | 4,80 | 0,15 | 2,80 | 5,20 | 6,90 | 0,26 | 16,000 | 3,50 | 4,79 | 2,12 | 0,00 | 33,840 | 4,71 | 4,98 | 0,88 | 30,720 | 4,66 | 0,2746 | G |
| VD-139 | | | | | | | | | | | 9,70 | 0,36 | 10,182 | 5,50 | 6,61 | 3,10 | 0,00 | 31,513 | 4,16 | 6,92 | 1,54 | 28,305 | 4,12 | 0,3745 | G |
| VD-140 | | | | | | | | | | | 14,00 | 0,51 | 6,588 | 8,50 | 9,34 | 4,67 | 0,00 | 30,734 | 3,82 | 9,81 | 2,38 | 27,605 | 3,78 | 0,5243 | G |
| VD-141 | 19,50 | 0,71 | 4,480 | 12,50 | 12,98 | | | | | | 6,53 | 0,00 | 29,232 | 3,60 | 13,67 | 3,50 | 26,118 | 3,56 | 0,7240 | G | | | | | |
| VD-142 | 28,00 | 1,00 | 3,027 | 18,50 | 18,44 | | | | | | 9,57 | 20,24 | 28,954 | 3,46 | 19,46 | 5,19 | 25,851 | 3,42 | 1,0236 | G | | | | | |
| VD-142AA | 3,60 | 4,40 | 0,15 | 2,40 | 4,80 | 6,00 | 0,24 | 21,948 | 3,50 | 4,77 | 1,23 | 0,00 | 27,105 | 5,68 | 4,96 | 0,78 | 22,826 | 5,62 | 0,2472 | G | | | | | |
| VD-142AB | | | | | | 9,00 | 0,33 | 13,967 | 5,50 | 6,57 | 2,43 | 0,00 | 33,888 | 5,15 | 6,86 | 1,23 | 29,889 | 5,09 | 0,3370 | G | | | | | |
| VD-142AC | | | | | | 13,00 | 0,47 | 9,037 | 8,50 | 9,29 | 3,71 | 0,00 | 33,560 | 4,73 | 9,74 | 1,91 | 29,462 | 4,67 | 0,4718 | G | | | | | |
| VD-142AD | | | | | | 20,00 | 0,69 | 5,690 | 13,50 | 13,81 | 6,19 | 0,00 | 35,233 | 4,47 | 14,52 | 2,86 | 31,182 | 4,41 | 0,6965 | G | | | | | |
| VD-142A | 0,90 | 14,10 | 15,00 | 0,40 | 12,60 | 16,40 | 39,20 | 2,38 | 0,585 | 3,50 | 6,42 | 32,78 | 0,00 | 19,178 | 1,68 | 8,80 | 7,17 | 17,788 | 1,68 | 1,2251 | G | | | | |
| VD-142B | | | | | | | 59,70 | 3,29 | 0,372 | 5,50 | 9,07 | 50,63 | 0,00 | 18,853 | 1,51 | 11,85 | 11,70 | 17,817 | 1,50 | 1,6707 | G | | | | |
| VD-142C | | | | | | | 101,00 | 5,08 | 0,216 | 9,50 | 14,35 | 86,65 | 74,59 | 18,679 | 1,37 | 18,60 | 20,47 | 17,763 | 1,37 | 2,5617 | G | | | | |
| VD-142D | | | | | | | 163,00 | 7,74 | 0,132 | 15,50 | 22,28 | 140,72 | 148,49 | 18,593 | 1,30 | 28,10 | 33,91 | 17,824 | 1,30 | 3,8982 | H | | | | |
| VD-142D-01 | 11,40 | 12,30 | 0,35 | 9,80 | 13,30 | 35,00 | 1,83 | 0,705 | 5,50 | 8,44 | 26,56 | 0,00 | 18,715 | 1,57 | 9,29 | 11,67 | 18,114 | 1,56 | 1,3507 | H | | | | | |
| VD-143 | 9,40 | 10,30 | 0,30 | 8,00 | 10,90 | 22,00 | 1,66 | 0,768 | 9,00 | 12,04 | 9,96 | 0,00 | 7,653 | 1,39 | 13,10 | 8,90 | 6,835 | 1,38 | 1,6335 | H | | | | | |
| VD-143A | 9,10 | 10,00 | 0,30 | 7,70 | 10,80 | 19,70 | 0,75 | 2,177 | 3,50 | 5,85 | 13,85 | 0,00 | 30,146 | 2,10 | 7,60 | 2,88 | 26,337 | 2,09 | 0,7907 | G | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|--------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-132 | 0,80 | 6,30 | 7,10 | 0,20 | 5,10 | 7,60 | 48,00 | 1,42 | 0,902 | 18,50 | 19,26 | 28,74 | 37,50 | 25,928 | 1,67 | 20,69 | 14,07 | 24,635 | 1,65 | 1,6121 | C | | | | | |
| D-132A | | | | | | | 48,00 | 1,69 | 0,742 | 22,50 | 23,07 | 24,93 | 37,50 | 18,487 | 1,53 | 24,81 | 20,63 | 17,200 | 1,51 | 1,9267 | D | | | | | |
| D-132A-01 | | | | | | | 65,00 | 2,18 | 0,566 | 29,50 | 29,76 | 35,24 | 57,79 | 19,938 | 1,53 | 32,04 | 26,15 | 18,645 | 1,51 | 2,4771 | E | | | | | |
| D-132A-10 | | 5,60 | 6,40 | 0,20 | 4,40 | 6,90 | 10,50 | 0,32 | 6,789 | 3,50 | 4,89 | 5,61 | 0,00 | 38,085 | 2,72 | 5,13 | 1,50 | 36,456 | 2,69 | 0,3845 | C | | | | | |
| D-132A-11 | | | | | | | 16,50 | 0,44 | 4,320 | 5,50 | 6,90 | 9,60 | 0,00 | 41,474 | 2,52 | 7,15 | 2,10 | 40,394 | 2,49 | 0,5243 | C | | | | | |
| D-132A-12 | | | | | | | 21,50 | 0,61 | 2,795 | 8,50 | 9,59 | 11,91 | 0,00 | 33,293 | 2,22 | 10,17 | 4,40 | 31,672 | 2,19 | 0,7340 | C | | | | | |
| D-132B | | | | | | | 28,00 | 0,85 | 1,901 | 12,50 | 13,34 | 14,67 | 0,00 | 27,876 | 2,03 | 14,21 | 7,53 | 26,213 | 2,01 | 1,0136 | C | | | | | |
| D-132C | | | | | | | 36,00 | 1,03 | 1,533 | 15,50 | 16,15 | 19,85 | 23,97 | 30,427 | 2,03 | 17,23 | 8,75 | 28,774 | 2,01 | 1,2233 | D | | | | | |
| D-132D | | | | | | | 43,00 | 1,20 | 1,284 | 18,50 | 18,97 | 24,03 | 33,76 | 30,866 | 2,01 | 20,26 | 10,33 | 29,207 | 1,98 | 1,4330 | D | | | | | |
| D-132E | | | | | | | 59,00 | 1,62 | 0,932 | 25,50 | 25,54 | 33,46 | 52,74 | 31,179 | 1,97 | 27,31 | 14,11 | 29,529 | 1,95 | 1,9223 | D | | | | | |
| D-133 | 5,00 | 5,80 | 0,20 | 3,80 | 6,30 | 8,30 | 0,28 | 9,538 | 3,50 | 4,84 | 3,46 | 0,00 | 32,962 | 3,14 | 5,07 | 1,57 | 30,807 | 3,11 | 0,3433 | C | | | | | | |
| D-134 | | | | | | 12,00 | 0,38 | 6,070 | 5,50 | 6,70 | 5,30 | 0,00 | 32,182 | 2,81 | 7,05 | 2,51 | 30,044 | 2,78 | 0,4681 | C | | | | | | |
| D-135 | | | | | | 17,50 | 0,54 | 3,927 | 8,50 | 9,48 | 8,02 | 0,00 | 31,503 | 2,59 | 10,02 | 3,93 | 29,377 | 2,56 | 0,6553 | C | | | | | | |
| D-136 | | | | | | 24,50 | 0,75 | 2,671 | 12,50 | 13,19 | 11,31 | 0,00 | 30,215 | 2,45 | 13,99 | 5,95 | 28,068 | 2,42 | 0,9050 | C | | | | | | |
| D-136A | | | | | | 24,50 | 1,06 | 1,804 | 18,50 | 18,75 | 5,75 | 0,00 | 10,381 | 2,06 | 19,93 | 4,57 | 8,246 | 2,03 | 1,2795 | D | | | | | | |
| D-137 | | | | | | 36,00 | 1,06 | 1,804 | 18,50 | 18,75 | 17,25 | 26,98 | 31,132 | 2,37 | 19,93 | 8,63 | 28,998 | 2,34 | 1,2795 | C | | | | | | |
| D-137A | | | | | | 36,00 | 1,26 | 1,484 | 22,50 | 22,45 | 13,55 | 29,99 | 20,097 | 2,18 | 23,88 | 12,10 | 17,982 | 2,15 | 1,5291 | D | | | | | | |
| D-138 | | | | | | 4,00 | 4,80 | 0,15 | 2,80 | 5,20 | 6,90 | 0,23 | 18,629 | 3,50 | 4,79 | 2,12 | 0,00 | 39,399 | 4,79 | 4,98 | 0,96 | 35,767 | 4,74 | 0,2746 | C | |
| D-139 | | | | | | | | | | | 9,70 | 0,31 | 11,855 | 5,50 | 6,61 | 3,10 | 0,00 | 36,690 | 4,24 | 6,92 | 1,60 | 32,956 | 4,19 | 0,3745 | C | |
| D-140 | | | | | | | | | | | 14,00 | 0,44 | 7,671 | 8,50 | 9,34 | 4,67 | 0,00 | 35,783 | 3,90 | 9,81 | 2,51 | 32,140 | 3,48 | 0,5243 | C | |
| D-141 | 19,50 | 0,61 | 5,216 | 12,50 | 12,98 | | | | | | 6,53 | 0,00 | 34,034 | 3,68 | 13,67 | 3,81 | 30,409 | 3,62 | 0,7240 | C | | | | | | |
| D-142 | 28,00 | 0,86 | 3,524 | 18,50 | 18,44 | | | | | | 9,57 | 20,48 | 33,710 | 3,53 | 19,46 | 5,67 | 30,098 | 3,48 | 1,0236 | C | | | | | | |
| D-142AA | 3,60 | 4,40 | 0,15 | 2,40 | 4,80 | | | | | | 6,00 | 0,21 | 25,554 | 3,50 | 4,77 | 1,23 | 0,00 | 31,557 | 5,75 | 4,96 | 0,92 | 26,576 | 5,68 | 0,2472 | C | |
| D-142AB | | | | | | | | | | | 9,00 | 0,29 | 16,261 | 5,50 | 6,57 | 2,43 | 0,00 | 39,456 | 5,23 | 6,86 | 1,27 | 34,799 | 5,16 | 0,3370 | C | |
| D-142AC | | | | | | 13,00 | 0,40 | 10,522 | 8,50 | 9,29 | 3,71 | 0,00 | 39,073 | 4,81 | 9,74 | 1,98 | 34,302 | 4,74 | 0,4718 | C | | | | | | |
| D-142AD | | | | | | 20,00 | 0,59 | 6,625 | 13,50 | 13,81 | 6,19 | 9,61 | 41,022 | 4,55 | 14,52 | 3,05 | 36,305 | 4,48 | 0,6965 | C | | | | | | |
| D-142A | 0,90 | 14,10 | 15,00 | 0,40 | 12,60 | 16,40 | 39,20 | 2,05 | 0,681 | 3,50 | 6,42 | 32,78 | 0,00 | 22,328 | 1,73 | 8,95 | 11,00 | 20,608 | 1,72 | 1,2251 | C | | | | | |
| D-142B | | | | | | | 59,70 | 2,82 | 0,434 | 5,50 | 9,07 | 50,63 | 0,00 | 21,951 | 1,55 | 12,30 | 17,30 | 20,549 | 1,55 | 1,6707 | C | | | | | |
| D-142C | | | | | | | 101,00 | 4,36 | 0,251 | 9,50 | 14,35 | 86,65 | 75,38 | 21,748 | 1,42 | 18,90 | 29,84 | 20,606 | 1,41 | 2,5617 | C | | | | | |
| D-142D | | | | | | | 163,00 | 6,65 | 0,154 | 15,50 | 22,28 | 140,72 | 148,80 | 21,647 | 1,35 | 29,50 | 48,79 | 20,537 | 1,34 | 3,8982 | D | | | | | |
| D-142D-01 | | | | | | | 11,40 | 12,30 | 0,35 | 9,80 | 13,30 | 35,00 | 1,57 | 0,820 | 5,50 | 8,44 | 26,56 | 0,00 | 21,790 | 1,62 | 9,29 | 12,76 | 21,089 | 1,61 | 1,3507 | D |
| D-143 | | | | | | | 9,40 | 10,30 | 0,30 | 8,00 | 10,90 | 22,00 | 1,42 | 0,894 | 9,00 | 12,04 | 9,96 | 0,00 | 8,910 | 1,41 | 13,10 | 8,90 | 7,958 | 1,40 | 1,6335 | D |
| D-143A | 9,10 | 10,00 | 0,30 | 7,70 | 10,80 | 19,70 | 0,65 | 2,534 | 3,50 | 5,75 | 13,95 | 0,00 | 35,357 | 2,17 | 8,10 | 4,54 | 29,397 | 2,16 | 0,7907 | C | | | | | | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-143B | 0,90 | 9,10 | 10,00 | 0,30 | 7,70 | 10,80 | 29,10 | 0,89 | 1,613 | 5,50 | 8,00 | 21,10 | 0,00 | 34,021 | 1,95 | 10,20 | 6,89 | 30,480 | 1,94 | 1,0782 | C |
| D-143C | | | | | | | 48,00 | 1,38 | 0,934 | 9,50 | 12,52 | 35,48 | 16,48 | 33,130 | 1,79 | 15,60 | 11,98 | 30,251 | 1,77 | 1,6533 | C |
| D-143D | | | | | | | 76,30 | 2,11 | 0,572 | 15,50 | 19,28 | 57,02 | 62,92 | 32,627 | 1,70 | 23,70 | 16,99 | 30,100 | 1,68 | 2,5158 | D |
| D-143E | | 8,60 | 9,50 | 0,30 | 7,20 | 10,10 | 27,00 | 1,01 | 1,401 | 7,50 | 10,15 | 16,85 | 0,00 | 23,610 | 1,77 | 10,95 | 10,72 | 22,488 | 1,75 | 1,2907 | C |
| D-143F | | | | | | | 35,00 | 1,11 | 1,236 | 8,50 | 11,26 | 23,74 | 0,00 | 29,346 | 1,82 | 12,17 | 10,52 | 28,225 | 1,80 | 1,4266 | C |
| D-143G | | | | | | | 43,00 | 1,33 | 1,001 | 10,50 | 13,49 | 29,51 | 0,00 | 29,535 | 1,77 | 14,61 | 12,92 | 28,413 | 1,76 | 1,6983 | C |
| D-143H | | | | | | | 65,00 | 1,65 | 0,778 | 13,50 | 16,83 | 48,17 | 50,51 | 37,497 | 1,85 | 23,90 | 15,01 | 31,993 | 1,83 | 2,1059 | C |
| D-143H-10 | 7,50 | 8,40 | 0,30 | 6,00 | 9,20 | 22,00 | 0,61 | 2,881 | 5,50 | 7,76 | 14,24 | 0,00 | 41,019 | 2,38 | 9,50 | 4,55 | 36,008 | 2,35 | 0,8886 | D | |
| D-143J | 7,10 | 8,00 | 0,25 | 5,80 | 8,60 | 29,00 | 0,86 | 1,966 | 9,50 | 12,00 | 17,00 | 0,00 | 33,412 | 2,20 | 12,83 | 8,04 | 31,787 | 2,17 | 1,2899 | C | |
| D-143K | | | | | | 36,00 | 1,01 | 1,624 | 11,50 | 14,15 | 21,85 | 0,00 | 35,481 | 2,18 | 15,15 | 9,29 | 33,859 | 2,16 | 1,5142 | C | |
| D-143L | | | | | | 43,00 | 1,24 | 1,288 | 14,50 | 17,37 | 25,63 | 26,04 | 33,006 | 2,09 | 18,63 | 12,39 | 31,387 | 2,07 | 1,8507 | C | |
| D-143M | | | | | | 57,00 | 1,62 | 0,958 | 19,50 | 22,74 | 34,26 | 45,96 | 32,808 | 2,04 | 24,44 | 16,73 | 31,183 | 2,02 | 2,4116 | D | |
| D-143P | 6,40 | 7,30 | 0,25 | 4,90 | 8,00 | 10,80 | 0,35 | 7,285 | 3,50 | 5,50 | 5,30 | 0,00 | 38,582 | 3,13 | 5,78 | 2,27 | 36,571 | 3,10 | 0,5561 | C | |
| D-143Q | | | | | | 17,00 | 0,48 | 4,636 | 5,50 | 7,62 | 9,38 | 0,00 | 43,483 | 2,89 | 8,40 | 3,32 | 39,869 | 2,86 | 0,7583 | C | |
| D-143R | | | | | | 26,36 | 0,68 | 3,000 | 8,50 | 10,80 | 15,56 | 0,00 | 46,690 | 2,74 | 12,80 | 5,03 | 40,676 | 2,71 | 1,0616 | D | |
| D-143S | | | | | | 38,70 | 0,94 | 2,040 | 12,50 | 15,03 | 23,67 | 23,36 | 48,285 | 2,65 | 18,70 | 7,38 | 40,796 | 2,62 | 1,4661 | D | |
| D-143T | | | | | | 57,30 | 1,33 | 1,378 | 18,50 | 21,38 | 35,92 | 48,63 | 49,509 | 2,58 | 27,90 | 11,00 | 40,520 | 2,55 | 2,0727 | D | |
| D-144 | | | | | | 6,00 | 6,90 | 0,20 | 4,70 | 7,40 | 19,50 | 0,60 | 3,868 | 8,00 | 10,20 | 9,30 | 0,00 | 35,973 | 2,88 | 10,80 | 4,95 |
| D-144A | 5,40 | 6,30 | 0,20 | 4,10 | 6,80 | 9,30 | 0,29 | 12,128 | 3,50 | 5,44 | 3,86 | 0,00 | 46,873 | 4,21 | 5,69 | 1,51 | 43,782 | 4,16 | 0,4692 | C | |
| D-144B | | | | | | 13,60 | 0,40 | 7,718 | 5,50 | 7,51 | 6,09 | 0,00 | 46,984 | 3,78 | 7,89 | 2,36 | 44,069 | 3,74 | 0,6398 | C | |
| D-144C | | | | | | 22,20 | 0,62 | 4,468 | 9,50 | 11,67 | 10,53 | 0,00 | 47,065 | 3,46 | 12,33 | 4,07 | 44,101 | 3,41 | 0,9811 | C | |
| D-144D | | | | | | 35,10 | 0,94 | 2,739 | 15,50 | 17,90 | 17,20 | 23,71 | 47,108 | 3,28 | 18,98 | 6,63 | 44,146 | 3,24 | 1,4929 | C | |
| D-145 | 4,50 | 5,40 | 0,20 | 3,20 | 5,80 | 24,00 | 0,68 | 5,642 | 13,00 | 15,11 | 8,89 | 9,21 | 50,167 | 4,64 | 15,91 | 4,01 | 45,646 | 4,57 | 1,0664 | D | |
| D-145A | 3,60 | 4,50 | 0,20 | 2,30 | 4,90 | 6,80 | 0,20 | 40,932 | 3,50 | 5,34 | 1,46 | 0,00 | 59,736 | 9,22 | 5,53 | 0,66 | 51,984 | 9,12 | 0,3128 | C | |
| D-145B | | | | | | 9,70 | 0,28 | 26,048 | 5,50 | 7,36 | 2,34 | 0,00 | 60,852 | 8,24 | 7,67 | 1,02 | 52,877 | 8,12 | 0,4265 | C | |
| D-145C | | | | | | 15,60 | 0,43 | 15,080 | 9,50 | 11,41 | 4,19 | 0,00 | 63,183 | 7,49 | 11,94 | 1,71 | 55,193 | 7,37 | 0,6540 | C | |
| D-145D | | | | | | 24,36 | 0,66 | 9,243 | 15,50 | 17,48 | 6,88 | 17,15 | 63,592 | 7,06 | 18,35 | 2,77 | 55,549 | 6,94 | 0,9953 | C | |
| D-145DA | 1,00 | 23,00 | 24,00 | 0,60 | 21,10 | 24,90 | 28,50 | 4,30 | 0,239 | 3,50 | 8,63 | 19,87 | 0,00 | 4,754 | 0,71 | 10,20 | 18,30 | 4,378 | 0,65 | 2,4672 | E |
| D-145DB | | | | | | | 44,50 | 7,62 | 0,152 | 5,50 | 12,41 | 32,09 | 0,00 | 4,885 | 0,73 | 14,87 | 29,63 | 4,511 | 0,67 | 3,3644 | E |
| D-145DC | | | | | | | 68,80 | 8,60 | 0,099 | 8,50 | 18,09 | 50,71 | 0,00 | 4,995 | 0,75 | 21,89 | 46,91 | 4,621 | 0,67 | 4,7102 | E |
| D-145DD | | | | | | | 101,00 | 15,20 | 0,067 | 12,50 | 25,67 | 75,33 | 0,00 | 5,046 | 0,75 | 31,26 | 69,74 | 4,671 | 0,70 | 6,5045 | F |
| D-145DE | | | | | | | 150,00 | 17,15 | 0,045 | 18,50 | 37,03 | 112,97 | 101,87 | 5,113 | 0,76 | 45,30 | 104,70 | 4,739 | 0,71 | 9,1961 | F |
| D-145DF | | | | | | | 20,00 | 21,00 | 0,50 | 18,20 | 22,00 | 20,00 | 4,05 | 0,364 | 3,50 | 7,95 | 12,05 | 0,00 | 4,384 | 1,54 | 9,18 |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | |
| VD-143B | 0,90 | 9,10 | 10,00 | 0,30 | 7,70 | 10,80 | 29,10 | 1,04 | 1,385 | 5,50 | 8,00 | 21,10 | 0,00 | 29,221 | 1,88 | 10,05 | 4,49 | 26,387 | 1,87 | 1,0782 | G | |
| VD-143C | | | | | | | 48,00 | 1,61 | 0,802 | 9,50 | 12,52 | 35,48 | 0,00 | 28,455 | 1,72 | 15,10 | 7,86 | 26,383 | 1,70 | 1,6533 | G | |
| VD-143D | | | | | | | 76,30 | 2,45 | 0,491 | 15,50 | 19,28 | 57,02 | 62,57 | 28,023 | 1,63 | 22,55 | 13,26 | 26,418 | 1,61 | 2,5158 | H | |
| VD-143E | | 8,60 | 9,50 | 0,30 | 7,20 | 10,10 | 27,00 | 1,17 | 1,203 | 7,50 | 10,15 | 16,85 | 0,00 | 20,278 | 1,72 | 10,95 | 8,90 | 19,315 | 1,70 | 1,2907 | G | |
| VD-143F | | | | | | | 35,00 | 1,30 | 1,062 | 8,50 | 11,26 | 23,74 | 0,00 | 25,205 | 1,76 | 12,17 | 9,37 | 24,242 | 1,74 | 1,4266 | G | |
| VD-143G | | | | | | | 43,00 | 1,55 | 0,860 | 10,50 | 13,49 | 29,51 | 0,00 | 25,367 | 1,71 | 14,61 | 10,24 | 24,404 | 1,70 | 1,6983 | G | |
| VD-143H | | 7,50 | 8,40 | 0,30 | 6,00 | 9,20 | 65,00 | 1,92 | 0,669 | 13,50 | 17,20 | 47,80 | 50,09 | 31,958 | 1,77 | 23,58 | 9,75 | 27,692 | 1,75 | 2,1059 | H | |
| VD-143H-10 | | | | | | | 22,00 | 0,71 | 2,474 | 5,50 | 7,76 | 14,24 | 0,00 | 35,231 | 2,29 | 9,45 | 2,99 | 31,051 | 2,20 | 0,8886 | H | |
| VD-143J | | | | | | | 7,10 | 8,00 | 0,25 | 5,80 | 8,60 | 29,00 | 1,00 | 1,688 | 9,50 | 12,00 | 17,00 | 0,00 | 28,698 | 2,13 | 12,83 | 7,33 |
| VD-143K | | 7,10 | 8,00 | 0,25 | 5,80 | 8,60 | 36,00 | 1,18 | 1,395 | 11,50 | 14,15 | 21,85 | 0,00 | 30,474 | 2,10 | 15,15 | 7,31 | 29,081 | 2,08 | 1,5142 | G | |
| VD-143L | | | | | | | 43,00 | 1,45 | 1,106 | 14,50 | 17,37 | 25,63 | 25,30 | 28,348 | 2,02 | 18,63 | 11,65 | 26,958 | 2,00 | 1,8507 | G | |
| VD-143M | | | | | | | 57,00 | 1,88 | 0,823 | 19,50 | 22,74 | 34,26 | 45,66 | 28,178 | 1,97 | 24,44 | 15,66 | 26,783 | 1,95 | 2,4116 | H | |
| VD-143P | 6,40 | 7,30 | 0,25 | 4,90 | 8,00 | 10,80 | 0,41 | 6,257 | 3,50 | 5,50 | 5,30 | 0,00 | 33,138 | 3,05 | 5,78 | 1,80 | 31,410 | 3,02 | 0,5561 | G | | |
| VD-143Q | | | | | | 17,00 | 0,56 | 3,982 | 5,50 | 7,62 | 9,38 | 0,00 | 37,347 | 2,80 | 8,10 | 2,32 | 35,438 | 2,77 | 0,7583 | G | | |
| VD-143R | | | | | | 26,36 | 0,79 | 2,576 | 8,50 | 10,80 | 15,56 | 0,00 | 40,102 | 2,64 | 12,60 | 3,25 | 35,452 | 2,58 | 1,0616 | H | | |
| VD-143S | | | | | | 38,70 | 1,10 | 1,752 | 12,50 | 15,03 | 23,67 | 22,69 | 41,472 | 2,54 | 18,20 | 4,78 | 35,916 | 2,40 | 1,4661 | H | | |
| VD-143T | | | | | | 57,30 | 1,55 | 1,184 | 18,50 | 21,38 | 35,92 | 48,41 | 42,523 | 2,48 | 27,40 | 7,07 | 35,395 | 2,40 | 2,0727 | H | | |
| VD-144 | 6,00 | 6,90 | 0,20 | 4,70 | 7,40 | 19,50 | 0,70 | 3,322 | 8,00 | 10,20 | 9,30 | 0,00 | 30,897 | 2,80 | 10,80 | 4,53 | 28,904 | 2,77 | 0,9479 | H | | |
| VD-144A | 5,40 | 6,30 | 0,20 | 4,10 | 6,80 | 9,30 | 0,34 | 10,417 | 3,50 | 5,44 | 3,86 | 0,00 | 40,259 | 4,11 | 5,69 | 1,16 | 37,604 | 4,07 | 0,4692 | G | | |
| VD-144B | | | | | | 13,60 | 0,46 | 6,629 | 5,50 | 7,51 | 6,09 | 0,00 | 40,354 | 3,69 | 7,89 | 1,81 | 37,850 | 3,65 | 0,6398 | G | | |
| VD-144C | | | | | | 22,20 | 0,72 | 3,838 | 9,50 | 11,67 | 10,53 | 0,00 | 40,424 | 3,36 | 12,33 | 3,12 | 37,878 | 3,32 | 0,9811 | G | | |
| VD-144D | | | | | | 35,10 | 1,09 | 2,352 | 15,50 | 17,90 | 17,20 | 23,30 | 40,461 | 3,18 | 18,98 | 5,08 | 37,917 | 3,14 | 1,4929 | G | | |
| VD-145 | 4,50 | 5,40 | 0,20 | 3,20 | 5,80 | 24,00 | 0,79 | 4,846 | 13,00 | 15,11 | 8,89 | 7,10 | 43,088 | 4,53 | 15,91 | 3,26 | 39,205 | 4,47 | 1,0664 | H | | |
| VD-145A | 3,60 | 4,50 | 0,20 | 2,30 | 4,90 | 6,80 | 0,24 | 35,156 | 3,50 | 5,34 | 1,46 | 0,00 | 51,307 | 9,11 | 5,53 | 0,54 | 44,648 | 9,01 | 0,3128 | G | | |
| VD-145B | | | | | | 9,70 | 0,33 | 22,372 | 5,50 | 7,36 | 2,34 | 0,00 | 52,266 | 8,11 | 7,67 | 0,83 | 45,415 | 8,00 | 0,4265 | G | | |
| VD-145C | | | | | | 15,60 | 0,51 | 12,952 | 9,50 | 11,41 | 4,19 | 0,00 | 54,268 | 7,36 | 11,94 | 1,37 | 47,405 | 7,26 | 0,6540 | G | | |
| VD-145D | | | | | | 24,36 | 0,77 | 7,939 | 15,50 | 17,48 | 6,88 | 16,91 | 54,619 | 6,93 | 18,35 | 2,21 | 47,710 | 6,83 | 0,9953 | G | | |
| VD-145DA | 1,00 | 23,00 | 24,00 | 0,60 | 21,10 | 24,90 | 28,50 | 4,70 | 0,205 | 3,50 | 8,63 | 19,87 | 0,00 | 4,083 | 0,61 | 10,20 | 18,30 | 3,760 | 0,56 | 2,4672 | H | |
| VD-145DB | | | | | | | 44,50 | 8,40 | 0,131 | 5,50 | 12,41 | 32,09 | 0,00 | 4,195 | 0,63 | 14,87 | 29,63 | 3,874 | 0,58 | 3,3644 | H | |
| VD-145DC | | | | | | | 68,80 | 9,40 | 0,085 | 8,50 | 18,09 | 50,71 | 0,00 | 4,290 | 0,64 | 21,89 | 46,91 | 3,969 | 0,59 | 4,7102 | H | |
| VD-145DD | | | | | | | 101,00 | 16,70 | 0,058 | 12,50 | 25,67 | 75,33 | 0,00 | 4,334 | 0,65 | 31,26 | 69,74 | 4,012 | 0,60 | 6,5045 | J | |
| VD-145DE | | | | | | | 150,00 | 18,90 | 0,039 | 18,50 | 37,03 | 112,97 | 100,02 | 4,392 | 0,66 | 45,30 | 104,70 | 4,070 | 0,61 | 9,1961 | J | |
| VD-145DF | 20,00 | 21,00 | 0,50 | 18,20 | 22,00 | 20,00 | 4,72 | 0,313 | 3,50 | 7,95 | 12,05 | 0,00 | 3,766 | 1,53 | 9,18 | 10,82 | 3,381 | 1,53 | 2,1454 | G | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-145DG | 1,00 | 20,00 | 21,00 | 0,50 | 18,20 | 22,00 | 31,40 | 6,51 | 0,199 | 5,50 | 11,35 | 20,05 | 0,00 | 3,987 | 1,36 | 13,28 | 18,12 | 3,603 | 1,35 | 2,9256 | H | | | | |
| VD-145DH | | | | | | | 48,50 | 9,17 | 0,129 | 8,50 | 16,45 | 32,05 | 0,00 | 4,124 | 1,24 | 19,43 | 29,07 | 3,741 | 1,24 | 4,0958 | H | | | | |
| VD-145DJ | | | | | | | 71,30 | 12,70 | 0,088 | 12,50 | 23,25 | 48,05 | 0,00 | 4,204 | 1,17 | 27,63 | 43,67 | 3,821 | 1,17 | 5,6561 | H | | | | |
| VD-145DK | | | | | | | 105,00 | 17,98 | 0,059 | 18,50 | 33,45 | 71,55 | 0,00 | 4,230 | 1,13 | 39,93 | 65,07 | 3,847 | 1,12 | 7,9966 | J | | | | |
| VD-145D-01 | 17,50 | 18,50 | 0,50 | 15,80 | 19,90 | 42,00 | 3,44 | 0,466 | 3,50 | 7,46 | 34,54 | 0,00 | 16,113 | 1,85 | 8,44 | 15,66 | 15,655 | 1,84 | 1,8772 | G | | | | | |
| VD-145D-02 | | | | | | 65,00 | 4,75 | 0,297 | 5,50 | 10,58 | 54,42 | 0,00 | 16,155 | 1,65 | 12,12 | 24,62 | 15,697 | 1,64 | 2,5599 | G | | | | | |
| VD-145D-03 | | | | | | 100,00 | 6,69 | 0,192 | 8,50 | 15,25 | 84,75 | 50,13 | 16,278 | 1,53 | 17,63 | 38,05 | 15,821 | 1,52 | 3,5838 | H | | | | | |
| VD-145D-04 | | | | | | 157,00 | 9,90 | 0,121 | 13,50 | 23,05 | 133,95 | 132,75 | 16,199 | 1,44 | 26,83 | 60,43 | 15,742 | 1,43 | 5,2904 | J | | | | | |
| VD-145E | 16,00 | 17,00 | 0,40 | 14,40 | 18,50 | 44,60 | 2,72 | 0,610 | 3,50 | 7,19 | 37,41 | 0,00 | 22,831 | 2,00 | 9,25 | 8,63 | 21,576 | 1,99 | 1,7163 | H | | | | | |
| VD-145F | | | | | | 68,10 | 3,75 | 0,388 | 5,50 | 10,16 | 57,94 | 0,00 | 22,503 | 1,79 | 12,55 | 13,97 | 21,576 | 1,79 | 2,3405 | H | | | | | |
| VD-145G | | | | | | 115,00 | 5,79 | 0,225 | 9,50 | 16,10 | 98,90 | 85,18 | 22,240 | 1,63 | 19,15 | 24,63 | 21,553 | 1,63 | 3,5887 | H | | | | | |
| VD-145H | | | | | | 186,00 | 8,83 | 0,138 | 15,50 | 25,00 | 161,00 | 169,64 | 22,189 | 1,55 | 29,65 | 40,30 | 21,548 | 1,54 | 5,4611 | H | | | | | |
| VD-145H-10 | 13,00 | 14,00 | 0,35 | 11,30 | 15,10 | 30,00 | 1,53 | 1,138 | 3,50 | 6,74 | 23,26 | 0,00 | 26,471 | 2,14 | 7,36 | 6,09 | 25,762 | 2,13 | 1,3945 | J | | | | | |
| VD-145H-11 | | | | | | 54,00 | 2,41 | 0,613 | 6,50 | 10,80 | 43,20 | 0,00 | 26,471 | 1,87 | 11,95 | 11,30 | 25,765 | 1,86 | 2,1552 | J | | | | | |
| VD-146 | 12,50 | 13,50 | 0,35 | 10,90 | 14,30 | 24,00 | 1,38 | 1,280 | 3,50 | 6,67 | 17,33 | 0,00 | 22,182 | 2,10 | 7,26 | 7,85 | 21,427 | 2,09 | 1,3409 | G | | | | | |
| VD-147 | | | | | | 36,50 | 1,90 | 0,815 | 5,50 | 9,34 | 27,16 | 0,00 | 22,124 | 1,88 | 10,26 | 12,34 | 21,374 | 1,87 | 1,8285 | G | | | | | |
| VD-148 | | | | | | 55,50 | 2,68 | 0,527 | 8,50 | 13,34 | 42,16 | 0,00 | 22,220 | 1,75 | 14,76 | 19,08 | 21,472 | 1,74 | 2,5599 | G | | | | | |
| VD-149 | | | | | | 80,50 | 3,71 | 0,358 | 12,50 | 18,68 | 61,82 | 52,74 | 22,156 | 1,66 | 20,77 | 28,06 | 21,407 | 1,65 | 3,5351 | G | | | | | |
| VD-149A | | | | | | 80,50 | 5,26 | 0,242 | 18,50 | 26,69 | 53,81 | 52,74 | 13,032 | 1,47 | 29,79 | 41,53 | 12,280 | 1,46 | 4,9979 | H | | | | | |
| VD-150 | | | | | | 115,00 | 5,26 | 0,242 | 18,50 | 26,69 | 88,31 | 98,21 | 21,386 | 1,59 | 29,79 | 41,53 | 20,635 | 1,58 | 4,9979 | H | | | | | |
| VD-150A | | | | | | 115,00 | 6,28 | 0,199 | 22,50 | 32,02 | 82,98 | 98,21 | 16,522 | 1,50 | 35,78 | 50,51 | 15,774 | 1,49 | 5,9731 | H | | | | | |
| VD-150B | | | | | | 11,50 | 12,50 | 0,35 | 10,00 | 13,30 | 21,00 | 1,11 | 1,644 | 3,50 | 6,54 | 14,46 | 0,00 | 23,762 | 2,18 | 7,06 | 6,62 | 22,914 | 2,17 | 1,2336 | G |
| VD-150C | | | | | | | | | | | 32,00 | 1,53 | 1,046 | 5,50 | 9,14 | 22,86 | 0,00 | 23,912 | 1,96 | 9,96 | 10,41 | 23,055 | 1,95 | 1,6822 | G |
| VD-150D | | | | | | | | | | | 48,00 | 2,15 | 0,677 | 8,50 | 13,04 | 34,96 | 0,00 | 23,665 | 1,81 | 14,31 | 16,09 | 22,803 | 1,80 | 2,3551 | G |
| VD-150E | | | | | | | | | | | 77,00 | 3,19 | 0,426 | 13,50 | 19,53 | 57,47 | 53,08 | 24,493 | 1,73 | 21,55 | 25,56 | 23,631 | 1,71 | 3,4766 | H |
| VD-151 | | | | | | 10,00 | 11,00 | 0,30 | 8,50 | 11,70 | 17,50 | 0,79 | 2,500 | 3,50 | 6,38 | 11,13 | 0,00 | 27,813 | 2,40 | 6,82 | 5,02 | 26,700 | 2,38 | 1,0727 | G |
| VD-151A | 21,40 | 0,79 | 2,500 | 3,50 | 6,38 | | | | | | 15,03 | 0,00 | 37,563 | 2,55 | 8,25 | 3,12 | 32,875 | 2,53 | 1,0727 | G | | | | | |
| VD-151B | 22,00 | 1,17 | 1,458 | 6,00 | 9,50 | | | | | | 12,50 | 0,00 | 18,229 | 1,99 | 10,25 | 8,60 | 17,135 | 1,97 | 1,5603 | G | | | | | |
| VD-152 | 26,00 | 1,09 | 1,591 | 5,50 | 8,88 | | | | | | 17,13 | 0,00 | 27,244 | 2,15 | 9,57 | 7,89 | 26,139 | 2,13 | 1,4628 | G | | | | | |
| VD-152A | 31,60 | 1,09 | 1,591 | 5,50 | 8,88 | | | | | | 22,73 | 0,00 | 36,153 | 2,28 | 10,95 | 4,89 | 32,852 | 2,27 | 1,4628 | G | | | | | |
| VD-152B | 36,00 | 1,39 | 1,167 | 7,50 | 11,38 | | | | | | 24,63 | 0,00 | 28,729 | 2,06 | 12,32 | 10,76 | 27,627 | 2,04 | 1,8529 | G | | | | | |
| VD-153 | 39,00 | 1,54 | 1,029 | 8,50 | 12,63 | | | | | | 26,38 | 0,00 | 27,151 | 1,99 | 13,70 | 12,19 | 26,044 | 1,98 | 2,0479 | G | | | | | |
| VD-153A | 52,00 | 1,69 | 0,921 | 9,50 | 13,88 | | | | | | 38,13 | 0,00 | 35,115 | 2,08 | 16,30 | 8,72 | 32,882 | 2,07 | 2,2429 | G | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-145DG | 1,00 | 20,00 | 21,00 | 0,50 | 18,20 | 22,00 | 31,40 | 5,59 | 0,232 | 5,50 | 11,35 | 20,05 | 0,00 | 4,642 | 1,37 | 13,28 | 18,12 | 4,195 | 1,36 | 2,9256 | E | | | | |
| D-145DH | | | | | | | 48,50 | 7,88 | 0,150 | 8,50 | 16,45 | 32,05 | 0,00 | 4,802 | 1,25 | 19,43 | 29,07 | 4,355 | 1,25 | 4,0958 | E | | | | |
| D-145DJ | | | | | | | 71,30 | 10,91 | 0,102 | 12,50 | 23,25 | 48,05 | 0,00 | 4,895 | 1,18 | 27,63 | 43,67 | 4,449 | 1,18 | 5,6561 | E | | | | |
| D-145DK | | | | | | | 105,00 | 14,44 | 0,069 | 18,50 | 33,45 | 71,55 | 34,02 | 4,925 | 1,14 | 39,93 | 65,07 | 4,479 | 1,13 | 7,9966 | F | | | | |
| D-145D-01 | 17,50 | 18,50 | 0,50 | 15,80 | 19,90 | 42,00 | 2,95 | 0,543 | 3,50 | 7,46 | 34,54 | 0,00 | 18,760 | 1,89 | 8,44 | 18,44 | 18,227 | 1,88 | 1,8772 | D | | | | | |
| D-145D-02 | | | | | | 65,00 | 4,08 | 0,346 | 5,50 | 10,58 | 54,42 | 0,00 | 18,809 | 1,69 | 12,12 | 28,91 | 18,276 | 1,68 | 2,5599 | D | | | | | |
| D-145D-03 | | | | | | 100,00 | 5,74 | 0,224 | 8,50 | 15,25 | 84,75 | 52,77 | 18,952 | 1,57 | 17,63 | 44,43 | 18,421 | 1,56 | 3,5838 | D | | | | | |
| D-145D-04 | | | | | | 157,00 | 8,50 | 0,141 | 13,50 | 23,05 | 133,95 | 133,30 | 18,861 | 1,48 | 26,83 | 70,81 | 18,329 | 1,47 | 5,2904 | D | | | | | |
| D-145E | 16,00 | 17,00 | 0,40 | 14,40 | 18,50 | 44,60 | 2,33 | 0,711 | 3,50 | 7,19 | 37,41 | 0,00 | 26,582 | 2,06 | 9,60 | 12,80 | 24,872 | 2,05 | 1,7163 | D | | | | | |
| D-145F | | | | | | 68,10 | 3,22 | 0,452 | 5,50 | 10,16 | 57,94 | 0,00 | 26,200 | 1,85 | 12,90 | 20,06 | 24,962 | 1,84 | 2,3405 | D | | | | | |
| D-145G | | | | | | 115,00 | 4,97 | 0,262 | 9,50 | 16,10 | 98,90 | 86,07 | 25,893 | 1,69 | 19,80 | 34,65 | 24,924 | 1,68 | 3,5887 | D | | | | | |
| D-145H | | | | | | 186,00 | 7,58 | 0,160 | 15,50 | 25,00 | 161,00 | 170,00 | 25,834 | 1,60 | 29,90 | 56,46 | 25,048 | 1,59 | 5,4611 | D | | | | | |
| D-145H-10 | 13,00 | 14,00 | 0,35 | 11,30 | 15,10 | 30,00 | 1,32 | 1,325 | 3,50 | 6,74 | 23,26 | 0,00 | 30,820 | 2,21 | 7,36 | 8,31 | 29,995 | 2,20 | 1,3945 | E | | | | | |
| D-145H-11 | | | | | | 54,00 | 2,07 | 0,713 | 6,50 | 10,80 | 43,20 | 0,00 | 30,820 | 1,94 | 11,95 | 15,44 | 29,998 | 1,92 | 2,1552 | E | | | | | |
| D-146 | 12,50 | 13,50 | 0,35 | 10,90 | 14,30 | 24,00 | 1,18 | 1,490 | 3,50 | 6,67 | 17,33 | 0,00 | 25,826 | 2,15 | 7,26 | 9,10 | 24,947 | 2,14 | 1,3409 | C | | | | | |
| D-147 | | | | | | 36,50 | 1,64 | 0,948 | 5,50 | 9,34 | 27,16 | 0,00 | 25,758 | 1,94 | 10,26 | 14,33 | 24,885 | 1,92 | 1,8285 | C | | | | | |
| D-148 | | | | | | 55,50 | 2,30 | 0,614 | 8,50 | 13,34 | 42,16 | 0,00 | 25,870 | 1,80 | 14,76 | 22,06 | 25,000 | 1,79 | 2,5599 | C | | | | | |
| D-149 | | | | | | 80,50 | 3,19 | 0,417 | 12,50 | 18,68 | 61,82 | 53,73 | 25,796 | 1,72 | 20,77 | 32,53 | 24,924 | 1,70 | 3,5351 | C | | | | | |
| D-149A | | | | | | 80,50 | 4,51 | 0,282 | 18,50 | 26,69 | 53,81 | 53,73 | 15,173 | 1,50 | 29,79 | 48,68 | 14,297 | 1,49 | 4,9979 | D | | | | | |
| D-150 | | | | | | 115,00 | 4,51 | 0,282 | 18,50 | 26,69 | 88,31 | 98,62 | 24,900 | 1,65 | 29,79 | 49,25 | 24,025 | 1,63 | 4,9979 | C | | | | | |
| D-150A | | | | | | 115,00 | 5,40 | 0,232 | 22,50 | 32,02 | 82,98 | 98,62 | 19,236 | 1,54 | 35,78 | 68,46 | 18,365 | 1,53 | 5,9731 | D | | | | | |
| D-150B | | | | | | 11,50 | 12,50 | 0,35 | 10,00 | 13,30 | 21,00 | 0,95 | 1,914 | 3,50 | 6,54 | 14,46 | 0,00 | 27,666 | 2,24 | 7,06 | 7,67 | 26,679 | 2,22 | 1,2336 | C |
| D-150C | | | | | | | | | | | 32,00 | 1,31 | 1,218 | 5,50 | 9,14 | 22,86 | 0,00 | 27,840 | 2,02 | 9,96 | 12,01 | 26,843 | 2,00 | 1,6822 | C |
| D-150D | | | | | | | | | | | 48,00 | 1,85 | 0,788 | 8,50 | 13,04 | 34,96 | 0,00 | 27,553 | 1,87 | 14,31 | 18,69 | 26,549 | 1,86 | 2,3551 | C |
| D-150E | 77,00 | 2,74 | 0,496 | 13,50 | 19,53 | | | | | | 57,47 | 53,88 | 28,516 | 1,79 | 21,55 | 29,00 | 27,513 | 1,77 | 3,4766 | D | | | | | |
| D-151 | 10,00 | 11,00 | 0,30 | 8,50 | 11,70 | 17,50 | 0,68 | 2,911 | 3,50 | 6,38 | 11,13 | 0,00 | 32,382 | 2,47 | 6,82 | 5,59 | 31,086 | 2,45 | 1,0727 | C | | | | | |
| D-151A | | | | | | 21,40 | 0,68 | 2,911 | 3,50 | 6,38 | 15,03 | 0,00 | 43,733 | 2,64 | 8,40 | 4,78 | 37,839 | 2,62 | 1,0727 | C | | | | | |
| D-151B | | | | | | 22,00 | 1,00 | 1,698 | 6,00 | 9,50 | 12,50 | 0,00 | 21,224 | 2,04 | 10,25 | 11,70 | 19,951 | 2,02 | 1,5603 | C | | | | | |
| D-152 | | | | | | 26,00 | 0,94 | 1,852 | 5,50 | 8,88 | 17,13 | 0,00 | 31,720 | 2,22 | 9,57 | 8,91 | 30,433 | 2,20 | 1,4628 | C | | | | | |
| D-152A | | | | | | 31,60 | 0,94 | 1,852 | 5,50 | 8,88 | 22,73 | 0,00 | 42,093 | 2,37 | 11,20 | 7,52 | 37,786 | 2,35 | 1,4628 | C | | | | | |
| D-152B | | | | | | 36,00 | 1,20 | 1,358 | 7,50 | 11,38 | 24,63 | 0,00 | 33,449 | 2,13 | 12,32 | 11,71 | 32,165 | 2,11 | 1,8529 | C | | | | | |
| D-153 | | | | | | 39,00 | 1,32 | 1,199 | 8,50 | 12,63 | 26,38 | 0,00 | 31,611 | 2,06 | 13,70 | 13,80 | 30,323 | 2,04 | 2,0479 | C | | | | | |
| D-153A | | | | | | 52,00 | 1,45 | 1,072 | 9,50 | 13,88 | 38,13 | 14,21 | 40,884 | 2,17 | 17,20 | 13,14 | 37,318 | 2,15 | 2,2429 | C | | | | | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|--------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-154 | 1,00 | 10,00 | 11,00 | 0,30 | 8,50 | 11,70 | 56,00 | 1,83 | 0,815 | 12,50 | 17,63 | 38,38 | 27,64 | 31,276 | 1,96 | 19,20 | 20,45 | 29,992 | 1,94 | 2,8281 | C | | | | | |
| D-154A | | | | | | | 56,00 | 2,59 | 0,551 | 18,50 | 25,13 | 30,88 | 27,64 | 17,002 | 1,68 | 27,45 | 28,55 | 15,722 | 1,66 | 3,9983 | D | | | | | |
| D-154B | | | | | | | 67,00 | 2,21 | 0,657 | 15,50 | 21,38 | 45,63 | 46,91 | 29,987 | 1,90 | 23,32 | 26,05 | 28,709 | 1,89 | 3,4132 | D | | | | | |
| D-155 | | | | | | | 81,50 | 2,59 | 0,551 | 18,50 | 25,13 | 56,38 | 66,26 | 31,044 | 1,89 | 27,45 | 30,40 | 29,764 | 1,88 | 3,9983 | D | | | | | |
| D-155A | | | | | | | 81,50 | 3,10 | 0,453 | 22,50 | 30,13 | 51,38 | 66,26 | 23,261 | 1,75 | 32,95 | 37,76 | 21,982 | 1,73 | 4,7784 | E | | | | | |
| D-155A-10 | | | | | | | 114,00 | 2,85 | 0,497 | 20,50 | 27,63 | 86,38 | 103,78 | 42,924 | 2,06 | 37,90 | 27,99 | 37,818 | 2,04 | 4,3884 | F | | | | | |
| D-155G | | | | | | | 9,30 | 10,30 | 0,30 | 7,80 | 11,00 | 22,00 | 0,58 | 3,619 | 3,50 | 8,95 | 13,05 | 0,00 | 47,224 | 2,97 | 11,25 | 4,23 | 38,901 | 2,94 | 0,9976 | C |
| D-156 | | | | | | | | | | | | 25,00 | 0,81 | 2,303 | 5,50 | 8,76 | 16,24 | 0,00 | 37,389 | 2,42 | 9,39 | 7,09 | 35,947 | 2,40 | 1,3604 | C |
| D-157 | | | | | | | | | | | | 40,00 | 1,24 | 1,333 | 9,50 | 13,68 | 26,32 | 0,00 | 35,087 | 2,18 | 14,77 | 12,86 | 33,637 | 2,16 | 2,0859 | C |
| D-158 | | | | | | | | | | | | 55,00 | 1,68 | 0,938 | 13,50 | 18,60 | 36,40 | 31,71 | 34,148 | 2,09 | 20,15 | 18,63 | 32,695 | 2,07 | 2,8115 | C |
| D-159 | 8,00 | 9,00 | 0,25 | 6,50 | 9,60 | 13,00 | 0,45 | 5,685 | 3,50 | 6,19 | 6,81 | 0,00 | 38,738 | 3,11 | 6,54 | 3,52 | 36,725 | 3,08 | 0,8582 | C | | | | | | |
| D-160 | | | | | | 19,00 | 0,62 | 3,618 | 5,50 | 8,58 | 10,42 | 0,00 | 37,704 | 2,79 | 9,12 | 5,57 | 35,743 | 2,76 | 1,1702 | C | | | | | | |
| D-161 | | | | | | 28,50 | 0,87 | 2,341 | 8,50 | 12,17 | 16,33 | 0,00 | 38,236 | 2,60 | 13,01 | 8,62 | 36,260 | 2,57 | 1,6383 | C | | | | | | |
| D-162 | | | | | | 36,00 | 0,95 | 2,094 | 9,50 | 13,36 | 22,64 | 0,00 | 47,415 | 2,70 | 14,29 | 8,09 | 45,471 | 2,67 | 1,7944 | C | | | | | | |
| D-163 | | | | | | 40,50 | 1,20 | 1,592 | 12,50 | 16,95 | 23,55 | 0,00 | 37,487 | 2,47 | 18,18 | 12,81 | 35,529 | 2,44 | 2,2624 | C | | | | | | |
| D-163A | | | | | | 40,50 | 1,70 | 1,076 | 18,50 | 24,13 | 16,37 | 0,00 | 17,611 | 2,09 | 25,95 | 14,55 | 15,649 | 2,06 | 3,1986 | D | | | | | | |
| D-164 | | | | | | 52,00 | 1,28 | 1,474 | 13,50 | 18,15 | 33,85 | 35,13 | 49,897 | 2,64 | 20,90 | 11,41 | 45,838 | 2,61 | 2,4185 | C | | | | | | |
| D-165 | | | | | | 59,00 | 1,70 | 1,076 | 18,50 | 24,13 | 34,87 | 45,05 | 37,508 | 2,39 | 25,95 | 18,99 | 35,547 | 2,36 | 3,1986 | C | | | | | | |
| D-165A | | | | | | 59,00 | 2,03 | 0,884 | 22,50 | 28,91 | 30,09 | 45,05 | 26,610 | 2,19 | 31,12 | 27,44 | 24,655 | 2,17 | 3,8228 | D | | | | | | |
| D-165B | | | | | | 7,70 | 8,70 | 0,25 | 6,20 | 9,20 | 12,00 | 0,42 | 6,376 | 3,50 | 6,16 | 5,84 | 0,00 | 37,226 | 3,24 | 6,49 | 3,39 | 35,130 | 3,21 | 0,8260 | C | |
| D-165C | 18,00 | 0,58 | 4,057 | 5,50 | 8,54 | | | | | | 9,46 | 0,00 | 38,385 | 2,93 | 9,06 | 5,24 | 36,272 | 2,90 | 1,1263 | C | | | | | | |
| D-165D | 27,00 | 0,82 | 2,625 | 8,50 | 12,11 | | | | | | 14,89 | 0,00 | 39,101 | 2,73 | 12,92 | 8,00 | 36,964 | 2,70 | 1,5769 | C | | | | | | |
| D-165E | 42,00 | 1,21 | 1,653 | 13,50 | 18,05 | | | | | | 23,95 | 18,49 | 39,587 | 2,59 | 19,33 | 12,60 | 37,473 | 2,56 | 2,3278 | D | | | | | | |
| D-166 | 7,30 | 8,30 | 0,25 | 5,80 | 9,00 | 25,00 | 0,72 | 3,273 | 8,00 | 11,44 | 13,56 | 0,00 | 44,390 | 3,05 | 12,16 | 6,34 | 42,031 | 3,02 | 1,4238 | C | | | | | | |
| D-166C | | | | | | 33,80 | 1,05 | 2,095 | 12,50 | 16,75 | 17,05 | 0,00 | 35,722 | 2,73 | 17,88 | 11,36 | 33,353 | 2,70 | 2,0645 | C | | | | | | |
| D-166D | | | | | | 50,00 | 1,49 | 1,416 | 18,50 | 23,83 | 26,17 | 35,83 | 37,047 | 2,66 | 25,50 | 16,48 | 34,681 | 2,62 | 2,9188 | C | | | | | | |
| D-166E | | | | | | 64,00 | 1,92 | 1,069 | 24,50 | 30,91 | 33,09 | 53,85 | 35,371 | 2,58 | 33,12 | 22,38 | 33,007 | 2,55 | 3,7730 | D | | | | | | |
| D-166H | 7,00 | 8,00 | 0,25 | 5,40 | 8,70 | 10,80 | 0,37 | 8,486 | 3,50 | 6,11 | 4,69 | 0,00 | 39,823 | 3,73 | 6,42 | 2,79 | 37,169 | 3,69 | 0,7509 | C | | | | | | |
| D-166J | | | | | | 16,50 | 0,51 | 5,400 | 5,50 | 8,45 | 8,05 | 0,00 | 43,449 | 3,41 | 8,93 | 4,15 | 40,880 | 3,37 | 1,0240 | C | | | | | | |
| D-166K | | | | | | 26,30 | 0,72 | 3,494 | 8,50 | 11,97 | 14,33 | 0,00 | 50,056 | 3,26 | 12,71 | 5,75 | 47,487 | 3,22 | 1,4335 | C | | | | | | |
| D-166L | | | | | | 34,50 | 0,96 | 2,475 | 12,00 | 16,08 | 18,42 | 0,00 | 45,586 | 3,08 | 17,12 | 8,75 | 43,017 | 3,04 | 1,9114 | C | | | | | | |
| D-166M | | | | | | 51,10 | 1,27 | 1,800 | 16,50 | 21,36 | 29,74 | 38,72 | 53,529 | 3,09 | 22,79 | 10,47 | 50,960 | 3,05 | 2,5257 | C | | | | | | |
| D-166N | | | | | | 69,70 | 1,68 | 1,320 | 22,50 | 28,40 | 41,30 | 61,35 | 54,513 | 3,04 | 31,50 | 14,42 | 50,426 | 3,00 | 3,3449 | D | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-154 | 1,00 | 10,00 | 11,00 | 0,30 | 8,50 | 11,70 | 56,00 | 2,13 | 0,700 | 12,50 | 17,63 | 38,38 | 25,88 | 26,863 | 1,90 | 19,20 | 17,93 | 25,760 | 1,88 | 2,8281 | G |
| VD-154A | | | | | | | 56,00 | 3,02 | 0,473 | 18,50 | 25,13 | 30,88 | 25,83 | 14,603 | 1,65 | 27,45 | 26,54 | 13,503 | 1,63 | 3,9983 | H |
| VD-154B | | | | | | | 67,00 | 2,58 | 0,565 | 15,50 | 21,38 | 45,63 | 46,23 | 25,756 | 1,84 | 23,32 | 22,23 | 24,658 | 1,82 | 3,4132 | H |
| VD-155 | | | | | | | 81,50 | 3,02 | 0,473 | 18,50 | 25,13 | 56,38 | 65,84 | 26,664 | 1,83 | 27,45 | 26,54 | 25,564 | 1,81 | 3,9983 | H |
| VD-155A | | | | | | | 81,50 | 3,61 | 0,389 | 22,50 | 30,13 | 51,38 | 65,84 | 19,979 | 1,70 | 32,95 | 32,28 | 18,881 | 1,69 | 4,7784 | G |
| VD-155A-10 | | | | | | | 114,00 | 3,32 | 0,427 | 20,50 | 27,63 | 86,38 | 103,55 | 36,867 | 1,97 | 36,95 | 18,12 | 32,887 | 1,95 | 4,3884 | K |
| VD-155G | | 9,30 | 10,30 | 0,30 | 7,80 | 11,00 | 22,00 | 0,68 | 3,108 | 3,50 | 9,00 | 13,00 | 0,00 | 40,405 | 2,60 | 10,75 | 2,68 | 34,966 | 2,50 | 0,9976 | G |
| VD-156 | | | | | | | 25,00 | 0,94 | 1,978 | 5,50 | 8,76 | 16,24 | 0,00 | 32,114 | 2,34 | 9,39 | 6,29 | 30,874 | 2,32 | 1,3604 | G |
| VD-157 | | | | | | | 40,00 | 1,45 | 1,145 | 9,50 | 13,68 | 26,32 | 0,00 | 30,136 | 2,11 | 14,77 | 11,64 | 28,890 | 2,09 | 2,0859 | G |
| VD-158 | | | | | | | 55,00 | 1,96 | 0,806 | 13,50 | 18,60 | 36,40 | 30,60 | 29,330 | 2,02 | 20,15 | 16,55 | 28,082 | 2,00 | 2,8115 | G |
| VD-159 | | 8,00 | 9,00 | 0,25 | 6,50 | 9,60 | 13,00 | 0,52 | 4,883 | 3,50 | 6,19 | 6,81 | 0,00 | 33,271 | 3,03 | 6,54 | 3,16 | 31,543 | 3,01 | 0,8582 | G |
| VD-160 | | | | | | | 19,00 | 0,72 | 3,107 | 5,50 | 8,58 | 10,42 | 0,00 | 32,384 | 2,71 | 9,12 | 4,97 | 30,700 | 2,69 | 1,1702 | G |
| VD-161 | | | | | | | 28,50 | 1,01 | 2,011 | 8,50 | 12,17 | 16,33 | 0,00 | 32,841 | 2,52 | 13,01 | 7,68 | 31,144 | 2,49 | 1,6383 | G |
| VD-162 | | | | | | | 36,00 | 1,11 | 1,799 | 9,50 | 13,36 | 22,64 | 0,00 | 40,724 | 2,60 | 14,29 | 5,96 | 39,055 | 2,57 | 1,7944 | G |
| VD-163 | | | | | | | 40,50 | 1,40 | 1,367 | 12,50 | 16,95 | 23,55 | 0,00 | 32,197 | 2,39 | 18,18 | 11,29 | 30,516 | 2,37 | 2,2624 | H |
| VD-163A | | | | | | | 40,50 | 1,98 | 0,924 | 18,50 | 24,13 | 16,37 | 0,00 | 15,126 | 2,05 | 25,95 | 14,55 | 13,441 | 2,03 | 3,1986 | H |
| VD-164 | | | | | | | 52,00 | 1,49 | 1,266 | 13,50 | 18,15 | 33,85 | 34,52 | 42,856 | 2,53 | 20,55 | 7,67 | 39,813 | 2,49 | 2,4185 | H |
| VD-165 | | | | | | | 59,00 | 1,98 | 0,924 | 18,50 | 24,13 | 34,87 | 44,64 | 32,216 | 2,31 | 25,95 | 16,71 | 30,531 | 2,28 | 3,1986 | H |
| VD-165A | | | | | | | 59,00 | 2,36 | 0,760 | 22,50 | 28,91 | 30,09 | 44,64 | 22,855 | 2,14 | 31,12 | 20,33 | 21,176 | 2,11 | 3,8228 | G |
| VD-165B | | 7,70 | 8,70 | 0,25 | 6,20 | 9,20 | 12,00 | 0,49 | 5,476 | 3,50 | 6,16 | 5,84 | 0,00 | 31,973 | 3,16 | 6,49 | 2,92 | 30,173 | 3,13 | 0,8260 | G |
| VD-165C | | | | | | | 18,00 | 0,68 | 3,485 | 5,50 | 8,54 | 9,46 | 0,00 | 32,969 | 2,85 | 9,06 | 4,59 | 31,154 | 2,82 | 1,1263 | G |
| VD-165D | | | | | | | 27,00 | 0,95 | 2,255 | 8,50 | 12,11 | 14,89 | 0,00 | 33,584 | 2,65 | 12,92 | 7,09 | 31,748 | 2,62 | 1,5769 | H |
| VD-165E | | | | | | | 42,00 | 1,41 | 1,420 | 13,50 | 18,05 | 23,95 | 16,56 | 34,001 | 2,51 | 19,33 | 11,26 | 32,185 | 2,48 | 2,3278 | H |
| VD-166 | | 7,30 | 8,30 | 0,25 | 5,80 | 9,00 | 25,00 | 0,84 | 2,812 | 8,00 | 11,44 | 13,56 | 0,00 | 38,126 | 2,95 | 12,16 | 5,77 | 36,101 | 2,92 | 1,4238 | G |
| VD-166C | | | | | | | 33,80 | 1,22 | 1,799 | 12,50 | 16,75 | 17,05 | 0,00 | 30,681 | 2,66 | 17,88 | 9,34 | 28,647 | 2,63 | 2,0645 | G |
| VD-166D | | | | | | | 50,00 | 1,73 | 1,216 | 18,50 | 23,83 | 26,17 | 35,36 | 31,819 | 2,58 | 25,50 | 13,83 | 29,787 | 2,55 | 2,9188 | H |
| VD-166E | | | | | | | 64,00 | 2,24 | 0,918 | 24,50 | 30,91 | 33,09 | 53,59 | 30,380 | 2,51 | 33,12 | 18,31 | 28,350 | 2,48 | 3,7730 | H |
| VD-166H | | 7,00 | 8,00 | 0,25 | 5,40 | 8,70 | 10,80 | 0,43 | 7,289 | 3,50 | 6,11 | 4,69 | 0,00 | 34,204 | 3,65 | 6,42 | 2,39 | 31,924 | 3,61 | 0,7509 | G |
| VD-166J | | | | | | | 16,50 | 0,59 | 4,638 | 5,50 | 8,45 | 8,05 | 0,00 | 37,318 | 3,31 | 8,93 | 3,77 | 35,111 | 3,28 | 1,0240 | G |
| VD-166K | | | | | | | 26,30 | 0,84 | 3,001 | 8,50 | 11,97 | 14,33 | 0,00 | 42,993 | 3,15 | 12,71 | 4,44 | 40,786 | 3,12 | 1,4335 | G |
| VD-166L | | | | | | | 34,50 | 1,12 | 2,126 | 12,00 | 16,08 | 18,42 | 0,00 | 39,154 | 2,98 | 17,12 | 8,22 | 36,947 | 2,94 | 1,9114 | G |
| VD-166M | | | | | | | 51,10 | 1,48 | 1,546 | 16,50 | 21,36 | 29,74 | 38,35 | 45,976 | 2,97 | 22,79 | 7,70 | 43,769 | 2,94 | 2,5257 | G |
| VD-166N | | | | | | | 69,70 | 1,96 | 1,134 | 22,50 | 28,40 | 41,30 | 61,15 | 46,821 | 2,92 | 30,50 | 10,14 | 44,444 | 2,89 | 3,3449 | H |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-1660 | 1,00 | 7,00 | 8,00 | 0,25 | 5,40 | 8,70 | 107,00 | 2,92 | 0,739 | 34,50 | 42,49 | 64,51 | 101,69 | 47,704 | 2,87 | 46,95 | 15,00 | 44,403 | 2,84 | 4,9832 | J | | | | |
| VD-166P | | | | | | | 135,00 | 3,64 | 0,586 | 43,50 | 53,05 | 81,95 | 130,84 | 48,060 | 2,86 | 59,30 | 18,63 | 44,394 | 2,82 | 6,2120 | J | | | | |
| VD-167 | 6,30 | 7,30 | 0,20 | 4,90 | 7,80 | 10,00 | 0,38 | 9,998 | 3,50 | 6,06 | 3,94 | 0,00 | 39,409 | 4,40 | 6,34 | 1,93 | 36,593 | 4,36 | 0,6758 | G | | | | | |
| VD-168 | | | | | | 14,50 | 0,53 | 6,362 | 5,50 | 8,38 | 6,12 | 0,00 | 38,954 | 3,93 | 8,82 | 3,04 | 36,139 | 3,89 | 0,9216 | G | | | | | |
| VD-169 | | | | | | 21,50 | 0,74 | 4,117 | 8,50 | 11,86 | 9,64 | 0,00 | 39,703 | 3,64 | 12,54 | 4,70 | 36,887 | 3,60 | 1,2902 | G | | | | | |
| VD-170 | | | | | | 30,50 | 1,03 | 2,799 | 12,50 | 16,49 | 14,01 | 0,00 | 39,209 | 3,46 | 17,49 | 6,91 | 36,421 | 3,42 | 1,7817 | G | | | | | |
| VD-170A | | | | | | 30,50 | 1,45 | 1,892 | 18,50 | 23,45 | 7,05 | 0,00 | 13,333 | 2,95 | 24,93 | 5,57 | 10,536 | 2,90 | 2,5189 | H | | | | | |
| VD-171 | | | | | | 43,50 | 1,45 | 1,892 | 18,50 | 23,45 | 20,05 | 31,02 | 37,923 | 3,31 | 24,93 | 10,23 | 35,126 | 3,27 | 2,5189 | H | | | | | |
| VD-171A | | | | | | 43,50 | 1,74 | 1,555 | 22,50 | 28,09 | 15,41 | 31,02 | 23,967 | 3,06 | 29,89 | 12,44 | 21,167 | 3,02 | 3,0104 | H | | | | | |
| VD-171B | | | | | | 6,00 | 7,00 | 0,20 | 4,60 | 7,50 | 10,30 | 0,36 | 11,574 | 3,50 | 6,04 | 4,26 | 0,00 | 49,317 | 4,93 | 6,31 | 1,30 | 46,181 | 4,89 | 0,6436 | G |
| VD-172 | | | | | | | | | | | 14,00 | 0,53 | 6,752 | 6,00 | 8,92 | 5,08 | 0,00 | 34,271 | 4,17 | 9,39 | 2,90 | 31,125 | 4,13 | 0,9362 | G |
| VD-173 | | | | | | | | | | | 14,00 | 0,60 | 5,787 | 7,00 | 10,08 | 3,92 | 0,00 | 22,697 | 3,87 | 10,62 | 3,38 | 19,560 | 3,82 | 1,0532 | G |
| VD-173A | 15,10 | 0,50 | 7,365 | 5,50 | 8,35 | | | | | | 6,75 | 0,00 | 49,738 | 4,43 | 8,78 | 2,02 | 46,549 | 4,38 | 0,8777 | G | | | | | |
| VD-173A-01 | 18,00 | 0,53 | 6,752 | 6,00 | 8,92 | | | | | | 9,08 | 0,00 | 61,277 | 4,58 | 10,60 | 1,77 | 49,961 | 4,40 | 0,9362 | H | | | | | |
| VD-173B | 24,50 | 0,77 | 4,264 | 9,50 | 12,96 | | | | | | 11,54 | 0,00 | 49,195 | 4,03 | 13,69 | 3,54 | 46,095 | 3,98 | 1,3458 | G | | | | | |
| VD-173C | 38,80 | 1,18 | 2,614 | 15,50 | 19,89 | | | | | | 18,91 | 25,57 | 49,429 | 3,82 | 21,09 | 5,74 | 46,285 | 3,75 | 2,0479 | G | | | | | |
| VD-173CH | 5,70 | 6,70 | 0,20 | 4,30 | 7,20 | | | | | | 34,20 | 0,93 | 3,780 | 12,50 | 16,75 | 17,45 | 19,71 | 65,958 | 4,52 | 20,40 | 3,29 | 52,162 | 4,45 | 1,6120 | H |
| VD-173CJ | | | | | | | | | | | 50,60 | 1,31 | 2,554 | 18,50 | 24,75 | 25,85 | 42,60 | 66,020 | 4,40 | 30,15 | 4,84 | 52,228 | 4,30 | 2,2790 | J |
| VD-173CK | | | | | | | | | | | 81,00 | 2,02 | 1,602 | 29,50 | 39,90 | 41,10 | 76,33 | 65,827 | 4,30 | 48,35 | 7,71 | 52,293 | 4,20 | 3,5019 | K |
| VD-173C-10 | 5,50 | 6,50 | 0,20 | 4,10 | 7,10 | 24,00 | 0,71 | 5,536 | 9,50 | 12,88 | 11,12 | 0,00 | 61,554 | 4,86 | 14,30 | 2,29 | 53,699 | 4,78 | 1,2336 | H | | | | | |
| VD-173D | 5,30 | 6,30 | 0,20 | 3,90 | 6,80 | 8,50 | 0,32 | 16,792 | 3,50 | 6,00 | 2,50 | 0,00 | 42,023 | 6,05 | 6,25 | 1,34 | 37,783 | 5,99 | 0,5685 | G | | | | | |
| VD-173E | | | | | | 12,00 | 0,45 | 10,686 | 5,50 | 8,28 | 3,72 | 0,00 | 39,734 | 5,36 | 8,67 | 2,11 | 35,585 | 5,30 | 0,7753 | G | | | | | |
| VD-173F | | | | | | 18,00 | 0,63 | 6,915 | 8,50 | 11,71 | 6,29 | 0,00 | 43,505 | 4,99 | 12,32 | 3,27 | 39,274 | 4,93 | 1,0854 | G | | | | | |
| VD-173G | | | | | | 28,00 | 0,93 | 4,354 | 13,50 | 17,42 | 10,58 | 0,00 | 46,066 | 4,74 | 18,38 | 5,19 | 41,881 | 4,67 | 1,6022 | G | | | | | |
| VD-173H | | | | | | 37,00 | 1,17 | 3,358 | 17,50 | 21,99 | 15,01 | 26,68 | 50,420 | 4,68 | 23,24 | 6,25 | 46,213 | 4,62 | 2,0157 | H | | | | | |
| VD-173J | | | | | | 41,00 | 1,35 | 2,867 | 20,50 | 25,41 | 15,59 | 32,10 | 44,686 | 4,54 | 26,87 | 7,88 | 40,511 | 4,48 | 2,3258 | H | | | | | |
| VD-173K | | | | | | 61,00 | 1,83 | 2,062 | 28,50 | 34,55 | 26,45 | 55,52 | 54,544 | 4,59 | 36,58 | 8,12 | 50,359 | 4,53 | 3,1528 | J | | | | | |
| VD-174 | | | | | | 5,00 | 6,00 | 0,20 | 3,60 | 6,40 | 8,50 | 0,31 | 20,000 | 3,50 | 5,98 | 2,52 | 0,00 | 50,375 | 6,90 | 6,22 | 1,19 | 45,600 | 6,82 | 0,5364 | G |
| VD-175 | | | | | | | | | | | 12,00 | 0,42 | 12,727 | 5,50 | 8,26 | 3,74 | 0,00 | 47,648 | 6,11 | 8,64 | 1,87 | 42,764 | 6,03 | 0,7314 | G |
| VD-176 | | | | | | | | | | | 17,00 | 0,60 | 8,235 | 8,50 | 11,67 | 5,33 | 0,00 | 43,904 | 5,57 | 12,26 | 2,89 | 39,035 | 5,50 | 1,0240 | G |
| VD-177 | 24,00 | 0,83 | 5,600 | 12,50 | 16,22 | | | | | | 7,78 | 0,00 | 43,575 | 5,28 | 17,08 | 4,25 | 38,752 | 5,21 | 1,4140 | G | | | | | |
| VD-178 | 34,00 | 1,17 | 3,784 | 18,50 | 23,04 | | | | | | 10,96 | 23,86 | 41,456 | 5,05 | 24,31 | 6,30 | 36,665 | 4,98 | 1,9991 | H | | | | | |
| VD-177A | 34,00 | 1,23 | 3,590 | 19,50 | 24,18 | | | | | | 9,82 | 23,86 | 35,247 | 4,93 | 25,52 | 6,64 | 30,441 | 4,86 | 2,0967 | H | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-1660 | 1,00 | 7,00 | 8,00 | 0,25 | 5,40 | 8,70 | 107,00 | 2,51 | 0,861 | 34,50 | 42,49 | 64,51 | 101,80 | 55,541 | 2,99 | 47,50 | 21,79 | 51,224 | 2,95 | 4,9832 | E |
| D-166P | | | | | | | 135,00 | 3,13 | 0,683 | 43,50 | 53,05 | 81,95 | 130,92 | 55,956 | 2,97 | 60,20 | 27,55 | 51,072 | 2,94 | 6,2120 | F |
| D-167 | | 6,30 | 7,30 | 0,20 | 4,90 | 7,80 | 10,00 | 0,33 | 11,641 | 3,50 | 6,06 | 3,94 | 0,00 | 45,883 | 4,50 | 6,34 | 2,15 | 42,605 | 4,45 | 0,6758 | C |
| D-168 | | | | | | | 14,50 | 0,45 | 7,408 | 5,50 | 8,38 | 6,12 | 0,00 | 45,354 | 4,03 | 8,82 | 3,40 | 42,076 | 3,98 | 0,9216 | C |
| D-169 | | | | | | | 21,50 | 0,64 | 4,793 | 8,50 | 11,86 | 9,64 | 0,00 | 46,226 | 3,74 | 12,54 | 5,20 | 42,947 | 3,69 | 1,2902 | C |
| D-170 | | | | | | | 30,50 | 0,88 | 3,259 | 12,50 | 16,49 | 14,01 | 0,00 | 45,650 | 3,55 | 17,49 | 7,70 | 42,405 | 3,51 | 1,7817 | C |
| D-170A | | | | | | | 30,50 | 1,25 | 2,202 | 18,50 | 23,45 | 7,05 | 0,00 | 15,523 | 2,98 | 24,93 | 5,57 | 12,267 | 2,93 | 2,5189 | D |
| D-171 | | | | | | | 43,50 | 1,25 | 2,202 | 18,50 | 23,45 | 20,05 | 31,42 | 44,153 | 3,41 | 24,93 | 11,64 | 40,897 | 3,36 | 2,5189 | C |
| D-171A | | | | | | | 43,50 | 1,49 | 1,811 | 22,50 | 28,09 | 15,41 | 31,42 | 27,905 | 3,12 | 29,89 | 13,61 | 24,645 | 3,07 | 3,0104 | D |
| D-171B | | 6,00 | 7,00 | 0,20 | 4,60 | 7,50 | 10,30 | 0,31 | 13,476 | 3,50 | 6,04 | 4,26 | 0,00 | 57,419 | 5,06 | 6,31 | 1,68 | 53,767 | 5,00 | 0,6436 | C |
| D-172 | | | | | | | 14,00 | 0,46 | 7,861 | 6,00 | 8,92 | 5,08 | 0,00 | 39,901 | 4,27 | 9,39 | 3,67 | 36,238 | 4,21 | 0,9362 | C |
| D-173 | | | | | | | 14,00 | 0,52 | 6,738 | 7,00 | 10,08 | 3,92 | 0,00 | 26,426 | 3,93 | 10,62 | 3,38 | 22,774 | 3,88 | 1,0532 | C |
| D-173A | | | | | | | 15,10 | 0,43 | 8,575 | 5,50 | 8,35 | 6,75 | 0,00 | 57,909 | 4,55 | 8,78 | 2,63 | 54,196 | 4,50 | 0,8777 | C |
| D-173A-01 | | | | | | | 18,00 | 0,46 | 7,861 | 6,00 | 8,92 | 9,08 | 0,00 | 71,344 | 4,74 | 10,70 | 2,72 | 57,383 | 4,68 | 0,9362 | D |
| D-173B | | | | | | | 24,50 | 0,66 | 4,965 | 9,50 | 12,96 | 11,54 | 0,00 | 57,277 | 4,15 | 13,69 | 4,57 | 53,668 | 4,10 | 1,3458 | C |
| D-173C | | | | | | | 38,80 | 1,01 | 3,043 | 15,50 | 19,89 | 18,91 | 26,04 | 57,550 | 3,94 | 21,09 | 7,44 | 53,889 | 3,89 | 2,0479 | C |
| D-173CH | | 5,70 | 6,70 | 0,20 | 4,30 | 7,20 | 34,20 | 0,80 | 4,401 | 12,50 | 16,75 | 17,45 | 20,33 | 76,794 | 4,69 | 20,50 | 5,01 | 60,291 | 4,62 | 1,6120 | D |
| D-173CJ | | | | | | | 50,60 | 1,13 | 2,974 | 18,50 | 24,80 | 25,80 | 42,80 | 76,717 | 4,58 | 30,30 | 7,41 | 60,363 | 4,51 | 2,2790 | E |
| D-173CK | | | | | | | 81,00 | 1,74 | 1,865 | 29,50 | 39,78 | 41,22 | 76,42 | 76,865 | 4,50 | 48,90 | 11,91 | 59,859 | 4,44 | 3,5019 | F |
| D-173C-10 | | 5,50 | 6,50 | 0,20 | 4,10 | 7,10 | 24,00 | 0,61 | 6,445 | 9,50 | 12,88 | 11,12 | 0,00 | 71,667 | 5,01 | 14,60 | 3,59 | 60,588 | 4,94 | 1,2336 | D |
| D-173D | | 5,30 | 6,30 | 0,20 | 3,90 | 6,80 | 8,50 | 0,28 | 19,551 | 3,50 | 6,00 | 2,50 | 0,00 | 48,927 | 6,16 | 6,25 | 1,55 | 43,990 | 6,08 | 0,5685 | C |
| D-173E | | | | | | | 12,00 | 0,38 | 12,442 | 5,50 | 8,28 | 3,72 | 0,00 | 46,261 | 5,46 | 8,67 | 2,50 | 41,431 | 5,38 | 0,7753 | C |
| D-173F | | | | | | | 18,00 | 0,54 | 8,050 | 8,50 | 11,71 | 6,29 | 0,00 | 50,652 | 5,10 | 12,32 | 3,68 | 45,727 | 5,02 | 1,0854 | C |
| D-173G | | | | | | | 28,00 | 0,80 | 5,069 | 13,50 | 17,42 | 10,58 | 9,86 | 53,634 | 4,85 | 18,38 | 5,64 | 48,762 | 4,78 | 1,6022 | C |
| D-173H | | | | | | | 37,00 | 1,00 | 3,910 | 17,50 | 21,99 | 15,01 | 27,00 | 58,703 | 4,81 | 23,24 | 6,85 | 53,805 | 4,74 | 2,0157 | D |
| D-173J | | | | | | | 41,00 | 1,16 | 3,338 | 20,50 | 25,41 | 15,59 | 32,35 | 52,027 | 4,65 | 26,87 | 8,73 | 47,166 | 4,58 | 2,3258 | E |
| D-173K | | | | | | | 61,00 | 1,57 | 2,401 | 28,50 | 34,55 | 26,45 | 55,64 | 63,505 | 4,73 | 36,58 | 10,45 | 58,633 | 4,66 | 3,1528 | E |
| D-174 | | 5,00 | 6,00 | 0,20 | 3,60 | 6,40 | 8,50 | 0,26 | 23,286 | 3,50 | 5,98 | 2,52 | 0,00 | 58,651 | 7,02 | 6,22 | 1,25 | 53,091 | 6,94 | 0,5364 | C |
| D-175 | | | | | | | 12,00 | 0,36 | 14,818 | 5,50 | 8,26 | 3,74 | 0,00 | 55,476 | 6,22 | 8,64 | 2,04 | 49,789 | 6,14 | 0,7314 | C |
| D-176 | | | | | | | 17,00 | 0,51 | 9,588 | 8,50 | 11,67 | 5,33 | 0,00 | 51,117 | 5,68 | 12,26 | 3,31 | 45,448 | 5,60 | 1,0240 | C |
| D-177 | | | | | | | 24,00 | 0,71 | 6,520 | 12,50 | 16,22 | 7,78 | 0,00 | 50,734 | 5,39 | 17,08 | 4,89 | 45,118 | 5,30 | 1,4140 | D |
| D-178 | | | | | | | 34,00 | 1,00 | 4,405 | 18,50 | 23,04 | 10,96 | 24,18 | 48,267 | 5,15 | 24,31 | 7,43 | 42,688 | 5,07 | 1,9991 | C |
| D-177A | | | | | | | 34,00 | 1,05 | 4,179 | 19,50 | 24,18 | 9,82 | 24,18 | 41,037 | 5,02 | 25,52 | 8,44 | 35,442 | 4,94 | 2,0967 | C |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-178A | 1,00 | 5,00 | 6,00 | 0,20 | 3,60 | 6,40 | 34,50 | 1,20 | 3,622 | 22,50 | 27,59 | 6,91 | 24,90 | 25,016 | 4,73 | 29,14 | 5,36 | 19,415 | 4,64 | 2,3892 | D |
| D-178B | | 4,80 | 5,80 | 0,20 | 3,40 | 6,30 | 30,00 | 0,78 | 6,353 | 14,50 | 18,45 | 11,55 | 19,18 | 73,370 | 6,06 | 19,43 | 4,02 | 67,151 | 5,97 | 1,5447 | C |
| D-179 | | 4,10 | 5,10 | 0,20 | 2,70 | 5,50 | 23,00 | 0,62 | 11,370 | 13,00 | 16,63 | 6,37 | 11,46 | 72,454 | 8,26 | 17,44 | 2,87 | 63,219 | 8,12 | 1,1995 | C |
| D-179A | | 4,00 | 5,00 | 0,20 | 2,60 | 5,40 | 7,60 | 0,22 | 45,480 | 3,50 | 5,93 | 1,67 | 0,00 | 75,770 | 11,11 | 6,15 | 0,72 | 65,946 | 10,96 | 0,4291 | C |
| D-179B | | | | | | | 10,80 | 0,30 | 28,942 | 5,50 | 8,18 | 2,62 | 0,00 | 75,770 | 9,80 | 8,52 | 1,13 | 65,987 | 9,75 | 0,5851 | C |
| D-179B-10 | | | | | | | 16,00 | 0,39 | 21,224 | 7,50 | 10,90 | 5,10 | 0,00 | 108,242 | 9,95 | 12,40 | 1,36 | 76,406 | 7,10 | 0,7411 | D |
| D-179C | | | | | | | 17,30 | 0,47 | 16,756 | 9,50 | 12,68 | 4,62 | 0,00 | 77,445 | 8,99 | 13,27 | 1,91 | 67,526 | 8,84 | 0,8972 | C |
| D-179D | | | | | | | 26,90 | 0,71 | 10,270 | 15,50 | 19,42 | 7,48 | 18,91 | 76,796 | 8,47 | 20,38 | 3,14 | 66,958 | 8,32 | 1,3653 | C |
| D-179E | | | | | | | 33,00 | 0,88 | 8,163 | 19,50 | 23,92 | 9,08 | 27,00 | 74,137 | 8,26 | 25,13 | 4,06 | 64,243 | 8,12 | 1,6773 | D |
| D-179F | 1,10 | 17,90 | 19,00 | 0,50 | 16,10 | 20,70 | 50,00 | 2,61 | 0,743 | 3,50 | 7,96 | 42,04 | 0,00 | 31,234 | 2,41 | 10,10 | 14,33 | 29,647 | 2,40 | 2,3234 | D |
| D-179G | | | | | | | 76,30 | 3,60 | 0,473 | 5,50 | 11,26 | 65,04 | 0,00 | 30,755 | 2,16 | 13,90 | 22,61 | 29,505 | 2,15 | 3,1683 | D |
| D-179H | | | | | | | 129,00 | 5,56 | 0,274 | 9,50 | 17,85 | 111,15 | 96,76 | 30,429 | 1,98 | 20,45 | 38,77 | 29,716 | 1,97 | 4,8580 | D |
| D-179J | | | | | | | 208,00 | 8,48 | 0,168 | 15,50 | 27,73 | 180,27 | 190,00 | 30,247 | 1,88 | 31,97 | 63,60 | 29,535 | 1,87 | 7,3926 | D |
| D-179J-10 | | 14,80 | 15,90 | 0,40 | 13,10 | 16,80 | 15,00 | 1,25 | 1,840 | 2,50 | 5,97 | 9,03 | 0,00 | 16,619 | 2,54 | 6,50 | 8,40 | 15,643 | 2,53 | 1,5717 | D |
| D-179J-11 | | | | | | | 22,00 | 1,50 | 1,315 | 3,50 | 7,48 | 14,52 | 0,00 | 19,088 | 2,32 | 8,20 | 13,50 | 18,141 | 2,31 | 1,9210 | D |
| D-179J-12 | | | | | | | 42,00 | 2,10 | 0,837 | 5,50 | 10,50 | 31,50 | 0,00 | 26,351 | 2,18 | 11,70 | 19,10 | 25,347 | 2,17 | 2,6196 | D |
| D-179J-13 | | | | | | | 85,00 | 3,00 | 0,541 | 8,50 | 15,02 | 69,98 | 0,00 | 37,880 | 2,17 | 16,80 | 23,40 | 36,916 | 2,15 | 3,6674 | D |
| D-179J-14 | | | | | | | 125,00 | 4,10 | 0,368 | 12,50 | 21,06 | 103,94 | 0,00 | 38,258 | 2,11 | 23,70 | 32,50 | 37,287 | 2,09 | 5,0645 | D |
| D-179J-01 | | 12,90 | 14,00 | 0,35 | 11,10 | 15,00 | 27,00 | 1,07 | 1,985 | 3,50 | 7,23 | 19,77 | 0,00 | 39,249 | 2,71 | 7,82 | 7,53 | 38,076 | 2,70 | 1,6744 | D |
| D-179J-02 | | | | | | | 42,30 | 1,48 | 1,263 | 5,50 | 10,10 | 32,20 | 0,00 | 40,674 | 2,48 | 11,03 | 11,45 | 39,503 | 2,46 | 2,2833 | D |
| D-179J-03 | | | | | | | 65,40 | 2,08 | 0,817 | 8,50 | 14,41 | 50,99 | 0,00 | 41,678 | 2,33 | 16,70 | 17,58 | 39,809 | 2,31 | 3,1966 | D |
| D-179J-04 | | | | | | | 96,20 | 2,88 | 0,556 | 12,50 | 20,16 | 76,04 | 74,06 | 42,266 | 2,23 | 24,25 | 25,72 | 39,994 | 2,22 | 4,4143 | E |
| D-179J-05 | | | | | | | 142,00 | 4,08 | 0,376 | 18,50 | 28,78 | 113,22 | 128,29 | 42,522 | 2,17 | 35,70 | 38,10 | 39,924 | 2,15 | 6,2409 | E |
| D-179K | | 10,90 | 12,00 | 0,35 | 9,20 | 12,90 | 23,00 | 0,71 | 3,291 | 3,50 | 7,00 | 16,00 | 0,00 | 52,645 | 3,14 | 8,95 | 5,06 | 46,235 | 3,11 | 1,4148 | D |
| D-179L | | | | | | | 34,00 | 0,98 | 2,094 | 5,50 | 9,75 | 24,25 | 0,00 | 50,790 | 2,82 | 11,85 | 7,92 | 46,384 | 2,80 | 1,9293 | D |
| D-179M | | | | | | | 55,90 | 1,52 | 1,212 | 9,50 | 15,23 | 40,67 | 0,00 | 49,302 | 2,58 | 17,75 | 13,73 | 46,252 | 2,56 | 2,9582 | D |
| D-179N | | | | | | | 88,80 | 2,32 | 0,743 | 15,50 | 23,47 | 65,33 | 72,17 | 48,547 | 2,45 | 26,72 | 22,45 | 46,130 | 2,43 | 4,5016 | D |
| D-180 | | 9,20 | 10,30 | 0,30 | 7,60 | 10,90 | 26,00 | 0,90 | 2,554 | 7,50 | 12,14 | 13,86 | 0,00 | 35,396 | 2,83 | 12,99 | 10,22 | 33,227 | 2,80 | 2,0626 | C |
| D-180-10 | | 7,90 | 9,00 | 0,25 | 6,20 | 9,70 | 14,00 | 0,41 | 8,643 | 3,50 | 6,73 | 7,27 | 0,00 | 62,813 | 4,47 | 7,07 | 2,56 | 59,899 | 4,43 | 1,0254 | D |
| D-180-11 | | | | | | | 18,50 | 0,56 | 5,500 | 5,50 | 9,32 | 9,18 | 0,00 | 50,477 | 3,86 | 9,86 | 4,78 | 47,523 | 3,81 | 1,3983 | D |
| D-180-12 | | | | | | | 22,00 | 0,79 | 3,559 | 8,50 | 13,21 | 8,79 | 0,00 | 31,290 | 3,29 | 14,04 | 7,95 | 28,330 | 3,25 | 1,9576 | D |
| D-180-13 | | | | | | | 50,00 | 1,10 | 2,420 | 12,50 | 19,80 | 30,20 | 32,58 | 73,089 | 3,80 | 24,90 | 9,02 | 60,746 | 3,76 | 2,7033 | D |
| D-180-14 | | | | | | | 74,00 | 1,55 | 1,635 | 18,50 | 29,35 | 44,65 | 63,87 | 73,014 | 3,72 | 36,85 | 13,35 | 60,750 | 3,10 | 3,8220 | E |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-178A | 1,00 | 5,00 | 6,00 | 0,20 | 3,60 | 6,40 | 34,50 | 1,40 | 3,111 | 22,50 | 27,59 | 6,91 | 24,59 | 21,486 | 4,67 | 29,14 | 5,36 | 16,676 | 4,60 | 2,3892 | H |
| VD-178B | | 4,80 | 5,80 | 0,20 | 3,40 | 6,30 | 30,00 | 0,91 | 5,457 | 14,50 | 18,45 | 11,55 | 18,75 | 63,017 | 5,90 | 19,43 | 2,99 | 57,675 | 5,82 | 1,5447 | H |
| VD-179 | | 4,10 | 5,10 | 0,20 | 2,70 | 5,50 | 23,00 | 0,73 | 9,766 | 13,00 | 16,63 | 6,37 | 10,65 | 62,230 | 8,09 | 17,44 | 2,36 | 54,299 | 7,97 | 1,1995 | H |
| VD-179A | | 4,00 | 5,00 | 0,20 | 2,60 | 5,40 | 7,60 | 0,26 | 39,063 | 3,50 | 5,93 | 1,67 | 0,00 | 65,078 | 10,95 | 6,15 | 0,58 | 56,641 | 10,82 | 0,4291 | H |
| VD-179B | | | | | | | 10,80 | 0,35 | 24,858 | 5,50 | 8,18 | 2,62 | 0,00 | 65,078 | 9,74 | 8,52 | 0,91 | 56,676 | 9,60 | 0,5851 | H |
| VD-179B-10 | | | | | | | 16,00 | 0,45 | 18,229 | 7,50 | 10,85 | 5,15 | 0,00 | 93,880 | 9,70 | 12,35 | 0,88 | 66,536 | 9,50 | 0,7411 | H |
| VD-179C | | | | | | | 17,30 | 0,54 | 14,391 | 9,50 | 12,68 | 4,62 | 0,00 | 66,517 | 8,82 | 13,27 | 1,53 | 57,998 | 8,70 | 0,8972 | H |
| VD-179D | | | | | | | 26,90 | 0,83 | 8,821 | 15,50 | 19,42 | 7,48 | 18,64 | 65,960 | 8,31 | 20,38 | 2,53 | 57,510 | 8,18 | 1,3653 | H |
| VD-179E | | | | | | | 33,00 | 1,02 | 7,011 | 19,50 | 23,92 | 9,08 | 26,84 | 63,676 | 8,11 | 25,13 | 3,34 | 55,178 | 7,98 | 1,6773 | H |
| VD-179F | 1,10 | 17,90 | 19,00 | 0,50 | 16,10 | 20,70 | 50,00 | 3,04 | 0,638 | 3,50 | 7,96 | 42,04 | 0,00 | 26,827 | 2,34 | 10,85 | 10,93 | 24,985 | 2,33 | 2,3234 | H |
| VD-179G | | | | | | | 76,30 | 4,19 | 0,406 | 5,50 | 11,26 | 65,04 | 0,00 | 26,415 | 2,10 | 14,70 | 17,71 | 25,017 | 2,09 | 3,1683 | G |
| VD-179H | | | | | | | 129,00 | 6,47 | 0,235 | 9,50 | 17,85 | 111,15 | 95,77 | 26,135 | 1,91 | 22,65 | 31,21 | 25,005 | 1,90 | 4,8580 | G |
| VD-179J | | | | | | | 208,00 | 9,88 | 0,144 | 15,50 | 27,73 | 180,27 | 189,69 | 25,979 | 1,81 | 34,55 | 51,51 | 24,996 | 1,80 | 7,3926 | G |
| VD-179J-10 | | 14,80 | 15,90 | 0,40 | 13,10 | 16,80 | 15,00 | 1,40 | 1,581 | 2,50 | 6,00 | 9,00 | 0,00 | 14,226 | 2,50 | 6,50 | 8,50 | 13,436 | 2,50 | 1,5717 | H |
| VD-179J-11 | | | | | | | 22,00 | 1,80 | 1,129 | 3,50 | 7,50 | 14,50 | 0,00 | 16,372 | 2,30 | 8,20 | 13,70 | 15,581 | 2,30 | 1,9210 | H |
| VD-179J-12 | | | | | | | 42,00 | 2,20 | 0,719 | 5,50 | 10,50 | 31,50 | 0,00 | 22,633 | 2,10 | 11,65 | 20,50 | 21,807 | 2,20 | 2,6196 | H |
| VD-179J-13 | | | | | | | 85,00 | 3,20 | 0,465 | 8,50 | 15,05 | 69,95 | 43,30 | 32,521 | 2,10 | 21,50 | 18,70 | 29,522 | 2,10 | 3,6674 | J |
| VD-179J-14 | | | | | | | 125,00 | 4,30 | 0,316 | 12,50 | 21,80 | 103,20 | 102,90 | 32,626 | 2,00 | 30,90 | 27,00 | 29,749 | 2,00 | 5,0645 | J |
| VD-179J-01 | | 12,90 | 14,00 | 0,35 | 11,10 | 15,00 | 27,00 | 1,25 | 1,705 | 3,50 | 7,23 | 19,77 | 0,00 | 33,711 | 2,63 | 7,82 | 6,30 | 32,703 | 2,62 | 1,6744 | H |
| VD-179J-02 | | | | | | | 42,30 | 1,72 | 1,085 | 5,50 | 10,10 | 32,20 | 0,00 | 34,935 | 2,39 | 11,35 | 9,30 | 33,582 | 2,38 | 2,2833 | H |
| VD-179J-03 | | | | | | | 65,40 | 2,42 | 0,702 | 8,50 | 14,41 | 50,99 | 0,00 | 35,797 | 2,24 | 17,45 | 13,75 | 33,665 | 2,22 | 3,1966 | H |
| VD-179J-04 | | | | | | | 96,20 | 3,35 | 0,477 | 12,50 | 20,16 | 76,04 | 73,41 | 36,302 | 2,15 | 25,65 | 19,68 | 33,682 | 2,13 | 4,4143 | J |
| VD-179J-05 | | | | | | | 142,00 | 4,75 | 0,323 | 18,50 | 28,78 | 113,22 | 128,00 | 36,522 | 2,08 | 37,85 | 28,64 | 33,597 | 2,06 | 6,2409 | J |
| VD-179K | | 10,90 | 12,00 | 0,35 | 9,20 | 12,90 | 23,00 | 0,83 | 2,826 | 3,50 | 7,20 | 15,80 | 0,00 | 44,657 | 3,03 | 9,20 | 3,71 | 39,004 | 3,01 | 1,4148 | G |
| VD-179L | | | | | | | 34,00 | 1,15 | 1,799 | 5,50 | 9,75 | 24,25 | 0,00 | 43,623 | 2,72 | 12,30 | 5,82 | 39,030 | 2,70 | 1,9293 | G |
| VD-179M | | | | | | | 55,90 | 1,77 | 1,041 | 9,50 | 15,23 | 40,67 | 0,00 | 42,345 | 2,48 | 18,40 | 10,42 | 39,049 | 2,46 | 2,9582 | G |
| VD-179N | | | | | | | 88,80 | 2,70 | 0,638 | 15,50 | 23,47 | 65,33 | 70,72 | 41,697 | 2,34 | 27,65 | 17,54 | 39,027 | 2,32 | 4,5016 | G |
| VD-180 | | 9,20 | 10,30 | 0,30 | 7,60 | 10,90 | 26,00 | 1,05 | 2,194 | 7,50 | 12,14 | 13,86 | 0,00 | 30,402 | 2,75 | 12,99 | 8,08 | 28,539 | 2,73 | 2,0626 | G |
| VD-180-10 | | 7,90 | 9,00 | 0,25 | 6,20 | 9,70 | 14,00 | 0,48 | 7,424 | 3,50 | 6,73 | 7,27 | 0,00 | 53,950 | 4,34 | 7,10 | 2,09 | 51,225 | 4,30 | 1,0254 | H |
| VD-180-11 | | | | | | | 18,50 | 0,66 | 4,724 | 5,50 | 9,32 | 9,18 | 0,00 | 43,354 | 3,75 | 9,86 | 4,33 | 40,818 | 3,71 | 1,3983 | H |
| VD-180-12 | | | | | | | 22,00 | 0,92 | 3,057 | 8,50 | 13,21 | 8,79 | 0,00 | 26,875 | 3,23 | 14,04 | 6,69 | 24,333 | 3,19 | 1,9576 | H |
| VD-180-13 | | | | | | | 50,00 | 1,28 | 2,079 | 12,50 | 20,40 | 29,60 | 31,90 | 61,529 | 3,64 | 25,35 | 6,64 | 51,239 | 3,60 | 2,7033 | J |
| VD-180-14 | | | | | | | 74,00 | 1,81 | 1,405 | 18,50 | 30,10 | 43,90 | 63,62 | 61,658 | 3,50 | 37,50 | 9,78 | 51,265 | 3,48 | 3,8220 | K |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-180-01 | 1,10 | 7,20 | 8,30 | 0,25 | 5,60 | 8,80 | 25,00 | 0,90 | 3,613 | 9,50 | 14,37 | 10,63 | 0,00 | 38,418 | 3,84 | 15,23 | 6,19 | 35,298 | 3,80 | 1,9541 | G |
| VD-180-02 | | | | | | | 32,00 | 1,14 | 2,746 | 12,50 | 18,21 | 13,79 | 0,00 | 37,869 | 3,71 | 19,34 | 8,15 | 34,762 | 3,66 | 2,4638 | G |
| VD-180-03 | | | | | | | 38,00 | 1,30 | 2,367 | 14,50 | 20,77 | 17,23 | 0,00 | 40,785 | 3,69 | 22,08 | 9,45 | 37,684 | 3,64 | 2,8036 | G |
| VD-180-04 | | | | | | | 44,00 | 1,54 | 1,961 | 17,50 | 24,61 | 19,39 | 26,37 | 38,025 | 3,59 | 26,19 | 11,41 | 34,931 | 3,54 | 3,3134 | G |
| VD-180-05 | | | | | | | 51,00 | 1,74 | 1,716 | 20,00 | 27,81 | 23,19 | 37,29 | 39,791 | 3,59 | 29,62 | 13,04 | 36,691 | 3,54 | 3,7382 | G |
| VD-180-06 | | | | | | | 64,00 | 2,09 | 1,401 | 24,50 | 33,58 | 30,42 | 53,91 | 42,620 | 3,57 | 35,80 | 15,97 | 39,506 | 3,52 | 4,5028 | G |
| VD-180-07 | | | | | | | 76,00 | 2,53 | 1,144 | 30,00 | 40,62 | 35,38 | 67,78 | 40,477 | 3,51 | 43,33 | 19,56 | 37,377 | 3,46 | 5,4374 | G |
| VD-180A | 6,40 | 7,50 | 0,25 | 4,80 | 8,00 | 11,00 | 0,38 | 13,963 | 3,50 | 6,63 | 4,37 | 0,00 | 61,010 | 6,16 | 6,92 | 1,46 | 56,968 | 6,10 | 0,8307 | G | |
| VD-180B | | | | | | 16,00 | 0,52 | 8,885 | 5,50 | 9,16 | 6,84 | 0,00 | 60,756 | 5,52 | 9,62 | 2,31 | 56,689 | 5,46 | 1,1328 | G | |
| VD-180C | | | | | | 26,00 | 0,80 | 5,144 | 9,50 | 14,23 | 11,77 | 0,00 | 60,569 | 5,03 | 15,02 | 4,00 | 56,483 | 4,97 | 1,7369 | G | |
| VD-180D | | | | | | 41,00 | 1,22 | 3,153 | 15,50 | 21,82 | 19,18 | 26,65 | 60,470 | 4,76 | 23,11 | 6,54 | 56,405 | 4,70 | 2,6432 | G | |
| VD-180D-01 | 5,40 | 6,50 | 0,20 | 3,80 | 7,10 | 9,50 | 0,32 | 23,245 | 3,50 | 6,57 | 2,93 | 0,00 | 68,011 | 8,53 | 6,83 | 1,05 | 62,064 | 8,43 | 0,7009 | G | |
| VD-180D-02 | | | | | | 13,70 | 0,45 | 14,792 | 5,50 | 9,07 | 4,63 | 0,00 | 68,433 | 7,63 | 9,48 | 1,64 | 62,423 | 7,53 | 0,9558 | G | |
| VD-180D-03 | | | | | | 20,00 | 0,63 | 9,571 | 8,50 | 12,82 | 7,18 | 0,00 | 68,695 | 7,04 | 13,46 | 2,53 | 62,597 | 6,95 | 1,3381 | H | |
| VD-180D-04 | | | | | | 28,30 | 0,87 | 6,509 | 12,50 | 17,82 | 10,48 | 0,00 | 68,197 | 6,68 | 18,76 | 3,76 | 62,092 | 6,59 | 1,8479 | H | |
| VD-180D-05 | | | | | | 40,90 | 1,23 | 4,398 | 18,50 | 25,32 | 15,58 | 31,56 | 68,513 | 6,44 | 26,71 | 5,53 | 62,403 | 6,35 | 2,6125 | J | |
| VD-180E | 4,40 | 5,50 | 0,25 | 2,80 | 6,00 | 8,30 | 0,27 | 42,969 | 3,50 | 6,53 | 1,77 | 0,00 | 76,166 | 12,87 | 6,77 | 0,73 | 65,742 | 12,71 | 0,5711 | G | |
| VD-180F | | | | | | 11,90 | 0,38 | 27,344 | 5,50 | 9,00 | 2,90 | 0,00 | 79,291 | 11,49 | 9,38 | 1,08 | 68,906 | 11,33 | 0,7788 | G | |
| VD-180G | | | | | | 18,90 | 0,58 | 15,831 | 9,50 | 13,95 | 4,95 | 0,00 | 78,428 | 10,38 | 14,60 | 1,90 | 68,072 | 10,23 | 1,1941 | G | |
| VD-180H | | | | | | 29,50 | 0,89 | 9,703 | 15,50 | 21,36 | 8,14 | 20,37 | 78,939 | 9,79 | 22,42 | 3,06 | 68,695 | 9,69 | 1,8172 | G | |
| VD-180J | 1,20 | 18,80 | 20,00 | 0,50 | 16,90 | 22,00 | 50,40 | 2,91 | 0,780 | 3,50 | 8,57 | 41,83 | 0,00 | 32,638 | 2,76 | 10,90 | 11,66 | 30,817 | 2,75 | 2,9040 | H |
| VD-180K | | | | | | | 76,80 | 4,02 | 0,496 | 5,50 | 12,09 | 64,71 | 0,00 | 32,127 | 2,48 | 14,70 | 18,90 | 30,831 | 2,47 | 3,9601 | H |
| VD-180L | | | | | | | 130,00 | 6,21 | 0,287 | 9,50 | 19,14 | 110,86 | 92,85 | 31,866 | 2,26 | 22,75 | 33,16 | 30,827 | 2,25 | 6,0721 | H |
| VD-180M | | | | | | | 209,00 | 9,47 | 0,176 | 15,50 | 29,71 | 179,29 | 188,78 | 31,586 | 2,14 | 34,07 | 54,92 | 30,817 | 2,13 | 9,2401 | H |
| VD-180M-10 | 15,80 | 17,00 | 0,35 | 14,00 | 18,10 | 31,50 | 1,80 | 1,314 | 3,50 | 8,11 | 23,39 | 0,00 | 30,739 | 2,83 | 8,87 | 10,29 | 29,743 | 2,82 | 2,4406 | H | |
| VD-180M-11 | | | | | | 48,00 | 2,49 | 0,836 | 5,50 | 11,38 | 36,62 | 0,00 | 30,631 | 2,54 | 12,57 | 16,17 | 29,633 | 2,53 | 3,3281 | H | |
| VD-180M-12 | | | | | | 72,80 | 3,51 | 0,541 | 8,50 | 16,27 | 56,53 | 0,00 | 30,592 | 2,36 | 18,11 | 25,00 | 29,597 | 2,34 | 4,6594 | H | |
| VD-180M-13 | | | | | | 89,40 | 4,18 | 0,438 | 10,50 | 19,54 | 69,86 | 43,15 | 30,607 | 2,29 | 21,81 | 30,88 | 29,611 | 2,28 | 5,5469 | H | |
| VD-180M-14 | | | | | | 106,00 | 4,86 | 0,368 | 12,50 | 22,80 | 83,20 | 73,25 | 30,618 | 2,25 | 25,50 | 36,77 | 29,624 | 2,23 | 6,4344 | H | |
| VD-180M-20 | 13,80 | 15,00 | 0,35 | 12,00 | 15,88 | 17,00 | 0,90 | 3,068 | 2,25 | 5,90 | 11,10 | 0,00 | 34,059 | 3,40 | 6,30 | 5,50 | 32,832 | 3,41 | 1,6472 | H | |
| VD-180M-21 | | | | | | 25,00 | 1,20 | 1,973 | 3,50 | 7,90 | 17,10 | 0,00 | 33,731 | 3,00 | 8,60 | 8,70 | 32,350 | 2,97 | 2,1317 | H | |
| VD-180M-22 | | | | | | 40,00 | 1,70 | 1,255 | 5,50 | 11,00 | 29,00 | 0,00 | 36,402 | 2,70 | 12,10 | 12,20 | 35,022 | 2,80 | 2,9069 | H | |
| VD-180M-23 | | | | | | 72,00 | 2,70 | 0,727 | 9,50 | 17,25 | 54,75 | 0,00 | 39,788 | 2,60 | 18,95 | 17,70 | 38,553 | 2,60 | 4,4572 | H | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-180-01 | 1,10 | 7,20 | 8,30 | 0,25 | 5,60 | 8,80 | 25,00 | 0,78 | 4,206 | 9,50 | 14,37 | 10,63 | 0,00 | 44,729 | 3,94 | 15,23 | 7,56 | 41,097 | 3,88 | 1,9541 | D |
| D-180-02 | | | | | | | 32,00 | 0,98 | 3,197 | 12,50 | 18,21 | 13,79 | 0,00 | 44,090 | 3,80 | 19,34 | 10,01 | 40,473 | 3,74 | 2,4638 | D |
| D-180-03 | | | | | | | 38,00 | 1,12 | 2,756 | 14,50 | 20,77 | 17,23 | 13,24 | 47,485 | 3,79 | 22,08 | 11,20 | 43,875 | 3,74 | 2,8036 | D |
| D-180-04 | | | | | | | 44,00 | 1,32 | 2,284 | 17,50 | 24,61 | 19,39 | 27,09 | 44,272 | 3,68 | 26,19 | 13,99 | 40,669 | 3,63 | 3,3134 | D |
| D-180-05 | | | | | | | 51,00 | 1,49 | 1,998 | 20,00 | 27,81 | 23,19 | 37,70 | 46,328 | 3,69 | 29,62 | 15,64 | 42,719 | 3,64 | 3,7382 | D |
| D-180-06 | | | | | | | 64,00 | 1,80 | 1,631 | 24,50 | 33,58 | 30,42 | 54,16 | 49,622 | 3,68 | 35,80 | 18,48 | 45,996 | 3,62 | 4,5028 | D |
| D-180-07 | | | | | | | 76,00 | 2,17 | 1,332 | 30,00 | 40,62 | 35,38 | 67,97 | 47,127 | 2,61 | 43,33 | 23,26 | 43,518 | 3,55 | 5,4374 | D |
| D-180A | 6,40 | 7,50 | 0,25 | 4,80 | 8,00 | 11,00 | 0,32 | 16,257 | 3,50 | 6,63 | 4,37 | 0,00 | 71,033 | 6,31 | 6,92 | 1,70 | 66,327 | 6,24 | 0,8307 | D | |
| D-180B | | | | | | 16,00 | 0,45 | 10,345 | 5,50 | 9,16 | 6,84 | 0,00 | 70,738 | 5,67 | 9,62 | 2,69 | 66,002 | 5,60 | 1,1328 | D | |
| D-180C | | | | | | 26,00 | 0,69 | 5,989 | 9,50 | 14,23 | 11,77 | 0,00 | 70,520 | 5,18 | 15,02 | 4,66 | 65,762 | 5,11 | 1,7369 | D | |
| D-180D | | | | | | 41,00 | 1,05 | 3,671 | 15,50 | 21,82 | 19,18 | 27,17 | 70,404 | 4,91 | 23,11 | 7,60 | 65,672 | 4,84 | 2,6432 | D | |
| D-180D-01 | 5,40 | 6,50 | 0,20 | 3,80 | 7,10 | 9,50 | 0,28 | 27,064 | 3,50 | 6,57 | 2,93 | 0,00 | 79,184 | 8,70 | 6,83 | 1,20 | 72,260 | 8,60 | 0,7009 | D | |
| D-180D-02 | | | | | | 13,70 | 0,38 | 17,222 | 5,50 | 9,07 | 4,63 | 0,00 | 79,676 | 7,79 | 9,48 | 1,88 | 72,679 | 7,69 | 0,9558 | D | |
| D-180D-03 | | | | | | 20,00 | 0,54 | 11,144 | 8,50 | 12,82 | 7,18 | 0,00 | 79,980 | 7,21 | 13,46 | 2,90 | 72,881 | 7,10 | 1,3381 | D | |
| D-180D-04 | | | | | | 28,30 | 0,75 | 7,578 | 12,50 | 17,82 | 10,48 | 9,05 | 79,401 | 6,85 | 18,76 | 4,29 | 72,293 | 6,74 | 1,8479 | D | |
| D-180D-05 | | | | | | 40,90 | 1,06 | 5,120 | 18,50 | 25,32 | 15,58 | 31,83 | 79,769 | 6,61 | 26,71 | 6,32 | 72,655 | 6,50 | 2,6125 | D | |
| D-180E | 4,40 | 5,50 | 0,25 | 2,80 | 6,00 | 8,30 | 0,23 | 50,028 | 3,50 | 6,53 | 1,77 | 0,00 | 88,679 | 13,06 | 6,77 | 0,79 | 76,543 | 12,88 | 0,5711 | D | |
| D-180F | | | | | | 11,90 | 0,32 | 31,836 | 5,50 | 9,00 | 2,90 | 0,00 | 92,318 | 11,68 | 9,38 | 1,21 | 80,227 | 11,50 | 0,7788 | D | |
| D-180G | | | | | | 18,90 | 0,50 | 18,431 | 9,50 | 13,95 | 4,95 | 0,00 | 91,313 | 10,57 | 14,60 | 2,11 | 79,255 | 10,39 | 1,1941 | D | |
| D-180H | | | | | | 29,50 | 0,76 | 11,297 | 15,50 | 21,36 | 8,14 | 20,67 | 91,907 | 9,99 | 22,42 | 3,42 | 79,980 | 9,81 | 1,8172 | D | |
| D-180J | 1,20 | 18,80 | 20,00 | 0,50 | 16,90 | 22,00 | 50,40 | 23,50 | 0,908 | 3,50 | 8,57 | 41,83 | 0,00 | 37,999 | 2,84 | 10,95 | 14,12 | 35,834 | 2,83 | 2,9040 | E |
| D-180K | | | | | | | 76,80 | 3,45 | 0,578 | 5,50 | 12,09 | 64,71 | 0,00 | 37,405 | 2,56 | 14,75 | 22,16 | 35,867 | 2,54 | 3,9601 | E |
| D-180L | | | | | | | 130,00 | 5,33 | 0,335 | 9,50 | 19,14 | 110,86 | 94,02 | 37,101 | 2,34 | 22,85 | 38,24 | 35,858 | 2,33 | 6,0721 | E |
| D-180M | | | | | | | 209,00 | 8,13 | 0,205 | 15,50 | 29,71 | 179,29 | 189,20 | 36,775 | 2,22 | 34,07 | 62,45 | 35,880 | 2,21 | 9,2401 | E |
| D-180M-10 | 15,80 | 17,00 | 0,35 | 14,00 | 18,10 | 31,50 | 1,55 | 1,530 | 3,50 | 8,11 | 23,39 | 0,00 | 35,788 | 2,91 | 8,87 | 11,60 | 34,629 | 2,89 | 2,4406 | E | |
| D-180M-11 | | | | | | 48,00 | 2,14 | 0,974 | 5,50 | 11,38 | 36,62 | 0,00 | 35,663 | 2,62 | 12,57 | 18,28 | 34,501 | 2,60 | 3,3281 | E | |
| D-180M-12 | | | | | | 72,80 | 3,01 | 0,630 | 8,50 | 16,27 | 56,53 | 0,00 | 35,617 | 2,43 | 18,11 | 28,28 | 34,460 | 2,42 | 4,6594 | E | |
| D-180M-13 | | | | | | 89,40 | 3,59 | 0,510 | 10,50 | 19,54 | 69,86 | 45,75 | 35,635 | 2,37 | 21,81 | 34,92 | 34,476 | 2,35 | 5,5469 | E | |
| D-180M-14 | 106,00 | 4,17 | 0,428 | 12,50 | 22,80 | 83,20 | 74,33 | 35,648 | 2,32 | 25,50 | 41,59 | 34,491 | 2,30 | 6,4344 | E | | | | | | |
| D-180M-20 | 13,80 | 15,00 | 0,35 | 12,00 | 15,88 | 17,00 | 0,80 | 3,573 | 2,25 | 5,91 | 11,09 | 0,00 | 39,619 | 3,51 | 6,40 | 5,60 | 37,869 | 3,50 | 1,6472 | E | |
| D-180M-21 | | | | | | 25,00 | 1,10 | 2,297 | 3,50 | 7,85 | 17,15 | 0,00 | 39,387 | 3,08 | 8,50 | 8,80 | 37,894 | 3,00 | 2,1317 | E | |
| D-180M-22 | | | | | | 40,00 | 1,40 | 1,461 | 5,50 | 10,97 | 29,03 | 0,00 | 42,427 | 2,82 | 12,00 | 13,20 | 40,921 | 2,80 | 2,9069 | E | |
| D-180M-23 | | | | | | 72,00 | 2,30 | 0,846 | 9,50 | 17,20 | 54,80 | 21,45 | 46,367 | 2,65 | 19,00 | 21,00 | 44,844 | 2,60 | 4,4572 | E | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|--------|--------|--------|--------|------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-180M-24 | 1,20 | 13,80 | 15,00 | 0,35 | 12,00 | 15,90 | 93,00 | 2,50 | 0,643 | 12,50 | 21,88 | 71,12 | 65,59 | 45,734 | 2,56 | 24,20 | 28,00 | 44,242 | 2,50 | 5,6199 | E | | | | | |
| D-180M-25 | | | | | | | 115,00 | 3,00 | 0,519 | 15,50 | 26,55 | 88,45 | 94,60 | 45,869 | 2,51 | 29,40 | 34,50 | 44,391 | 2,50 | 6,7827 | E | | | | | |
| D-180N | | | | | | | 11,80 | 13,00 | 0,35 | 10,00 | 13,80 | 22,80 | 0,75 | 3,673 | 3,50 | 7,63 | 15,17 | 0,00 | 55,730 | 3,58 | 8,15 | 5,36 | 53,817 | 3,55 | 1,8228 | E |
| D-1800 | | | | | | | | | | | | 34,40 | 1,03 | 2,338 | 5,50 | 10,62 | 23,78 | 0,00 | 55,596 | 3,24 | 11,43 | 8,43 | 53,696 | 3,21 | 2,4856 | E |
| D-1800-01 | | | | | | | | | | | | 41,00 | 1,31 | 1,714 | 7,50 | 13,61 | 27,39 | 0,00 | 46,962 | 2,95 | 14,72 | 13,38 | 45,052 | 2,92 | 3,1484 | E |
| D-180P | | | | | | | | | | | | 57,70 | 1,59 | 1,353 | 9,50 | 16,59 | 41,11 | 0,00 | 55,633 | 2,98 | 17,99 | 14,56 | 53,743 | 2,96 | 3,8112 | E |
| D-180P-01 | | | | | | | | | | | | 69,00 | 2,15 | 0,952 | 13,50 | 22,57 | 46,43 | 38,74 | 44,220 | 2,71 | 24,56 | 25,15 | 42,324 | 2,68 | 5,1368 | F |
| D-180P-02 | | | | | | | | | | | | 82,00 | 2,56 | 0,779 | 16,50 | 27,05 | 54,95 | 59,58 | 42,817 | 2,64 | 29,48 | 31,40 | 40,925 | 2,61 | 6,1311 | F |
| D-180Q | | | | | | | | | | | | 92,70 | 2,42 | 0,829 | 15,50 | 25,56 | 67,14 | 73,83 | 55,694 | 2,85 | 27,84 | 23,73 | 53,801 | 2,82 | 5,7997 | G |
| D-180Q-01 | | | | | | | | | | | | 9,80 | 11,00 | 0,30 | 8,00 | 11,80 | 19,20 | 0,52 | 6,413 | 3,50 | 7,44 | 11,76 | 0,00 | 75,413 | 4,49 | 9,65 |
| D-180Q-02 | 30,20 | 0,72 | 4,081 | 5,50 | 11,75 | 18,45 | 0,00 | 75,292 | 4,17 | 14,85 | 5,69 | | | | | | 62,641 | 4,02 | 2,0643 | F | | | | | | |
| D-180Q-03 | 46,70 | 1,02 | 2,641 | 8,50 | 18,10 | 28,60 | 0,00 | 75,520 | 3,96 | 22,85 | 8,75 | | | | | | 62,977 | 3,65 | 2,8900 | F | | | | | | |
| D-180Q-04 | 68,70 | 1,41 | 1,796 | 12,50 | 26,70 | 42,00 | 50,30 | 75,414 | 3,83 | 33,35 | 12,76 | | | | | | 63,474 | 3,24 | 3,9910 | F | | | | | | |
| D-180Q-05 | 101,00 | 1,99 | 1,213 | 18,50 | 38,80 | 62,20 | 89,77 | 75,463 | 3,73 | 48,45 | 18,80 | | | | | | 63,755 | 3,01 | 5,6424 | G | | | | | | |
| D-180R | 7,30 | 8,50 | 0,25 | 5,60 | 9,10 | 12,40 | 0,36 | 15,515 | 3,50 | 7,25 | 5,15 | 0,00 | 79,854 | 6,76 | 7,58 | 2,02 | 74,783 | 6,68 | 1,1276 | E | | | | | | |
| D-180S | | | | | | 18,10 | 0,49 | 9,873 | 5,50 | 10,03 | 8,07 | 0,00 | 79,713 | 6,08 | 10,55 | 3,18 | 74,543 | 6,00 | 1,5377 | E | | | | | | |
| D-180T | | | | | | 29,40 | 0,76 | 5,716 | 9,50 | 15,57 | 13,83 | 0,00 | 79,038 | 5,55 | 16,46 | 5,49 | 73,966 | 5,48 | 2,3578 | E | | | | | | |
| D-180U | | | | | | 46,50 | 1,17 | 3,503 | 15,50 | 23,89 | 22,61 | 30,57 | 79,204 | 5,27 | 25,34 | 9,01 | 74,132 | 5,19 | 3,5879 | F | | | | | | |
| D-180U-10 | | | | | | 6,80 | 8,00 | 0,25 | 5,10 | 8,70 | 25,00 | 0,62 | 8,398 | 8,00 | 13,42 | 11,58 | 0,00 | 97,229 | 6,73 | 14,95 | 3,70 | 84,400 | 6,64 | 1,9098 | G | |
| D-180V | 4,80 | 6,00 | 0,25 | 3,10 | 6,50 | 9,00 | 0,25 | 54,576 | 3,50 | 7,12 | 1,88 | 0,00 | 102,559 | 15,14 | 7,38 | 0,87 | 88,413 | 14,92 | 0,7415 | E | | | | | | |
| D-180W | | | | | | 12,90 | 0,34 | 34,730 | 5,50 | 9,82 | 3,08 | 0,00 | 107,024 | 13,55 | 10,23 | 1,31 | 92,729 | 13,33 | 1,0111 | E | | | | | | |
| D-180X | | | | | | 20,50 | 0,53 | 20,107 | 9,50 | 15,21 | 5,29 | 0,00 | 106,293 | 12,27 | 15,92 | 2,28 | 92,090 | 12,05 | 1,5503 | E | | | | | | |
| D-180Y | | | | | | 32,00 | 0,81 | 12,324 | 15,50 | 23,31 | 8,69 | 22,28 | 107,136 | 11,58 | 24,47 | 3,70 | 92,797 | 11,37 | 2,3592 | E | | | | | | |
| D-180Y-08 | 1,25 | 17,75 | 19,00 | 0,50 | 15,80 | 20,10 | 20,00 | 1,40 | 1,977 | 2,25 | 6,44 | 13,56 | 0,00 | 26,803 | 3,33 | 7,10 | 10,50 | 25,499 | 3,50 | 2,2989 | E | | | | | |
| D-180Y-01 | | | | | | | 32,00 | 1,96 | 1,271 | 3,50 | 8,64 | 23,36 | 0,00 | 29,689 | 2,94 | 9,52 | 15,60 | 28,565 | 2,92 | 2,9751 | E | | | | | |
| D-180Y-02 | | | | | | | 49,00 | 2,71 | 0,809 | 5,50 | 12,14 | 36,86 | 0,00 | 29,805 | 2,64 | 13,54 | 24,47 | 28,674 | 2,62 | 4,0570 | E | | | | | |
| D-180Y-03 | | | | | | | 75,00 | 3,82 | 0,523 | 8,50 | 17,40 | 57,60 | 0,00 | 30,138 | 2,45 | 19,55 | 37,59 | 29,013 | 2,43 | 5,6797 | F | | | | | |
| D-180Y-04 | | | | | | | 116,00 | 5,65 | 0,329 | 13,50 | 26,17 | 89,83 | 78,90 | 29,595 | 2,31 | 29,56 | 60,34 | 28,477 | 2,29 | 8,3844 | F | | | | | |
| D-181 | 16,00 | 17,25 | 0,35 | 14,20 | 18,50 | 40,50 | 1,48 | 1,735 | 3,50 | 10,70 | 29,80 | 0,00 | 51,701 | 3,40 | 14,20 | 9,44 | 45,628 | 3,38 | 2,6818 | E | | | | | | |
| D-182 | | | | | | 62,00 | 2,04 | 1,104 | 5,50 | 14,95 | 47,05 | 0,00 | 51,945 | 3,08 | 20,90 | 14,93 | 45,376 | 3,06 | 3,6570 | E | | | | | | |
| D-183 | | | | | | 94,00 | 2,87 | 0,714 | 8,50 | 21,35 | 72,65 | 53,38 | 51,900 | 2,88 | 29,90 | 22,86 | 45,792 | 2,86 | 5,1198 | F | | | | | | |
| D-184 | | | | | | 140,00 | 3,97 | 0,486 | 12,50 | 33,20 | 106,80 | 117,70 | 51,881 | 2,70 | 45,50 | 33,49 | 45,906 | 2,76 | 7,0701 | F | | | | | | |
| D-184A | | | | | | 140,00 | 5,63 | 0,328 | 18,50 | 33,62 | 106,38 | 117,70 | 34,917 | 2,37 | 37,63 | 63,83 | 33,601 | 2,35 | 9,9957 | G | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------|---------------------------|-------------|--------|--------|--------|------|
| | | | | | | | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-180M-24 | 1,20 | 13,80 | 15,00 | 0,35 | 12,00 | 15,90 | 93,00 | 3,30 | 0,552 | 12,50 | 21,90 | 71,10 | 64,50 | 39,269 | 2,50 | 24,20 | 24,00 | 37,999 | 2,50 | 5,6199 | H | | | | | |
| VD-180M-25 | | | | | | | 115,00 | 4,00 | 0,445 | 15,50 | 26,60 | 88,40 | 94,00 | 39,375 | 2,40 | 29,50 | 29,60 | 38,083 | 2,40 | 29,50 | 29,60 | 38,083 | 2,40 | 6,7827 | H | |
| VD-180N | | | | | | | 11,80 | 13,00 | 0,35 | 10,00 | 13,80 | 22,80 | 0,87 | 3,155 | 3,50 | 7,63 | 15,17 | 0,00 | 47,866 | 3,46 | 8,15 | 4,74 | 46,223 | 3,50 | 1,8228 | H |
| VD-1800 | | | | | | | | | | | | 34,40 | 1,20 | 2,008 | 5,50 | 10,62 | 23,78 | 0,00 | 47,751 | 3,12 | 11,43 | 7,48 | 46,120 | 3,10 | 2,4856 | H |
| VD-1800-01 | | | | | | | | | | | | 41,00 | 1,52 | 1,472 | 7,50 | 13,61 | 27,39 | 0,00 | 40,336 | 2,85 | 14,72 | 12,10 | 38,695 | 2,83 | 3,1484 | H |
| VD-180P | | | | | | | | | | | | 57,70 | 1,85 | 1,162 | 9,50 | 16,59 | 41,11 | 0,00 | 47,783 | 2,87 | 17,99 | 12,91 | 46,160 | 2,84 | 3,8112 | H |
| VD-180P-01 | | | | | | | | | | | | 69,00 | 2,50 | 0,818 | 13,50 | 22,57 | 46,43 | 37,24 | 37,980 | 2,61 | 24,56 | 21,79 | 36,352 | 2,59 | 5,1368 | H |
| VD-180P-02 | | | | | | | | | | | | 82,00 | 2,98 | 0,669 | 16,50 | 27,05 | 54,95 | 58,86 | 36,775 | 2,55 | 29,48 | 26,63 | 35,150 | 2,52 | 6,1311 | H |
| VD-180Q | | | | | | | | | | | | 92,70 | 2,82 | 0,712 | 15,50 | 25,56 | 67,14 | 73,30 | 47,836 | 2,73 | 27,84 | 21,03 | 46,210 | 2,70 | 5,7997 | H |
| VD-180Q-01 | | | | | | | | | | | | 9,80 | 11,00 | 0,30 | 8,00 | 11,80 | 19,20 | 0,61 | 5,508 | 3,50 | 7,44 | 11,76 | 0,00 | 64,772 | 4,33 | 9,25 |
| VD-180Q-02 | 30,20 | 0,84 | 3,505 | 5,50 | 11,72 | 18,48 | 0,00 | 64,773 | 3,99 | 14,55 | 4,44 | | | | | | 54,854 | 3,96 | 2,0643 | J | | | | | | |
| VD-180Q-03 | 46,70 | 1,18 | 2,268 | 8,50 | 18,30 | 28,40 | 0,00 | 64,410 | 3,78 | 22,55 | 6,81 | | | | | | 54,771 | 3,70 | 2,8900 | K | | | | | | |
| VD-180Q-04 | 68,70 | 1,64 | 1,542 | 12,50 | 26,75 | 41,95 | 49,74 | 64,696 | 3,65 | 33,15 | 10,04 | | | | | | 54,826 | 3,60 | 3,9910 | K | | | | | | |
| VD-180Q-05 | 101,00 | 2,32 | 1,042 | 18,50 | 38,90 | 62,10 | 89,50 | 64,710 | 3,54 | 48,35 | 14,83 | | | | | | 54,863 | 3,50 | 5,6424 | L | | | | | | |
| VD-180R | 7,30 | 8,50 | 0,25 | 5,60 | 9,10 | 12,40 | 0,42 | 13,326 | 3,50 | 7,25 | 5,15 | 0,00 | 68,586 | 6,59 | 7,58 | 1,86 | 64,231 | 6,53 | 1,1276 | H | | | | | | |
| VD-180S | | | | | | 18,10 | 0,58 | 8,480 | 5,50 | 10,03 | 8,07 | 0,00 | 68,465 | 5,91 | 10,55 | 2,94 | 64,025 | 5,85 | 1,5377 | H | | | | | | |
| VD-180T | | | | | | 29,40 | 0,89 | 4,910 | 9,50 | 15,57 | 13,83 | 0,00 | 67,885 | 5,38 | 16,46 | 5,12 | 63,529 | 5,32 | 2,3578 | H | | | | | | |
| VD-180U | | | | | | 46,50 | 1,36 | 3,009 | 15,50 | 23,89 | 22,61 | 29,97 | 68,028 | 5,10 | 25,34 | 8,34 | 63,672 | 5,04 | 3,5879 | H | | | | | | |
| VD-180U-10 | | | | | | 6,80 | 8,00 | 0,25 | 5,10 | 8,70 | 25,00 | 0,72 | 7,213 | 8,00 | 13,42 | 11,58 | 0,00 | 83,509 | 6,52 | 14,80 | 2,94 | 73,573 | 6,35 | 1,9098 | K | |
| VD-180V | 4,80 | 6,00 | 0,25 | 3,10 | 6,50 | 9,00 | 0,29 | 46,875 | 3,50 | 7,12 | 1,88 | 0,00 | 88,088 | 14,92 | 7,38 | 0,87 | 75,938 | 14,74 | 0,7415 | H | | | | | | |
| VD-180W | | | | | | 12,90 | 0,40 | 29,830 | 5,50 | 9,82 | 3,08 | 0,00 | 91,923 | 13,32 | 10,23 | 1,26 | 79,645 | 13,14 | 1,0111 | H | | | | | | |
| VD-180X | | | | | | 20,50 | 0,62 | 17,270 | 9,50 | 15,21 | 5,29 | 0,00 | 91,295 | 12,04 | 15,92 | 2,20 | 79,095 | 11,86 | 1,5503 | H | | | | | | |
| VD-180Y | | | | | | 32,00 | 0,94 | 10,585 | 15,50 | 23,31 | 8,69 | 21,95 | 92,019 | 11,36 | 24,47 | 3,55 | 79,703 | 11,17 | 2,3592 | H | | | | | | |
| VD-180Y-08 | 1,25 | 17,75 | 19,00 | 0,50 | 15,80 | 20,10 | 20,00 | 1,50 | 1,698 | 2,25 | 6,45 | 13,55 | 0,00 | 23,004 | 3,30 | 7,10 | 11,25 | 21,901 | 3,30 | 2,2989 | H | | | | | |
| VD-180Y-01 | | | | | | | 32,00 | 2,29 | 1,091 | 3,50 | 8,64 | 23,36 | 0,00 | 25,500 | 2,88 | 9,52 | 12,44 | 24,535 | 2,86 | 2,9751 | H | | | | | |
| VD-180Y-02 | | | | | | | 49,00 | 3,16 | 0,695 | 5,50 | 12,14 | 36,86 | 0,00 | 25,599 | 2,58 | 13,54 | 19,55 | 24,628 | 2,56 | 4,0570 | H | | | | | |
| VD-180Y-03 | | | | | | | 75,00 | 4,44 | 0,449 | 8,50 | 17,40 | 57,60 | 0,00 | 25,885 | 2,39 | 19,55 | 30,22 | 24,919 | 2,37 | 5,6797 | J | | | | | |
| VD-180Y-04 | | | | | | | | 116,00 | 6,58 | 0,283 | 13,50 | 26,17 | 89,83 | 77,57 | 25,419 | 2,24 | 29,56 | 48,00 | 24,459 | 2,23 | 8,3844 | J | | | | |
| VD-181 | 16,00 | 17,25 | 0,35 | 14,20 | 18,50 | 40,50 | 1,72 | 1,490 | 3,50 | 10,50 | 30,00 | 0,00 | 44,703 | 3,10 | 13,55 | 7,05 | 40,159 | 3,15 | 2,6818 | H | | | | | | |
| VD-182 | | | | | | 62,00 | 2,37 | 0,948 | 5,50 | 14,75 | 47,25 | 0,00 | 44,805 | 3,00 | 19,65 | 11,08 | 40,159 | 2,84 | 3,6570 | H | | | | | | |
| VD-183 | | | | | | 94,00 | 3,34 | 0,614 | 8,50 | 21,30 | 72,70 | 51,40 | 44,607 | 2,70 | 28,50 | 17,07 | 40,189 | 2,64 | 5,1198 | J | | | | | | |
| VD-184 | | | | | | 140,00 | 4,63 | 0,417 | 12,50 | 32,70 | 107,30 | 117,13 | 44,769 | 2,66 | 43,65 | 25,66 | 40,200 | 2,52 | 7,0701 | J | | | | | | |
| VD-184A | | | | | | 140,00 | 6,55 | 0,282 | 18,50 | 33,62 | 106,38 | 117,13 | 29,990 | 2,30 | 37,63 | 53,42 | 28,860 | 2,28 | 9,9957 | K | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|--------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-185 | 1,25 | 16,00 | 17,25 | 0,35 | 14,20 | 18,50 | 205,00 | 6,55 | 0,282 | 18,50 | 46,10 | 158,90 | 190,31 | 44,796 | 2,57 | 62,40 | 37,14 | 40,201 | 2,44 | 9,9957 | K | | | | | |
| VD-185A | | | | | | | 205,00 | 7,83 | 0,232 | 22,50 | 40,35 | 164,65 | 190,31 | 38,165 | 2,39 | 45,21 | 57,05 | 37,039 | 2,37 | 11,9461 | L | | | | | |
| VD-185B | | | | | | | 13,75 | 15,00 | 0,35 | 11,90 | 15,90 | 16,00 | 0,80 | 3,652 | 2,25 | 6,10 | 9,90 | 0,00 | 36,157 | 3,90 | 6,70 | 3,60 | 33,966 | 4,10 | 1,6190 | H |
| VD-185C | | | | | | | | | | | | 23,50 | 1,00 | 2,348 | 3,50 | 8,10 | 15,40 | 0,00 | 36,157 | 3,20 | 8,75 | 8,50 | 34,631 | 3,60 | 2,0951 | H |
| VD-185D | | | | | | | | | | | | 36,00 | 1,30 | 1,494 | 5,50 | 11,30 | 24,70 | 0,00 | 36,904 | 2,90 | 12,35 | 13,00 | 35,335 | 3,30 | 2,8570 | J |
| VD-185E | | | | | | | | | | | | 55,00 | 2,10 | 0,967 | 8,50 | 16,10 | 38,90 | 0,00 | 37,607 | 2,70 | 17,62 | 19,60 | 36,138 | 3,10 | 3,9998 | J |
| VD-185G | | | | | | | | | | | | 80,00 | 2,90 | 0,657 | 12,50 | 22,50 | 57,50 | 51,90 | 37,801 | 2,60 | 24,85 | 28,70 | 36,256 | 2,95 | 5,5235 | K |
| VD-185H | | | | | | | | | | | | 112,00 | 3,60 | 0,444 | 18,50 | 32,10 | 79,90 | 94,60 | 35,491 | 2,40 | 35,40 | 45,90 | 34,025 | 2,80 | 7,8092 | K |
| VD-185J | | | | | | | | | | | | 125,00 | 3,80 | 0,401 | 20,50 | 35,30 | 89,70 | 109,80 | 35,957 | 2,40 | 39,00 | 39,00 | 34,473 | 2,80 | 8,5710 | K |
| VD-185K | 12,50 | 13,75 | 0,35 | 10,70 | 14,60 | 16,00 | | | | | | 0,70 | 4,861 | 2,25 | 6,10 | 9,90 | 0,00 | 48,125 | 4,10 | 6,50 | 3,30 | 46,181 | 4,10 | 1,6190 | H | |
| VD-186 | | | | | | 27,00 | 0,93 | 3,125 | 3,50 | 8,70 | 18,30 | 0,00 | 57,188 | 3,79 | 11,00 | 4,19 | 50,000 | 3,63 | 2,0951 | H | | | | | | |
| VD-187 | | | | | | 41,50 | 1,28 | 1,989 | 5,50 | 12,80 | 28,70 | 0,00 | 57,074 | 3,45 | 16,35 | 6,60 | 50,014 | 3,28 | 2,8570 | H | | | | | | |
| VD-188 | | | | | | 62,50 | 1,80 | 1,287 | 8,50 | 17,95 | 44,55 | 0,00 | 57,325 | 3,22 | 23,65 | 10,14 | 49,991 | 3,05 | 3,9998 | J | | | | | | |
| VD-189 | | | | | | 90,50 | 2,49 | 0,875 | 12,50 | 25,05 | 65,45 | 67,45 | 57,269 | 3,08 | 33,35 | 14,90 | 50,006 | 2,92 | 5,5235 | J | | | | | | |
| VD-189A | | | | | | 90,50 | 3,53 | 0,591 | 18,50 | 31,41 | 59,09 | 67,45 | 34,937 | 2,61 | 34,29 | 32,28 | 33,232 | 2,59 | 7,8092 | K | | | | | | |
| VD-190 | | | | | | 130,00 | 3,53 | 0,591 | 18,50 | 32,90 | 97,10 | 115,49 | 57,407 | 2,96 | 45,35 | 22,09 | 50,046 | 2,82 | 7,8092 | K | | | | | | |
| VD-190A | | | | | | 130,00 | 4,22 | 0,486 | 22,50 | 37,66 | 92,34 | 115,49 | 44,889 | 2,73 | 41,18 | 37,14 | 43,176 | 2,70 | 9,3329 | K | | | | | | |
| VD-190B | | | | | | 11,75 | 13,00 | 0,35 | 10,00 | 13,70 | 18,00 | 0,81 | 3,762 | 3,50 | 7,89 | 10,11 | 0,00 | 38,029 | 3,63 | 8,41 | 5,36 | 36,082 | 3,60 | 1,9694 | H | |
| VD-190C | | | | | | | | | | | 27,00 | 1,12 | 2,394 | 5,50 | 10,97 | 16,03 | 0,00 | 38,371 | 3,26 | 11,78 | 8,42 | 36,441 | 3,23 | 2,6856 | H | |
| VD-190D | 40,00 | 1,58 | 1,549 | 8,50 | 15,60 | | | | | | 24,40 | 0,00 | 37,808 | 3,01 | 16,83 | 13,02 | 35,896 | 2,98 | 3,7598 | H | | | | | | |
| VD-190E | 63,00 | 2,34 | 0,975 | 13,50 | 23,30 | | | | | | 39,70 | 20,83 | 38,726 | 2,86 | 25,26 | 20,68 | 36,813 | 2,83 | 5,5502 | J | | | | | | |
| VD-190G | 10,00 | 11,25 | 0,25 | 8,30 | 11,90 | 12,00 | 0,50 | 9,494 | 2,25 | 5,90 | 6,10 | 0,00 | 57,916 | 5,20 | 6,20 | 2,10 | 55,067 | 5,20 | 1,2952 | H | | | | | | |
| VD-191 | | | | | | 20,00 | 0,61 | 6,104 | 3,50 | 8,30 | 11,70 | 0,00 | 71,411 | 4,83 | 10,10 | 2,61 | 60,425 | 4,59 | 1,6761 | H | | | | | | |
| VD-192 | | | | | | 29,50 | 0,84 | 3,884 | 5,50 | 11,15 | 18,35 | 0,00 | 71,272 | 4,35 | 13,95 | 4,11 | 60,397 | 4,14 | 2,2856 | H | | | | | | |
| VD-193 | | | | | | 44,50 | 1,18 | 2,513 | 8,50 | 15,99 | 28,51 | 0,00 | 71,652 | 4,07 | 20,45 | 6,31 | 60,443 | 3,85 | 3,1998 | H | | | | | | |
| VD-194 | | | | | | 64,00 | 1,63 | 1,709 | 12,50 | 22,18 | 41,82 | 41,55 | 71,470 | 3,89 | 28,60 | 9,26 | 60,498 | 3,68 | 4,4188 | J | | | | | | |
| VD-194A | | | | | | 64,00 | 2,31 | 1,155 | 18,50 | 30,16 | 33,84 | 41,55 | 39,079 | 3,25 | 32,43 | 20,34 | 36,454 | 3,22 | 6,2473 | K | | | | | | |
| VD-195 | | | | | | 93,50 | 2,31 | 1,155 | 18,50 | 31,60 | 61,90 | 80,33 | 71,477 | 3,77 | 41,10 | 13,70 | 60,507 | 3,56 | 6,2473 | K | | | | | | |
| VD-195A | | | | | | 93,50 | 2,76 | 0,949 | 22,50 | 36,14 | 57,36 | 80,33 | 54,462 | 3,44 | 38,90 | 23,26 | 51,839 | 3,40 | 7,4663 | K | | | | | | |
| VD-195A-15 | | | | | | 9,75 | 11,00 | 0,25 | 8,00 | 11,70 | 20,00 | 0,60 | 5,122 | 4,50 | 9,20 | 10,80 | 0,00 | 55,315 | 4,40 | 9,80 | 4,50 | 52,242 | 4,40 | 1,9313 | K | |
| VD-195A-10 | 40,00 | 1,13 | 2,712 | 8,50 | 15,16 | | | | | | 24,84 | 0,00 | 67,362 | 4,08 | 17,20 | 5,99 | 61,823 | 4,04 | 3,1199 | K | | | | | | |
| VD-195A-11 | 46,00 | 1,57 | 1,844 | 12,50 | 21,11 | | | | | | 24,89 | 0,00 | 45,887 | 3,58 | 22,62 | 12,99 | 43,109 | 3,54 | 4,3084 | K | | | | | | |
| VD-195A-12 | 70,00 | 1,70 | 1,487 | 15,50 | 25,60 | | | | | | 44,40 | 51,80 | 66,022 | 3,80 | 28,70 | 11,30 | 61,412 | 3,80 | 5,1998 | K | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-185 | 1,25 | 16,00 | 17,25 | 0,35 | 14,20 | 18,50 | 205,00 | 5,63 | 0,328 | 18,50 | 46,50 | 158,50 | 180,60 | 52,024 | 2,69 | 65,50 | 49,76 | 45,788 | 2,67 | 9,9957 | G |
| D-185A | | | | | | | 205,00 | 6,73 | 0,270 | 22,50 | 40,35 | 164,65 | 190,60 | 44,435 | 2,48 | 45,21 | 64,19 | 43,124 | 2,46 | 11,9461 | H |
| D-185B | | 13,75 | 15,00 | 0,35 | 11,90 | 15,90 | 16,00 | 0,70 | 4,252 | 2,25 | 6,10 | 9,90 | 0,00 | 42,097 | 3,80 | 6,50 | 3,70 | 40,396 | 3,80 | 1,6190 | E |
| D-185C | | | | | | | 23,50 | 0,90 | 2,734 | 3,50 | 8,10 | 15,40 | 0,00 | 42,097 | 3,30 | 8,80 | 5,70 | 40,184 | 3,30 | 2,0951 | E |
| D-185D | | | | | | | 36,00 | 1,30 | 1,740 | 5,50 | 11,35 | 24,60 | 0,00 | 42,880 | 3,00 | 12,30 | 8,90 | 41,227 | 3,00 | 2,8570 | E |
| D-185E | | | | | | | 55,00 | 1,80 | 1,126 | 8,50 | 16,20 | 38,80 | 0,00 | 43,673 | 2,90 | 17,70 | 13,50 | 41,985 | 2,80 | 3,9998 | E |
| D-185G | | | | | | | 80,00 | 2,50 | 0,765 | 12,50 | 22,60 | 57,40 | 44,50 | 43,934 | 2,70 | 27,80 | 19,70 | 39,954 | 2,60 | 5,5235 | F |
| D-185H | | | | | | | 112,00 | 3,20 | 0,517 | 18,50 | 32,20 | 79,80 | 91,10 | 41,270 | 2,50 | 35,40 | 31,30 | 39,615 | 2,50 | 7,8092 | F |
| D-185J | | | | | | | 125,00 | 3,80 | 0,467 | 20,50 | 35,40 | 89,60 | 106,70 | 41,817 | 2,50 | 39,00 | 34,20 | 40,137 | 2,50 | 8,5710 | G |
| D-185K | 12,50 | 13,75 | 0,35 | 10,70 | 14,60 | 16,00 | 0,60 | 5,660 | 2,25 | 6,10 | 9,90 | 0,00 | 56,031 | 4,20 | 6,40 | 3,50 | 54,333 | 4,20 | 1,6190 | E | |
| D-186 | | | | | | 27,00 | 0,80 | 3,638 | 3,50 | 8,80 | 18,20 | 0,00 | 66,219 | 3,94 | 11,45 | 5,63 | 56,577 | 3,91 | 2,0951 | E | |
| D-187 | | | | | | 41,50 | 1,10 | 2,315 | 5,50 | 12,90 | 28,60 | 0,00 | 66,219 | 3,60 | 17,20 | 8,89 | 56,263 | 3,57 | 2,8570 | E | |
| D-188 | | | | | | 62,50 | 1,55 | 1,498 | 8,50 | 18,20 | 44,30 | 0,00 | 66,369 | 3,37 | 24,60 | 13,61 | 56,780 | 3,34 | 3,9998 | F | |
| D-189 | | | | | | 90,50 | 2,14 | 1,019 | 12,50 | 25,50 | 65,00 | 68,13 | 66,219 | 3,23 | 34,60 | 19,95 | 56,948 | 3,20 | 5,5235 | F | |
| D-189A | | | | | | 90,50 | 3,03 | 0,688 | 18,50 | 31,41 | 59,09 | 68,13 | 40,677 | 2,70 | 34,29 | 39,60 | 38,692 | 2,67 | 7,8092 | G | |
| D-190 | | | | | | 130,00 | 3,03 | 0,688 | 18,50 | 33,50 | 96,50 | 115,80 | 66,425 | 3,11 | 46,90 | 29,40 | 57,201 | 3,08 | 7,8092 | F | |
| D-190A | | | | | | 130,00 | 3,63 | 0,566 | 22,50 | 37,66 | 92,34 | 115,80 | 52,264 | 2,84 | 41,18 | 40,39 | 50,270 | 2,81 | 9,3329 | G | |
| D-190B | 11,75 | 13,00 | 0,35 | 10,00 | 13,70 | 18,00 | 0,70 | 4,381 | 3,50 | 7,89 | 10,11 | 0,00 | 44,277 | 3,72 | 8,41 | 6,46 | 42,009 | 3,61 | 1,9694 | E | |
| D-190C | | | | | | 27,00 | 0,96 | 2,788 | 5,50 | 10,97 | 16,03 | 0,00 | 44,675 | 3,35 | 11,78 | 10,10 | 42,427 | 3,32 | 2,6856 | E | |
| D-190D | | | | | | 40,00 | 1,36 | 1,804 | 8,50 | 15,60 | 24,40 | 0,00 | 44,019 | 3,11 | 16,83 | 15,74 | 41,793 | 3,07 | 3,7598 | E | |
| D-190E | | | | | | 63,00 | 2,04 | 1,136 | 13,50 | 23,30 | 39,70 | 24,99 | 45,088 | 2,96 | 25,26 | 24,63 | 42,861 | 2,92 | 5,5502 | F | |
| D-190G | 10,00 | 11,25 | 0,25 | 8,30 | 11,90 | 12,00 | 0,39 | 11,054 | 2,25 | 5,86 | 6,14 | 0,00 | 67,872 | 5,37 | 6,20 | 2,30 | 64,114 | 5,30 | 1,2952 | E | |
| D-191 | | | | | | 20,00 | 0,52 | 7,106 | 3,50 | 8,35 | 11,65 | 0,00 | 82,788 | 5,01 | 10,40 | 3,50 | 68,220 | 4,96 | 1,6761 | E | |
| D-192 | | | | | | 29,50 | 0,72 | 4,522 | 5,50 | 11,20 | 18,30 | 0,00 | 82,755 | 4,53 | 14,30 | 5,46 | 68,737 | 4,48 | 2,2856 | E | |
| D-193 | | | | | | 44,50 | 1,01 | 2,926 | 8,50 | 16,20 | 28,30 | 0,00 | 82,809 | 4,25 | 21,00 | 8,43 | 68,763 | 4,20 | 3,1998 | E | |
| D-194 | | | | | | 64,00 | 1,40 | 1,990 | 12,50 | 22,40 | 41,60 | 42,36 | 82,773 | 4,07 | 29,90 | 12,57 | 67,850 | 4,02 | 4,4188 | F | |
| D-194A | | | | | | 64,00 | 1,98 | 1,344 | 18,50 | 30,16 | 33,84 | 42,36 | 45,499 | 3,35 | 32,43 | 25,77 | 42,443 | 3,31 | 6,2473 | G | |
| D-195 | | | | | | 93,50 | 1,98 | 1,344 | 18,50 | 31,90 | 61,60 | 80,65 | 82,816 | 3,95 | 42,50 | 18,41 | 68,566 | 3,90 | 6,2473 | F | |
| D-195A | | | | | | 93,50 | 2,37 | 1,105 | 22,50 | 36,14 | 57,36 | 80,65 | 63,409 | 3,57 | 38,90 | 25,20 | 60,356 | 3,53 | 7,4663 | G | |
| D-195A-15 | 9,75 | 11,00 | 0,25 | 8,00 | 11,70 | 20,00 | 0,60 | 5,963 | 4,50 | 9,20 | 10,80 | 0,00 | 64,403 | 4,53 | 18,30 | 1,70 | 10,137 | 3,71 | 1,9313 | G | |
| D-195A-10 | | | | | | 40,00 | 0,97 | 3,157 | 8,50 | 15,16 | 24,84 | 0,00 | 78,429 | 4,25 | 18,30 | 8,19 | 68,507 | 4,20 | 3,1199 | G | |
| D-195A-11 | | | | | | 46,00 | 1,35 | 2,147 | 12,50 | 21,11 | 24,89 | 0,00 | 53,426 | 3,70 | 22,62 | 15,27 | 50,191 | 3,65 | 4,3084 | G | |
| D-195A-12 | | | | | | 70,00 | 1,60 | 1,731 | 15,50 | 25,58 | 44,42 | 52,38 | 76,903 | 3,97 | 27,50 | 13,70 | 73,579 | 3,92 | 5,1998 | G | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-195A-13 | 1,25 | 8,25 | 9,50 | 0,25 | 6,50 | 10,10 | 17,50 | 0,50 | 9,843 | 4,50 | 9,06 | 8,44 | 0,00 | 83,076 | 5,97 | 9,60 | 3,00 | 77,761 | 5,89 | 1,6342 | H |
| D-195A-20 | | | | | | | 34,00 | 0,78 | 5,211 | 8,50 | 14,88 | 19,12 | 0,00 | 99,627 | 5,57 | 18,70 | 5,60 | 79,729 | 5,50 | 2,6399 | H |
| D-195A-21 | | | | | | | 41,00 | 0,93 | 4,218 | 10,50 | 17,80 | 23,20 | 0,00 | 97,890 | 5,40 | 21,90 | 6,84 | 80,573 | 5,33 | 3,1427 | H |
| D-195B | | 8,00 | 9,25 | 0,25 | 6,30 | 9,80 | 12,00 | 0,39 | 13,879 | 3,50 | 7,58 | 4,42 | 0,00 | 61,329 | 6,32 | 7,95 | 2,85 | 56,211 | 6,24 | 1,3409 | E |
| D-196 | | | | | | | 15,00 | 0,39 | 13,879 | 3,50 | 7,58 | 7,42 | 0,00 | 102,967 | 6,94 | 9,15 | 2,17 | 81,194 | 6,87 | 1,3409 | E |
| D-196A | | | | | | | 17,00 | 0,54 | 8,832 | 5,50 | 10,48 | 6,52 | 0,00 | 57,543 | 5,61 | 11,05 | 4,64 | 52,552 | 5,53 | 1,8285 | E |
| D-197 | | | | | | | 22,00 | 0,54 | 8,832 | 5,50 | 10,48 | 11,52 | 0,00 | 101,705 | 6,27 | 12,70 | 3,37 | 82,141 | 6,19 | 1,8285 | E |
| D-197A | | | | | | | 25,00 | 0,76 | 5,715 | 8,50 | 14,84 | 10,16 | 0,00 | 58,063 | 5,19 | 15,71 | 7,13 | 53,093 | 5,12 | 2,5599 | E |
| D-198 | | | | | | | 33,00 | 0,76 | 5,715 | 8,50 | 14,95 | 18,05 | 0,00 | 103,156 | 5,88 | 18,65 | 5,21 | 82,011 | 5,80 | 2,5599 | E |
| D-198A | | | | | | | 39,00 | 1,12 | 3,598 | 13,50 | 22,10 | 16,90 | 0,00 | 60,815 | 4,94 | 23,46 | 11,03 | 55,918 | 4,87 | 3,7789 | E |
| D-199 | | | | | | | 47,50 | 1,05 | 3,886 | 12,50 | 20,95 | 26,55 | 27,63 | 103,179 | 5,63 | 26,40 | 7,67 | 81,999 | 5,56 | 3,5351 | E |
| D-199A | | | | | | | 47,50 | 1,48 | 2,626 | 18,50 | 29,36 | 18,14 | 27,63 | 47,637 | 4,61 | 31,23 | 16,25 | 42,722 | 4,53 | 4,9979 | F |
| D-199B | | | | | | | 58,00 | 1,34 | 2,944 | 16,50 | 26,45 | 31,55 | 43,71 | 92,873 | 5,33 | 29,90 | 10,03 | 82,729 | 5,26 | 4,5103 | F |
| D-200 | | | | | | | 69,00 | 1,48 | 2,626 | 18,50 | 29,75 | 39,25 | 57,65 | 103,064 | 5,45 | 37,50 | 11,24 | 82,714 | 5,38 | 4,9979 | F |
| D-200A | | | | | | | 69,00 | 1,77 | 2,159 | 22,50 | 35,17 | 33,83 | 57,65 | 73,049 | 4,92 | 37,44 | 16,23 | 68,138 | 4,85 | 5,9731 | G |
| D-200A-05 | | 7,25 | 8,50 | 0,25 | 5,50 | 9,20 | 22,00 | 0,50 | 10,041 | 6,50 | 14,72 | 7,28 | 0,00 | 73,099 | 6,64 | 12,50 | 2,90 | 95,390 | 7,00 | 1,8780 | E |
| D-200A-06 | | | | | | | 42,00 | 0,90 | 5,221 | 12,50 | 20,48 | 21,52 | 23,08 | 112,364 | 6,63 | 21,70 | 4,80 | 105,994 | 6,50 | 3,2037 | E |
| D-200A-10 | | | | | | | 57,50 | 1,34 | 3,528 | 18,50 | 29,10 | 28,40 | 46,05 | 100,178 | 6,23 | 32,10 | 9,01 | 89,610 | 6,14 | 4,5293 | E |
| D-200A-20 | | 6,80 | 8,05 | 0,25 | 5,10 | 8,50 | 10,00 | 0,33 | 22,600 | 3,50 | 7,51 | 2,49 | 0,00 | 56,349 | 8,34 | 7,83 | 2,17 | 49,043 | 8,23 | 1,1398 | E |
| D-200B | | | | | | | 30,00 | 0,83 | 6,878 | 11,50 | 18,95 | 11,05 | 0,00 | 76,001 | 6,85 | 19,99 | 6,25 | 68,852 | 6,75 | 2,7976 | E |
| D-200C | | | | | | | 36,00 | 0,95 | 5,859 | 13,50 | 21,81 | 14,19 | 12,95 | 83,134 | 6,84 | 23,04 | 6,87 | 75,937 | 6,73 | 3,2120 | E |
| D-200D | | | | | | | 42,00 | 1,14 | 4,794 | 16,50 | 26,10 | 15,90 | 26,34 | 76,210 | 6,61 | 27,60 | 8,95 | 69,033 | 6,50 | 3,8337 | E |
| D-200E | | | | | | | 57,00 | 1,51 | 3,516 | 22,50 | 34,69 | 22,31 | 47,00 | 78,447 | 6,49 | 36,72 | 11,96 | 71,296 | 6,38 | 5,0771 | F |
| D-201 | | 6,30 | 7,55 | 0,20 | 4,60 | 8,10 | 12,00 | 0,31 | 28,420 | 3,50 | 7,48 | 4,52 | 0,00 | 128,479 | 10,75 | 8,60 | 1,28 | 96,627 | 10,62 | 1,0560 | E |
| D-202 | | | | | | | 17,00 | 0,43 | 18,085 | 5,50 | 10,32 | 6,68 | 0,00 | 120,729 | 9,56 | 11,50 | 1,96 | 99,469 | 9,43 | 1,4399 | E |
| D-203 | | | | | | | 25,00 | 0,60 | 11,702 | 8,50 | 14,59 | 10,41 | 0,00 | 121,792 | 8,88 | 16,50 | 3,03 | 99,469 | 8,75 | 2,0159 | E |
| D-204 | | | | | | | 35,50 | 0,84 | 7,957 | 12,50 | 20,28 | 15,22 | 17,97 | 121,090 | 8,46 | 23,10 | 4,49 | 98,673 | 8,33 | 2,7839 | E |
| D-204A | | | | | | | 35,50 | 1,18 | 5,377 | 18,50 | 28,82 | 6,68 | 17,97 | 35,924 | 6,90 | 30,42 | 5,08 | 27,314 | 6,77 | 3,9358 | F |
| D-205 | | | | | | | 51,50 | 1,18 | 5,377 | 18,50 | 28,82 | 22,68 | 41,93 | 121,951 | 8,19 | 33,25 | 6,68 | 98,124 | 8,06 | 3,9358 | F |
| D-205A | | | | | | | 51,50 | 1,41 | 4,421 | 22,50 | 34,51 | 16,99 | 41,93 | 75,114 | 7,38 | 36,45 | 10,83 | 66,533 | 7,25 | 4,7038 | G |
| D-205A-10 | | 5,75 | 7,00 | 0,20 | 4,00 | 7,50 | 25,00 | 0,61 | 13,771 | 9,50 | 15,94 | 9,06 | 0,00 | 124,778 | 10,31 | 17,35 | 2,77 | 105,352 | 10,15 | 2,0151 | G |
| D-205A-11 | | | | | | | 30,00 | 0,72 | 11,376 | 11,50 | 18,77 | 11,23 | 8,94 | 127,771 | 10,11 | 20,70 | 3,34 | 105,801 | 9,95 | 2,3656 | G |
| D-205B | | 5,55 | 6,80 | 0,20 | 3,90 | 7,30 | 9,00 | 0,28 | 41,568 | 3,50 | 7,44 | 1,56 | 0,00 | 64,769 | 12,58 | 7,74 | 1,26 | 52,376 | 12,40 | 0,9302 | E |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | | | dynamic | | | | weight one spring in gram | price group | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------|---------------------------|-------------|-------|--------|---|
| | | | | | | | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-195A-13 | 1,25 | 8,25 | 9,50 | 0,25 | 6,50 | 10,10 | 17,50 | 0,60 | 8,454 | 4,50 | 9,10 | 8,40 | 0,00 | 71,015 | 5,80 | 9,70 | 2,70 | 65,943 | 5,80 | 1,6342 | K | | | | |
| VD-195A-20 | | | | | | | 34,00 | 0,91 | 4,476 | 8,50 | 14,88 | 19,12 | 0,00 | 85,569 | 5,36 | 18,20 | 4,16 | 70,717 | 5,00 | 2,6399 | L | | | | |
| VD-195A-21 | | | | | | | 41,00 | 1,09 | 3,623 | 10,50 | 17,80 | 23,20 | 0,00 | 84,077 | 5,20 | 21,45 | 5,14 | 70,834 | 4,85 | 3,1427 | L | | | | |
| VD-195B | | 8,00 | 9,25 | 0,25 | 6,30 | 9,80 | 12,00 | 0,45 | 11,921 | 3,50 | 7,58 | 4,42 | 0,00 | 52,675 | 6,19 | 7,95 | 2,42 | 48,280 | 6,12 | 1,3409 | H | | | | |
| VD-196 | | | | | | | 15,00 | 0,45 | 11,921 | 3,50 | 7,58 | 7,42 | 0,00 | 88,438 | 6,73 | 8,95 | 1,64 | 72,122 | 6,47 | 1,3409 | H | | | | |
| VD-196A | | | | | | | 17,00 | 0,63 | 7,586 | 5,50 | 10,48 | 6,52 | 0,00 | 49,424 | 5,48 | 11,05 | 3,80 | 45,137 | 5,42 | 1,8285 | H | | | | |
| VD-197 | | | | | | | 22,00 | 0,63 | 7,586 | 5,50 | 10,48 | 11,52 | 0,00 | 87,354 | 6,05 | 12,45 | 2,52 | 72,447 | 5,81 | 1,8285 | H | | | | |
| VD-197A | | | | | | | 25,00 | 0,88 | 4,909 | 8,50 | 14,84 | 10,16 | 0,00 | 49,870 | 5,07 | 15,71 | 5,87 | 45,601 | 5,01 | 2,5599 | H | | | | |
| VD-198 | | | | | | | 33,00 | 0,88 | 4,909 | 8,50 | 14,84 | 18,16 | 0,00 | 89,139 | 5,66 | 18,20 | 3,87 | 72,648 | 5,39 | 2,5599 | H | | | | |
| VD-198A | | | | | | | 39,00 | 1,30 | 3,091 | 13,50 | 22,10 | 16,90 | 0,00 | 52,233 | 4,81 | 23,46 | 9,33 | 48,028 | 4,75 | 3,7789 | H | | | | |
| VD-199 | | | | | | | 47,50 | 1,22 | 3,338 | 12,50 | 20,68 | 26,82 | 26,70 | 89,521 | 5,41 | 25,75 | 5,69 | 72,598 | 5,14 | 3,5351 | H | | | | |
| VD-199A | | | | | | | 47,50 | 1,73 | 2,255 | 18,50 | 29,36 | 18,14 | 26,70 | 40,915 | 4,51 | 31,23 | 12,79 | 36,694 | 4,44 | 4,9979 | J | | | | |
| VD-199B | 58,00 | | | | | | 1,56 | 2,529 | 16,50 | 26,45 | 31,55 | 43,28 | 79,768 | 5,13 | 29,30 | 7,63 | 72,573 | 5,01 | 4,5103 | J | | | | | |
| VD-200 | 69,00 | | | | | | 1,73 | 2,255 | 18,50 | 29,36 | 39,64 | 57,36 | 89,404 | 5,23 | 36,80 | 8,44 | 72,621 | 4,96 | 4,9979 | J | | | | | |
| VD-200A | 69,00 | | | | | | 2,06 | 1,854 | 22,50 | 35,17 | 33,83 | 57,36 | 62,742 | 4,77 | 37,44 | 15,55 | 58,524 | 4,70 | 5,9731 | K | | | | | |
| VD-200A-05 | 7,25 | 8,50 | 0,25 | 5,50 | 9,20 | 22,00 | 0,60 | 8,624 | 6,50 | 11,90 | 10,10 | 0,00 | 87,105 | 6,80 | 12,90 | 2,50 | 78,481 | 6,75 | 1,8780 | H | | | | | |
| VD-200A-06 | | | | | | 42,00 | 1,00 | 4,485 | 12,50 | 20,50 | 21,50 | 22,00 | 96,419 | 6,30 | 24,50 | 4,70 | 78,481 | 6,20 | 3,2037 | H | | | | | |
| VD-200A-10 | | | | | | 57,50 | 1,56 | 3,030 | 18,50 | 29,10 | 28,40 | 45,73 | 86,043 | 6,02 | 31,60 | 7,03 | 78,481 | 5,94 | 4,5293 | H | | | | | |
| VD-200A-20 | 6,80 | 8,05 | 0,25 | 5,10 | 8,50 | 10,00 | 0,39 | 19,411 | 3,50 | 7,51 | 2,49 | 0,00 | 48,398 | 8,22 | 7,83 | 1,72 | 42,122 | 8,13 | 1,1398 | H | | | | | |
| VD-200B | | | | | | 30,00 | 0,97 | 5,908 | 11,50 | 18,95 | 11,05 | 0,00 | 65,277 | 6,69 | 19,99 | 5,65 | 59,137 | 6,60 | 2,7976 | H | | | | | |
| VD-200C | | | | | | 36,00 | 1,11 | 5,033 | 13,50 | 21,81 | 14,19 | 8,00 | 71,404 | 6,66 | 23,04 | 6,63 | 65,222 | 6,57 | 3,2120 | H | | | | | |
| VD-200D | | | | | | 42,00 | 1,33 | 4,118 | 16,50 | 26,10 | 15,90 | 25,69 | 65,456 | 6,45 | 27,60 | 8,10 | 59,293 | 6,36 | 3,8337 | J | | | | | |
| VD-200E | | | | | | 57,00 | 1,76 | 3,020 | 22,50 | 34,69 | 22,31 | 46,74 | 67,378 | 6,32 | 36,72 | 11,05 | 61,236 | 6,23 | 5,0771 | J | | | | | |
| VD-201 | | | | | | 6,30 | 7,55 | 0,20 | 4,60 | 8,10 | 12,00 | 0,36 | 24,409 | 3,50 | 7,48 | 4,52 | 0,00 | 110,350 | 10,48 | 8,45 | 0,96 | 86,654 | 10,10 | 1,0560 | H |
| VD-202 | | | | | | | | | | | 17,00 | 0,50 | 15,533 | 5,50 | 10,32 | 6,68 | 0,00 | 103,693 | 9,30 | 11,40 | 1,51 | 86,986 | 9,02 | 1,4399 | H |
| VD-203 | 25,00 | 0,70 | 10,051 | 8,50 | 14,59 | | | | | | 10,41 | 0,00 | 104,607 | 8,63 | 16,35 | 2,29 | 86,941 | 8,34 | 2,0159 | H | | | | | |
| VD-204 | 35,50 | 0,97 | 6,835 | 12,50 | 20,28 | | | | | | 15,22 | 16,80 | 104,004 | 8,21 | 22,75 | 3,37 | 87,142 | 7,93 | 2,7839 | H | | | | | |
| VD-204A | 35,50 | 1,38 | 4,618 | 18,50 | 28,82 | | | | | | 6,68 | 16,80 | 30,855 | 6,82 | 30,42 | 5,08 | 87,280 | 6,71 | 3,9358 | J | | | | | |
| VD-205 | 51,50 | 1,38 | 4,618 | 18,50 | 28,82 | | | | | | 22,68 | 41,68 | 104,743 | 7,93 | 32,60 | 4,98 | 87,280 | 7,64 | 3,9358 | J | | | | | |
| VD-205A | 51,50 | 1,65 | 3,797 | 22,50 | 34,51 | | | | | | 16,99 | 41,68 | 64,515 | 7,22 | 36,45 | 9,46 | 57,145 | 7,11 | 4,7038 | K | | | | | |
| VD-205A-10 | 5,75 | 7,00 | 0,20 | 4,00 | 7,50 | | | | | | 25,00 | 0,71 | 11,828 | 9,50 | 15,94 | 9,06 | 0,00 | 107,171 | 10,04 | 17,15 | 2,09 | 92,852 | 9,90 | 2,0151 | K |
| VD-205A-11 | | | | | | 30,00 | 0,84 | 9,771 | 11,50 | 18,77 | 11,23 | 0,00 | 109,742 | 9,84 | 20,50 | 2,54 | 92,826 | 9,68 | 2,3656 | K | | | | | |
| VD-205B | 5,55 | 6,80 | 0,20 | 3,90 | 7,30 | 9,00 | 0,33 | 35,703 | 3,50 | 7,44 | 1,56 | 0,00 | 55,629 | 12,44 | 7,74 | 1,12 | 44,985 | 12,28 | 0,9302 | G | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-205C | 1,25 | 5,55 | 6,80 | 0,20 | 3,90 | 7,30 | 13,00 | 0,45 | 22,720 | 5,50 | 10,27 | 2,73 | 0,00 | 62,121 | 11,13 | 10,72 | 1,76 | 51,801 | 10,97 | 1,2685 | H |
| VD-205D | | | | | | | 19,00 | 0,63 | 14,701 | 8,50 | 14,50 | 4,50 | 0,00 | 66,130 | 10,28 | 15,20 | 3,32 | 55,864 | 10,13 | 1,7759 | H |
| VD-205E | | | | | | | 29,00 | 0,94 | 9,256 | 13,50 | 21,56 | 7,44 | 0,00 | 68,853 | 9,69 | 22,67 | 4,34 | 58,592 | 9,54 | 2,6216 | H |
| VD-206 | 1,30 | 6,00 | 7,30 | 0,20 | 4,30 | 7,80 | 23,00 | 0,70 | 12,855 | 9,00 | 15,84 | 7,16 | 0,00 | 91,995 | 10,54 | 16,62 | 3,02 | 82,017 | 10,39 | 2,1755 | H |
| VD-206A-20 | 1,40 | 32,60 | 34,00 | 1,02 | 30,20 | 35,20 | 54,00 | 3,80 | 0,149 | 6,50 | 20,21 | 33,79 | 0,00 | 5,043 | 0,75 | 24,37 | 29,63 | 4,423 | 1,87 | 10,5928 | J |
| VD-206A-21 | | | | | | | 103,00 | 7,00 | 0,078 | 12,50 | 36,28 | 66,72 | 0,00 | 5,178 | 0,78 | 44,27 | 58,73 | 4,558 | 1,68 | 18,0702 | K |
| VD-206A-22 | | | | | | | 153,00 | 9,50 | 0,052 | 18,50 | 52,36 | 100,64 | 0,00 | 5,278 | 0,78 | 64,19 | 88,81 | 4,658 | 1,61 | 25,5475 | K |
| VD-206A | 22,60 | 24,00 | 0,50 | 20,50 | 25,80 | 60,90 | 3,52 | 0,832 | 3,50 | 10,11 | 50,79 | 0,00 | 42,261 | 3,56 | 13,15 | 13,30 | 39,728 | 3,55 | 4,7517 | J | |
| VD-206B | | | | | | 93,00 | 4,86 | 0,529 | 5,50 | 14,28 | 78,72 | 0,00 | 41,679 | 3,20 | 17,95 | 21,52 | 39,736 | 3,18 | 6,4796 | J | |
| VD-206C | | | | | | 157,00 | 7,50 | 0,307 | 9,50 | 22,63 | 134,37 | 112,66 | 41,189 | 2,92 | 27,50 | 37,86 | 39,695 | 2,90 | 9,9353 | K | |
| VD-206D | 19,00 | 20,40 | 0,45 | 17,00 | 21,30 | 25,00 | 1,60 | 2,178 | 2,25 | 7,20 | 17,80 | 0,00 | 38,770 | 4,20 | 7,80 | 9,00 | 37,463 | 7,20 | 3,0869 | K | |
| VD-206D-10 | | | | | | 40,00 | 2,10 | 1,400 | 3,50 | 9,60 | 30,40 | 0,00 | 42,566 | 3,70 | 10,60 | 12,10 | 41,166 | 3,70 | 3,9948 | K | |
| VD-206D-12 | | | | | | 58,00 | 3,00 | 0,891 | 5,50 | 13,40 | 44,60 | 0,00 | 39,740 | 3,20 | 14,95 | 21,10 | 38,359 | 3,30 | 5,4474 | L | |
| VD-206D-14 | 16,00 | 17,40 | 0,35 | 14,00 | 18,50 | 85,00 | 4,00 | 0,577 | 8,50 | 19,20 | 65,80 | 0,00 | 37,937 | 3,00 | 21,50 | 34,80 | 36,611 | 3,10 | 7,6264 | L | |
| VD-206D-16 | | | | | | 125,00 | 5,20 | 0,392 | 12,50 | 26,90 | 98,10 | 84,30 | 38,461 | 2,90 | 30,30 | 50,50 | 37,128 | 2,90 | 10,5317 | M | |
| VD-206D-18 | | | | | | 34,30 | 1,38 | 2,345 | 3,50 | 9,15 | 25,15 | 0,00 | 58,970 | 4,12 | 11,15 | 6,25 | 54,280 | 4,10 | 3,3640 | K | |
| VD-206D-01 | 13,60 | 15,00 | 0,35 | 11,60 | 15,90 | 53,90 | 1,91 | 1,492 | 5,50 | 12,92 | 40,98 | 0,00 | 61,146 | 3,76 | 17,50 | 9,59 | 54,312 | 3,74 | 4,5873 | K | |
| VD-206D-02 | | | | | | 83,30 | 2,68 | 0,965 | 8,50 | 19,90 | 63,40 | 0,00 | 61,211 | 3,53 | 27,10 | 14,85 | 54,260 | 3,51 | 6,4222 | L | |
| VD-206D-03 | | | | | | 122,00 | 3,72 | 0,657 | 12,50 | 28,85 | 93,15 | 94,60 | 61,155 | 3,39 | 39,35 | 21,78 | 54,262 | 3,30 | 8,8688 | M | |
| VD-206D-04 | 12,00 | 13,40 | 0,35 | 10,00 | 14,00 | 181,00 | 5,26 | 0,444 | 18,50 | 43,10 | 137,90 | 164,13 | 61,172 | 3,30 | 58,65 | 32,15 | 54,274 | 3,27 | 12,5386 | M | |
| VD-206D-05 | | | | | | 25,80 | 0,94 | 3,818 | 3,50 | 8,88 | 16,92 | 0,00 | 64,587 | 4,57 | 9,47 | 4,95 | 62,348 | 4,53 | 2,8594 | J | |
| VD-206E | | | | | | 39,00 | 1,30 | 2,430 | 5,50 | 12,36 | 26,64 | 0,00 | 64,726 | 4,13 | 13,29 | 7,75 | 62,466 | 4,10 | 3,8992 | J | |
| VD-206F | 9,60 | 11,00 | 0,25 | 7,70 | 11,60 | 65,30 | 2,01 | 1,407 | 9,50 | 19,31 | 45,99 | 0,00 | 64,687 | 3,79 | 20,92 | 13,40 | 62,426 | 3,76 | 5,9788 | J | |
| VD-206G | | | | | | 79,00 | 2,53 | 1,069 | 12,50 | 24,53 | 54,47 | 41,81 | 58,234 | 3,58 | 26,65 | 20,93 | 55,964 | 3,55 | 7,5385 | J | |
| VD-206G-01 | | | | | | 93,00 | 2,89 | 0,922 | 14,50 | 28,00 | 65,00 | 65,66 | 59,900 | 3,56 | 30,45 | 23,27 | 57,645 | 3,52 | 8,5783 | K | |
| VD-206G-02 | 12,00 | 13,40 | 0,35 | 10,00 | 14,00 | 105,00 | 3,06 | 0,862 | 15,50 | 29,74 | 75,26 | 82,10 | 64,882 | 3,61 | 32,36 | 21,76 | 62,625 | 3,58 | 9,0982 | K | |
| VD-206H | | | | | | 23,00 | 0,95 | 3,891 | 5,00 | 11,27 | 11,73 | 0,00 | 45,630 | 4,41 | 12,01 | 6,95 | 42,757 | 4,37 | 3,2111 | J | |
| VD-207 | | | | | | 28,00 | 0,93 | 5,066 | 7,50 | 15,09 | 12,91 | 0,00 | 65,396 | 5,70 | 15,99 | 6,61 | 60,840 | 5,63 | 3,4864 | J | |
| VD-207AA | 9,60 | 11,00 | 0,25 | 7,70 | 11,60 | 36,00 | 1,13 | 3,999 | 9,50 | 18,37 | 17,63 | 0,00 | 70,515 | 5,58 | 19,51 | 8,38 | 65,948 | 5,51 | 4,2203 | J | |
| VD-207AB | | | | | | 44,00 | 1,33 | 3,304 | 11,50 | 21,65 | 22,35 | 0,00 | 73,854 | 5,50 | 23,03 | 10,14 | 69,280 | 5,43 | 4,9543 | J | |
| VD-207AC | | | | | | 54,00 | 1,63 | 2,620 | 14,50 | 26,56 | 27,44 | 25,42 | 71,894 | 5,34 | 28,29 | 12,79 | 67,366 | 5,27 | 6,0552 | J | |
| VD-207AD | | | | | | 69,00 | 2,02 | 2,054 | 18,50 | 33,12 | 35,88 | 51,11 | 73,693 | 5,26 | 35,33 | 16,32 | 69,148 | 5,19 | 7,5232 | K | |
| VD-207AE | | | | | | | | | | | | | | | | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-205C | 1,25 | 5,55 | 6,80 | 0,20 | 3,90 | 7,30 | 13,00 | 0,39 | 26,452 | 5,50 | 10,27 | 2,73 | 0,00 | 72,326 | 11,28 | 10,72 | 2,16 | 60,312 | 11,10 | 1,2685 | E |
| D-205D | | | | | | | 19,00 | 0,54 | 17,116 | 8,50 | 14,50 | 4,50 | 0,00 | 76,994 | 10,44 | 15,20 | 3,24 | 65,042 | 10,27 | 1,7759 | E |
| D-205E | | | | | | | 29,00 | 0,80 | 10,777 | 13,50 | 21,56 | 7,44 | 8,87 | 80,164 | 9,85 | 22,67 | 5,03 | 68,218 | 9,68 | 2,6216 | E |
| D-206 | 1,30 | 6,00 | 7,30 | 0,20 | 4,30 | 7,80 | 23,00 | 0,60 | 14,967 | 9,00 | 15,84 | 7,16 | 0,00 | 107,109 | 10,79 | 16,62 | 3,21 | 95,492 | 10,62 | 2,1755 | E |
| D-206A-20 | 1,40 | 32,60 | 34,00 | 1,00 | 30,20 | 35,20 | 54,00 | 3,50 | 0,174 | 6,50 | 20,21 | 33,79 | 0,00 | 5,872 | 0,88 | 24,37 | 26,63 | 5,149 | 0,77 | 10,5928 | F |
| D-206A-21 | | | | | | | 103,00 | 6,40 | 0,090 | 12,50 | 36,28 | 66,72 | 0,00 | 6,029 | 0,90 | 44,27 | 58,73 | 5,307 | 0,79 | 18,0702 | G |
| D-206A-22 | | | | | | | 153,00 | 8,80 | 0,061 | 18,50 | 52,36 | 100,64 | 0,00 | 6,145 | 0,92 | 64,19 | 88,81 | 5,423 | 0,81 | 25,5475 | G |
| D-206A | | 22,60 | 24,00 | 0,50 | 20,50 | 25,80 | 60,90 | 3,02 | 0,969 | 3,50 | 10,11 | 50,79 | 0,00 | 49,204 | 3,67 | 14,25 | 16,81 | 45,190 | 3,65 | 4,7517 | F |
| D-206B | | | | | | | 93,00 | 4,17 | 0,616 | 5,50 | 14,28 | 78,72 | 0,00 | 48,526 | 3,30 | 18,80 | 26,07 | 45,740 | 3,28 | 6,4796 | F |
| D-206C | | | | | | | 157,00 | 6,44 | 0,357 | 9,50 | 22,63 | 134,37 | 114,00 | 47,955 | 3,02 | 29,20 | 45,13 | 45,610 | 3,00 | 9,9353 | G |
| D-206D | | | | | | | 253,00 | 9,83 | 0,219 | 15,50 | 35,15 | 217,85 | 229,40 | 47,651 | 2,86 | 43,90 | 73,32 | 45,738 | 2,85 | 15,1190 | G |
| D-206D-10 | | 19,00 | 20,40 | 0,45 | 17,00 | 21,30 | 25,00 | 1,40 | 2,536 | 2,25 | 7,62 | 17,38 | 0,00 | 44,074 | 4,25 | 7,80 | 9,00 | 43,618 | 4,25 | 3,0869 | F |
| D-206D-12 | | | | | | | 40,00 | 1,70 | 1,630 | 3,50 | 9,54 | 30,46 | 0,00 | 49,657 | 3,80 | 10,50 | 12,90 | 48,092 | 3,78 | 3,9948 | F |
| D-206D-14 | | | | | | | 58,00 | 2,30 | 1,037 | 5,50 | 13,40 | 44,60 | 0,00 | 46,269 | 3,38 | 14,90 | 21,60 | 44,713 | 3,30 | 5,4474 | F |
| D-206D-16 | | | | | | | 85,00 | 3,00 | 0,671 | 8,50 | 19,18 | 65,82 | 0,00 | 44,183 | 3,11 | 21,50 | 34,80 | 42,626 | 3,00 | 7,6264 | G |
| D-206D-18 | | | | | | | 125,00 | 4,00 | 0,456 | 12,50 | 26,88 | 98,12 | 85,80 | 44,788 | 2,98 | 30,20 | 50,70 | 43,273 | 2,90 | 10,5317 | G |
| D-206D-01 | | 16,00 | 17,40 | 0,35 | 14,00 | 18,50 | 34,30 | 1,19 | 2,730 | 3,50 | 9,15 | 25,15 | 0,00 | 68,658 | 4,27 | 11,40 | 8,05 | 62,515 | 4,24 | 3,3640 | F |
| D-206D-02 | | | | | | | 53,90 | 1,64 | 1,737 | 5,50 | 12,78 | 41,12 | 0,00 | 71,437 | 3,92 | 17,90 | 12,64 | 62,540 | 3,89 | 4,5873 | F |
| D-206D-03 | | | | | | | 83,30 | 2,30 | 1,124 | 8,50 | 19,65 | 63,65 | 23,41 | 71,548 | 3,69 | 27,80 | 19,59 | 62,387 | 3,66 | 6,4222 | F |
| D-206D-04 | | | | | | | 122,00 | 3,19 | 0,764 | 12,50 | 28,50 | 93,50 | 95,36 | 71,470 | 3,55 | 40,70 | 28,95 | 62,144 | 3,52 | 8,8688 | G |
| D-206D-05 | | | | | | | 181,00 | 4,52 | 0,516 | 18,50 | 41,90 | 139,10 | 164,51 | 71,841 | 3,45 | 59,90 | 42,55 | 62,545 | 3,42 | 12,5386 | G |
| D-206E | | 13,60 | 15,00 | 0,35 | 11,60 | 15,90 | 25,80 | 0,81 | 4,445 | 3,50 | 8,88 | 16,92 | 0,00 | 75,197 | 4,02 | 9,70 | 5,75 | 71,568 | 4,69 | 2,8594 | F |
| D-206F | | | | | | | 39,00 | 1,12 | 2,829 | 5,50 | 12,36 | 26,64 | 0,00 | 75,359 | 4,29 | 13,70 | 9,03 | 71,568 | 4,25 | 3,8992 | F |
| D-206G | | | | | | | 65,30 | 1,72 | 1,638 | 9,50 | 19,31 | 45,99 | 0,00 | 75,314 | 3,95 | 21,35 | 15,50 | 71,978 | 3,91 | 5,9788 | F |
| D-206G-01 | | | | | | | 79,00 | 2,18 | 1,245 | 12,50 | 24,53 | 54,47 | 43,63 | 67,801 | 3,73 | 26,65 | 22,68 | 65,158 | 3,69 | 7,5385 | F |
| D-206G-02 | | | | | | | 93,00 | 2,48 | 1,073 | 14,50 | 28,00 | 65,00 | 66,53 | 69,741 | 3,71 | 30,45 | 25,50 | 67,115 | 3,67 | 8,5783 | G |
| D-206H | | | | | | | 105,00 | 2,63 | 1,004 | 15,50 | 29,74 | 75,26 | 82,74 | 75,542 | 3,77 | 33,50 | 25,37 | 71,769 | 3,73 | 9,0982 | F |
| D-207 | | 12,00 | 13,40 | 0,35 | 10,00 | 14,00 | 23,00 | 0,81 | 4,530 | 5,00 | 11,27 | 11,73 | 0,00 | 53,126 | 4,53 | 12,01 | 9,04 | 49,781 | 4,48 | 3,2111 | F |
| D-207AA | | 9,60 | 11,00 | 0,25 | 7,70 | 11,60 | 28,00 | 0,80 | 5,898 | 7,50 | 15,09 | 12,91 | 0,00 | 76,140 | 5,86 | 15,99 | 7,58 | 70,835 | 5,78 | 3,4864 | F |
| D-207AB | | | | | | | 36,00 | 0,97 | 4,656 | 9,50 | 18,37 | 17,63 | 0,00 | 82,100 | 5,75 | 19,51 | 9,07 | 76,783 | 5,67 | 4,2203 | F |
| D-207AC | | | | | | | 44,00 | 1,14 | 3,847 | 11,50 | 21,65 | 22,35 | 0,00 | 85,987 | 5,68 | 23,03 | 10,56 | 80,662 | 5,60 | 4,9543 | F |
| D-207AD | | | | | | | 54,00 | 1,40 | 3,051 | 14,50 | 26,56 | 27,44 | 27,09 | 83,706 | 5,52 | 28,29 | 13,62 | 78,433 | 5,44 | 6,0552 | F |
| D-207AE | | | | | | | 69,00 | 1,74 | 2,391 | 18,50 | 33,12 | 35,88 | 51,64 | 85,800 | 5,44 | 35,33 | 17,01 | 80,508 | 5,36 | 7,5232 | F |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Ldyn minimum length dynamic | shdyn maximum stroke dynamic | Fdyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-207A | 1,40 | 8,60 | 10,00 | 0,25 | 6,70 | 10,60 | 14,40 | 0,40 | 17,580 | 3,50 | 8,47 | 5,93 | 0,00 | 104,295 | 8,66 | 8,86 | 2,30 | 97,393 | 8,55 | 1,8082 | E |
| D-207B | | | | | | | 21,10 | 0,56 | 11,187 | 5,50 | 11,71 | 9,39 | 0,00 | 105,094 | 7,80 | 12,32 | 3,58 | 98,224 | 7,70 | 2,4657 | F |
| D-207C | | | | | | | 34,40 | 0,86 | 6,477 | 9,50 | 18,18 | 16,22 | 0,00 | 105,036 | 7,14 | 19,22 | 6,18 | 98,318 | 7,04 | 3,7807 | F |
| D-207D | | | | | | | 54,40 | 1,31 | 3,970 | 15,50 | 27,90 | 26,50 | 35,41 | 105,203 | 6,78 | 29,60 | 10,07 | 98,447 | 6,68 | 5,7532 | F |
| D-207DA | | 8,10 | 9,50 | 0,25 | 6,20 | 10,10 | 24,00 | 0,77 | 8,182 | 9,00 | 17,29 | 6,71 | 0,00 | 54,882 | 7,25 | 18,24 | 5,76 | 47,131 | 7,13 | 3,4061 | F |
| D-207D-02 | | 7,20 | 8,60 | 0,25 | 5,30 | 9,10 | 25,00 | 0,70 | 11,650 | 9,00 | 17,16 | 7,84 | 0,00 | 91,340 | 9,60 | 18,04 | 5,07 | 81,087 | 9,45 | 3,0276 | F |
| D-207D-03 | | | | | | | 32,00 | 0,86 | 9,118 | 11,50 | 21,15 | 10,85 | 0,00 | 98,938 | 9,29 | 22,28 | 6,13 | 88,624 | 9,14 | 3,7157 | F |
| D-207D-04 | | | | | | | 38,00 | 0,95 | 8,066 | 13,00 | 23,54 | 14,46 | 0,00 | 116,613 | 9,51 | 24,81 | 6,01 | 106,386 | 9,35 | 4,1286 | F |
| D-207D-05 | | | | | | | 44,00 | 1,17 | 6,355 | 16,50 | 29,13 | 14,87 | 27,09 | 94,518 | 8,88 | 30,75 | 9,09 | 84,200 | 8,72 | 5,0919 | F |
| D-207D-06 | | | | | | | 51,00 | 1,33 | 5,519 | 19,00 | 33,12 | 17,88 | 37,70 | 98,698 | 8,89 | 34,97 | 10,14 | 88,463 | 8,75 | 5,7800 | F |
| D-207D-07 | | | | | | | 64,00 | 1,62 | 4,462 | 23,50 | 40,30 | 23,70 | 54,16 | 105,767 | 8,82 | 42,60 | 11,88 | 95,483 | 8,66 | 7,0186 | F |
| D-207D-08 | | | | | | | 76,00 | 1,91 | 3,745 | 28,00 | 47,48 | 28,52 | 67,97 | 106,819 | 8,78 | 50,21 | 14,04 | 96,577 | 8,63 | 8,2571 | F |
| D-207E | 5,70 | | | | | | 7,10 | 0,20 | 3,90 | 7,60 | 22,00 | 0,55 | 24,862 | 8,50 | 16,19 | 5,81 | 0,00 | 144,550 | 15,77 | 16,94 | 2,29 |
| D-207F | 5,60 | 7,00 | 0,20 | 3,80 | 7,50 | 10,60 | 0,28 | 63,672 | 3,50 | 8,31 | 2,29 | 0,00 | 145,961 | 19,86 | 8,62 | 0,91 | 126,070 | 19,56 | 1,1774 | E | |
| D-207G | | | | | | 15,00 | 0,38 | 40,518 | 5,50 | 11,45 | 3,55 | 0,00 | 143,646 | 17,68 | 11,93 | 1,45 | 124,392 | 17,39 | 1,6056 | E | |
| D-207H | | | | | | 23,80 | 0,59 | 23,458 | 9,50 | 17,75 | 6,05 | 0,00 | 141,940 | 16,00 | 18,58 | 2,54 | 122,451 | 15,71 | 2,4619 | F | |
| D-207J | | | | | | 37,10 | 0,90 | 14,378 | 15,50 | 27,19 | 9,91 | 26,65 | 142,470 | 15,10 | 28,54 | 4,13 | 123,072 | 14,81 | 3,7463 | F | |
| D-207JA | | | | | | 1,50 | 34,00 | 35,50 | 1,00 | 31,00 | 36,80 | 74,50 | 7,80 | 0,375 | 3,50 | 12,82 | 61,68 | 0,00 | 23,124 | 3,46 | 15,11 |
| D-207JB | 115,00 | 11,50 | 0,239 | 5,50 | 18,43 | | | | | | | 96,57 | 0,00 | 23,039 | 3,45 | 22,02 | 83,34 | 22,183 | 3,32 | 11,1903 | G |
| D-207JC | 176,00 | 17,60 | 0,154 | 8,50 | 26,85 | | | | | | | 149,15 | 41,50 | 23,025 | 3,45 | 32,40 | 129,08 | 22,168 | 3,32 | 15,6665 | H |
| D-207JD | 260,00 | 20,40 | 0,105 | 12,50 | 38,08 | | | | | | | 221,93 | 203,60 | 23,297 | 3,49 | 46,25 | 188,53 | 22,438 | 3,36 | 21,6346 | H |
| D-207JE | 384,00 | 23,06 | 0,071 | 18,50 | 54,91 | | 329,09 | 348,89 | 23,342 | 3,50 | 66,99 | 278,66 | 22,485 | 3,37 | 30,5869 | J | | | | | |
| D-207JF | 32,50 | 34,00 | 1,00 | 30,00 | 35,20 | | 69,10 | 5,90 | 0,429 | 3,50 | 12,47 | 56,63 | 0,00 | 24,308 | 3,64 | 14,58 | 48,14 | 23,403 | 3,51 | 7,8442 | G |
| D-207JG | | | | | | | 107,00 | 8,60 | 0,273 | 5,50 | 17,88 | 89,12 | 0,00 | 24,343 | 3,65 | 21,20 | 75,60 | 23,437 | 3,51 | 10,6966 | G |
| D-207JH | | | | | | | 164,00 | 12,90 | 0,177 | 8,50 | 26,00 | 138,00 | 0,00 | 24,391 | 3,65 | 31,13 | 116,61 | 23,485 | 3,52 | 14,9753 | H |
| D-207JJ | | | | | | | 239,00 | 18,60 | 0,120 | 12,50 | 36,83 | 202,17 | 182,12 | 24,299 | 3,64 | 44,37 | 172,04 | 23,393 | 3,50 | 20,6802 | H |
| D-207JK | 352,00 | 25,40 | 0,081 | 18,50 | 53,07 | | 298,93 | 316,81 | 24,277 | 3,64 | 64,23 | 254,85 | 23,370 | 3,50 | 29,2375 | J | | | | | |
| D-207JL | 25,00 | 26,50 | 0,50 | 22,70 | 27,90 | | 45,00 | 3,46 | 0,943 | 3,50 | 10,96 | 34,04 | 0,00 | 32,100 | 3,74 | 12,32 | 27,58 | 30,820 | 3,72 | 6,0340 | G |
| D-207JM | | | | | | | 68,90 | 4,77 | 0,600 | 5,50 | 15,51 | 53,39 | 0,00 | 32,040 | 3,34 | 17,64 | 43,38 | 30,763 | 3,32 | 8,2282 | G |
| D-207JN | | | | | | 105,00 | 6,72 | 0,388 | 8,50 | 22,34 | 82,66 | 0,00 | 32,100 | 3,09 | 25,64 | 67,01 | 30,817 | 3,07 | 11,5195 | G | |
| D-207JO | | | | | | 152,00 | 9,30 | 0,264 | 12,50 | 31,44 | 120,56 | 92,71 | 31,836 | 2,93 | 36,28 | 98,91 | 30,557 | 2,91 | 15,9078 | H | |
| D-207JP | | | | | | 224,00 | 13,16 | 0,178 | 18,50 | 45,09 | 178,91 | 190,16 | 31,921 | 2,83 | 52,26 | 146,35 | 30,642 | 2,81 | 22,4904 | H | |
| D-207JQ | 20,50 | 22,00 | 0,45 | 18,20 | 23,10 | 33,30 | 2,01 | 1,710 | 3,50 | 10,25 | 23,05 | 0,00 | 39,432 | 4,03 | 11,25 | 18,06 | 37,715 | 4,00 | 4,9479 | G | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-207A | 1,40 | 8,60 | 10,00 | 0,25 | 6,70 | 10,60 | 14,40 | 0,47 | 15,099 | 3,50 | 8,47 | 5,93 | 0,00 | 89,579 | 8,43 | 8,86 | 2,10 | 83,650 | 8,35 | 1,8082 | H |
| VD-207B | | | | | | | 21,10 | 0,65 | 9,609 | 5,50 | 11,71 | 9,39 | 0,00 | 90,265 | 7,58 | 12,32 | 3,26 | 84,364 | 7,49 | 2,4657 | J |
| VD-207C | | | | | | | 34,40 | 1,00 | 5,563 | 9,50 | 18,18 | 16,22 | 0,00 | 90,215 | 6,92 | 19,22 | 5,63 | 84,445 | 6,83 | 3,7807 | J |
| VD-207D | | | | | | | 54,40 | 1,53 | 3,410 | 15,50 | 27,90 | 26,50 | 34,68 | 90,358 | 6,56 | 29,60 | 9,17 | 84,556 | 6,47 | 5,7532 | J |
| VD-207DA | | 8,10 | 9,50 | 0,25 | 6,20 | 10,10 | 24,00 | 0,90 | 7,028 | 9,00 | 17,29 | 6,71 | 0,00 | 47,138 | 7,12 | 18,24 | 5,54 | 40,480 | 7,02 | 3,4061 | K |
| VD-207D-02 | | 7,20 | 8,60 | 0,25 | 5,30 | 9,10 | 25,00 | 0,81 | 10,006 | 9,00 | 17,16 | 7,84 | 0,00 | 78,452 | 9,39 | 18,04 | 4,35 | 69,645 | 9,26 | 3,0276 | H |
| VD-207D-03 | | | | | | | 32,00 | 1,00 | 7,831 | 11,50 | 21,15 | 10,85 | 0,00 | 84,978 | 9,08 | 22,28 | 5,56 | 76,119 | 8,95 | 3,7157 | H |
| VD-207D-04 | | | | | | | 38,00 | 1,11 | 6,928 | 13,00 | 23,54 | 14,46 | 0,00 | 100,158 | 9,25 | 24,81 | 5,60 | 91,374 | 9,12 | 4,1286 | H |
| VD-207D-05 | | | | | | | 44,00 | 1,37 | 5,458 | 16,50 | 29,13 | 14,87 | 26,37 | 81,181 | 8,68 | 30,75 | 7,99 | 72,319 | 8,55 | 5,0919 | H |
| VD-207D-06 | | | | | | | 51,00 | 1,55 | 4,740 | 19,00 | 33,12 | 17,88 | 37,29 | 84,772 | 8,68 | 34,97 | 9,20 | 75,981 | 8,60 | 5,7800 | H |
| VD-207D-07 | | | | | | | 64,00 | 1,89 | 3,832 | 23,50 | 40,30 | 23,70 | 53,91 | 90,843 | 8,59 | 42,60 | 11,38 | 82,010 | 8,46 | 7,0186 | J |
| VD-207D-08 | | | | | | | 76,00 | 2,22 | 3,216 | 28,00 | 47,48 | 28,52 | 67,78 | 91,746 | 8,55 | 50,21 | 13,56 | 82,950 | 8,42 | 8,2571 | J |
| VD-207E | 5,70 | | | | | | 7,10 | 0,20 | 3,90 | 7,60 | 22,00 | 0,64 | 21,354 | 8,50 | 16,19 | 5,81 | 0,00 | 124,154 | 15,47 | 16,94 | 2,13 |
| VD-207F | 5,60 | 7,00 | 0,20 | 3,80 | 7,50 | 10,60 | 0,32 | 54,688 | 3,50 | 8,31 | 2,29 | 0,00 | 125,366 | 19,55 | 8,62 | 0,85 | 108,281 | 19,29 | 1,1774 | H | |
| VD-207G | | | | | | 15,00 | 0,45 | 34,801 | 5,50 | 11,45 | 3,55 | 0,00 | 123,377 | 17,37 | 11,93 | 1,35 | 106,839 | 17,12 | 1,6056 | H | |
| VD-207H | | | | | | 23,80 | 0,69 | 20,148 | 9,50 | 17,75 | 6,05 | 0,00 | 121,912 | 15,70 | 18,58 | 2,40 | 105,173 | 45,45 | 2,4619 | J | |
| VD-207J | | | | | | 37,10 | 1,05 | 12,349 | 15,50 | 27,19 | 9,91 | 25,25 | 122,367 | 14,80 | 28,54 | 3,89 | 105,706 | 14,55 | 3,7463 | J | |
| VD-207JA | | | | | | 1,50 | 34,00 | 35,50 | 1,06 | 31,00 | 36,80 | 74,50 | 8,50 | 0,322 | 3,50 | 12,82 | 61,68 | 0,00 | 19,861 | 2,97 | 15,11 |
| VD-207JB | 115,00 | 12,60 | 0,205 | 5,50 | 18,43 | | | | | | | 96,57 | 0,00 | 19,788 | 2,97 | 22,02 | 58,68 | 19,053 | 2,86 | 11,1903 | K |
| VD-207JC | 176,00 | 18,80 | 0,133 | 8,50 | 26,85 | | | | | | | 149,15 | 0,00 | 19,776 | 2,97 | 32,40 | 90,69 | 19,040 | 2,86 | 15,6665 | L |
| VD-207JD | 260,00 | 22,60 | 0,090 | 12,50 | 38,08 | | | | | | | 221,93 | 202,00 | 20,009 | 2,99 | 46,25 | 133,37 | 19,272 | 2,88 | 21,6346 | L |
| VD-207JE | 384,00 | 33,60 | 0,061 | 18,50 | 54,91 | | 329,09 | 348,09 | 20,048 | 3,01 | 66,99 | 197,38 | 19,312 | 2,89 | 30,5869 | M | | | | | |
| VD-207JF | 32,50 | 34,00 | 1,02 | 30,00 | 35,20 | | 69,10 | 6,40 | 0,369 | 3,50 | 12,47 | 56,63 | 0,00 | 20,878 | 3,12 | 14,58 | 34,12 | 20,101 | 3,01 | 7,8442 | K |
| VD-207JG | | | | | | | 107,00 | 9,40 | 0,235 | 5,50 | 17,88 | 89,12 | 0,00 | 20,908 | 3,14 | 21,20 | 53,61 | 20,130 | 3,02 | 10,6966 | K |
| VD-207JH | | | | | | | 164,00 | 13,90 | 0,152 | 8,50 | 26,00 | 138,00 | 0,00 | 20,949 | 3,14 | 31,13 | 82,86 | 20,171 | 3,02 | 14,9753 | L |
| VD-207JJ | | | | | | | 239,00 | 20,40 | 0,103 | 12,50 | 36,83 | 202,17 | 180,42 | 20,871 | 3,12 | 44,37 | 121,86 | 20,092 | 3,00 | 20,6802 | L |
| VD-207JK | | | | | | | 352,00 | 27,90 | 0,070 | 18,50 | 53,07 | 298,93 | 315,99 | 20,851 | 3,13 | 64,23 | 180,35 | 20,072 | 3,02 | 29,2375 | M |
| VD-207JL | 25,00 | 26,50 | 0,50 | 22,70 | 27,90 | | 45,00 | 4,02 | 0,810 | 3,50 | 10,96 | 34,04 | 0,00 | 27,570 | 3,67 | 12,32 | 20,05 | 26,471 | 3,66 | 6,0340 | K |
| VD-207JM | | | | | | | 68,90 | 5,55 | 0,515 | 5,50 | 15,51 | 53,39 | 0,00 | 27,519 | 3,28 | 17,64 | 31,51 | 26,422 | 3,26 | 8,2282 | K |
| VD-207JN | | | | | | 105,00 | 7,82 | 0,334 | 8,50 | 22,34 | 82,66 | 0,00 | 27,570 | 3,02 | 25,64 | 48,70 | 26,469 | 3,01 | 11,5195 | K | |
| VD-207JO | | | | | | 152,00 | 10,83 | 0,227 | 12,50 | 31,44 | 120,56 | 90,16 | 27,344 | 2,87 | 36,28 | 71,62 | 26,245 | 2,85 | 15,9078 | L | |
| VD-207JP | | | | | | 224,00 | 15,33 | 0,153 | 18,50 | 45,09 | 178,91 | 189,31 | 27,417 | 2,76 | 52,26 | 105,99 | 26,318 | 2,74 | 22,4904 | L | |
| VD-207JQ | | | | | | 20,50 | 22,00 | 0,45 | 18,20 | 23,10 | 33,30 | 2,34 | 1,469 | 3,50 | 10,25 | 23,05 | 0,00 | 33,868 | 3,94 | 11,25 | 13,35 |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-207JR | 1,50 | 20,50 | 22,00 | 0,45 | 18,20 | 23,10 | 50,70 | 3,23 | 0,935 | 5,50 | 14,39 | 36,31 | 0,00 | 33,948 | 3,53 | 15,96 | 20,38 | 32,477 | 3,50 | 6,7471 | K |
| VD-207JS | | | | | | | 76,20 | 4,54 | 0,605 | 8,50 | 20,60 | 55,60 | 0,00 | 33,635 | 3,25 | 23,03 | 32,43 | 32,163 | 3,23 | 9,4460 | K |
| VD-207JT | | | | | | | 110,00 | 6,29 | 0,411 | 12,50 | 28,88 | 81,12 | 36,76 | 33,369 | 3,09 | 32,45 | 47,70 | 31,899 | 3,07 | 13,0444 | K |
| VD-207JU | | | | | | | 162,00 | 8,90 | 0,278 | 18,50 | 41,30 | 120,70 | 128,56 | 33,547 | 2,98 | 46,58 | 70,59 | 32,079 | 2,96 | 18,4421 | L |
| VD-207J-70 | 18,50 | 20,00 | 0,45 | 16,20 | 21,40 | 38,00 | 1,80 | 1,999 | 3,50 | 10,00 | 28,00 | 0,00 | 55,969 | 4,30 | 10,90 | 9,40 | 54,170 | 4,40 | 4,4652 | M | |
| VD-207J-71 | | | | | | 55,00 | 2,40 | 1,272 | 5,50 | 14,00 | 41,00 | 0,00 | 52,153 | 3,90 | 15,40 | 16,70 | 50,372 | 3,90 | 6,0889 | K | |
| VD-207J-72 | | | | | | 80,00 | 3,40 | 0,823 | 8,50 | 19,95 | 60,05 | 0,00 | 49,426 | 3,60 | 22,10 | 28,00 | 47,656 | 3,60 | 8,5244 | K | |
| VD-207J-73 | | | | | | 112,00 | 4,00 | 0,666 | 10,50 | 23,95 | 88,05 | 65,70 | 58,668 | 3,60 | 26,60 | 25,20 | 56,902 | 3,60 | 10,1481 | L | |
| VD-207J-80 | 17,00 | 18,50 | 0,45 | 14,70 | 19,50 | 152,00 | 5,09 | 0,518 | 13,50 | 29,90 | 122,10 | 123,34 | 63,279 | 3,59 | 39,60 | 29,29 | 58,249 | 3,56 | 12,5836 | M | |
| VD-207JV | | | | | | 25,60 | 1,42 | 2,576 | 3,50 | 9,79 | 15,81 | 0,00 | 40,737 | 4,27 | 10,56 | 9,15 | 38,744 | 4,24 | 4,1031 | K | |
| VD-207JW | | | | | | 38,60 | 1,96 | 1,639 | 5,50 | 13,66 | 24,94 | 0,00 | 40,877 | 3,82 | 14,87 | 14,38 | 38,901 | 3,79 | 5,5952 | K | |
| VD-207JX | | | | | | 59,50 | 2,76 | 1,061 | 8,50 | 19,48 | 40,02 | 0,00 | 42,449 | 3,56 | 21,35 | 22,22 | 40,467 | 3,53 | 7,8332 | K | |
| VD-207J-85 | | | | | | 85,00 | 2,76 | 1,061 | 8,50 | 19,48 | 65,52 | 0,00 | 69,498 | 3,97 | 25,80 | 15,42 | 62,796 | 3,94 | 7,8332 | K | |
| VD-207JY | | | | | | 87,50 | 3,82 | 0,721 | 12,50 | 27,24 | 60,26 | 0,00 | 43,467 | 3,41 | 29,98 | 32,69 | 41,489 | 3,38 | 10,8173 | K | |
| VD-207J-90 | | | | | | 104,00 | 3,29 | 0,859 | 10,50 | 23,36 | 80,64 | 62,46 | 69,245 | 3,86 | 30,90 | 19,05 | 62,770 | 3,83 | 9,3253 | K | |
| VD-207JZ | | | | | | 129,00 | 5,40 | 0,487 | 18,50 | 38,87 | 90,13 | 99,69 | 43,926 | 3,29 | 42,93 | 48,39 | 41,948 | 3,26 | 15,2935 | K | |
| VD-207J-01 | 15,00 | 16,50 | 0,35 | 12,80 | 17,40 | 23,30 | 1,05 | 3,750 | 3,50 | 9,56 | 13,74 | 0,00 | 51,516 | 4,72 | 10,21 | 7,10 | 49,088 | 4,69 | 3,6204 | K | |
| VD-207J-02 | | | | | | 35,00 | 1,45 | 2,386 | 5,50 | 13,31 | 21,69 | 0,00 | 51,754 | 4,25 | 14,34 | 11,19 | 49,302 | 4,21 | 4,9369 | K | |
| VD-207J-03 | | | | | | 48,90 | 1,95 | 1,641 | 8,00 | 18,00 | 30,90 | 0,00 | 50,695 | 3,98 | 19,50 | 16,28 | 48,234 | 3,94 | 6,5825 | L | |
| VD-207J-04 | | | | | | 52,50 | 2,05 | 1,544 | 8,50 | 18,94 | 33,56 | 0,00 | 51,824 | 3,94 | 20,54 | 17,30 | 49,350 | 3,90 | 6,9117 | L | |
| VD-207J-05 | | | | | | 75,70 | 2,83 | 1,050 | 12,50 | 26,44 | 49,26 | 0,00 | 51,726 | 3,75 | 28,79 | 25,44 | 49,256 | 3,71 | 9,5447 | L | |
| VD-207J-06 | | | | | | 110,00 | 4,01 | 0,709 | 18,50 | 37,69 | 72,31 | 82,85 | 51,303 | 3,62 | 41,16 | 37,65 | 48,839 | 3,58 | 13,4942 | L | |
| VD-207J-20 | 14,50 | 16,00 | 0,35 | 12,30 | 16,80 | 35,00 | 1,81 | 1,816 | 8,00 | 17,88 | 17,12 | 0,00 | 31,091 | 3,77 | 19,32 | 15,12 | 28,479 | 3,73 | 6,3631 | J | |
| VD-207J-21 | 14,00 | 15,50 | 0,35 | 11,80 | 16,50 | 29,00 | 0,91 | 4,612 | 3,50 | 10,35 | 18,65 | 0,00 | 86,020 | 5,55 | 12,90 | 4,22 | 74,259 | 5,40 | 3,3790 | J | |
| VD-207J-22 | 13,50 | 15,00 | 0,35 | 11,30 | 15,70 | 80,00 | 2,11 | 1,537 | 10,50 | 23,95 | 56,05 | 40,10 | 86,174 | 4,57 | 31,60 | 12,63 | 74,412 | 4,48 | 7,6796 | K | |
| VD-207J-25 | | | | | | 54,00 | 2,99 | 1,059 | 17,00 | 34,15 | 19,85 | 0,00 | 21,024 | 3,49 | 36,97 | 17,03 | 18,036 | 3,45 | 11,2562 | J | |
| VD-207J-26 | | | | | | 55,00 | 2,04 | 1,637 | 11,00 | 23,15 | 31,85 | 0,00 | 52,122 | 4,14 | 24,98 | 17,97 | 49,135 | 4,10 | 7,7016 | J | |
| VD-207J-27 | 13,00 | 14,50 | 0,35 | 10,90 | 15,30 | 70,00 | 2,51 | 1,286 | 14,00 | 28,65 | 41,35 | 0,00 | 53,175 | 4,05 | 30,98 | 22,87 | 50,180 | 4,00 | 9,4789 | J | |
| VD-207J-08 | | | | | | 32,30 | 1,09 | 3,666 | 5,50 | 13,00 | 19,30 | 0,00 | 70,735 | 5,05 | 13,88 | 8,02 | 67,526 | 5,01 | 4,2787 | J | |
| VD-207J-09 | | | | | | 50,00 | 1,53 | 2,372 | 8,50 | 18,46 | 31,54 | 0,00 | 74,811 | 4,76 | 19,82 | 11,47 | 71,589 | 4,71 | 5,9901 | J | |
| VD-207J-10 | | | | | | 73,50 | 2,12 | 1,613 | 12,50 | 25,74 | 47,76 | 35,36 | 77,041 | 4,58 | 27,74 | 16,12 | 73,811 | 4,53 | 8,2721 | K | |
| VD-207J-11 | 12,50 | 14,00 | 0,35 | 10,30 | 14,90 | 97,00 | 2,71 | 1,222 | 16,50 | 33,01 | 63,99 | 74,05 | 78,189 | 4,49 | 35,64 | 20,76 | 74,980 | 4,44 | 10,5540 | K | |
| VD-207J-30 | | | | | | 20,50 | 0,74 | 6,480 | 3,50 | 9,32 | 11,18 | 0,00 | 72,434 | 5,86 | 9,86 | 4,88 | 68,947 | 5,81 | 3,0170 | K | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-207JR | 1,50 | 20,50 | 22,00 | 0,45 | 18,20 | 23,10 | 50,70 | 2,77 | 1,088 | 5,50 | 14,39 | 36,31 | 0,00 | 39,526 | 3,61 | 15,96 | 28,34 | 37,813 | 3,58 | 6,7471 | G |
| D-207JS | | | | | | | 76,20 | 3,90 | 0,704 | 8,50 | 20,60 | 55,60 | 0,00 | 39,161 | 3,34 | 23,03 | 44,01 | 37,447 | 3,31 | 9,4460 | G |
| D-207JT | | | | | | | 110,00 | 5,40 | 0,479 | 12,50 | 28,88 | 81,12 | 43,88 | 38,851 | 3,17 | 32,45 | 64,97 | 37,140 | 3,14 | 13,0444 | G |
| D-207JU | | | | | | | 162,00 | 7,65 | 0,324 | 18,50 | 41,30 | 120,70 | 129,46 | 39,058 | 3,06 | 46,58 | 95,84 | 37,349 | 3,03 | 18,4421 | H |
| D-207J-70 | 18,50 | 20,00 | 0,45 | 16,20 | 21,40 | 38,00 | 1,50 | 2,327 | 3,50 | 9,97 | 28,03 | 0,00 | 65,234 | 4,51 | 10,90 | 10,70 | 63,069 | 4,40 | 4,4652 | G | |
| D-207J-71 | | | | | | 55,00 | 2,00 | 1,481 | 5,50 | 13,96 | 41,04 | 0,00 | 60,780 | 4,02 | 15,40 | 18,00 | 58,648 | 3,90 | 6,0889 | G | |
| D-207J-72 | | | | | | 80,00 | 2,70 | 0,958 | 8,50 | 19,93 | 60,07 | 0,00 | 57,565 | 3,69 | 22,10 | 29,20 | 55,485 | 3,60 | 8,5244 | G | |
| D-207J-73 | | | | | | 112,00 | 3,20 | 0,776 | 10,50 | 23,92 | 88,08 | 67,88 | 68,329 | 3,75 | 26,50 | 30,30 | 66,328 | 3,70 | 10,1481 | G | |
| D-207J-80 | 17,00 | 18,50 | 0,45 | 14,70 | 19,50 | 152,00 | 4,37 | 0,603 | 13,50 | 29,90 | 122,10 | 124,09 | 73,674 | 3,74 | 41,50 | 38,98 | 66,672 | 3,71 | 12,5836 | H | |
| D-207JV | | | | | | 25,60 | 1,22 | 2,999 | 3,50 | 9,79 | 15,81 | 0,00 | 47,429 | 4,37 | 10,56 | 12,11 | 45,109 | 4,33 | 4,1031 | G | |
| D-207JW | | | | | | 38,60 | 1,68 | 1,909 | 5,50 | 13,66 | 24,94 | 0,00 | 47,593 | 3,92 | 14,87 | 18,99 | 45,292 | 3,89 | 5,5952 | G | |
| D-207JX | | | | | | 59,50 | 2,37 | 1,235 | 8,50 | 19,48 | 40,02 | 0,00 | 49,423 | 3,67 | 21,35 | 28,75 | 47,115 | 3,63 | 7,8332 | G | |
| D-207J-85 | | | | | | 85,00 | 2,37 | 1,235 | 8,50 | 19,48 | 65,52 | 0,00 | 80,915 | 4,14 | 26,90 | 20,57 | 71,754 | 4,10 | 7,8332 | G | |
| D-207JY | | | | | | 87,50 | 3,28 | 0,840 | 12,50 | 27,24 | 60,26 | 0,00 | 50,608 | 3,51 | 29,98 | 41,69 | 48,305 | 3,48 | 10,8173 | G | |
| D-207J-90 | | | | | | 104,00 | 2,82 | 1,000 | 10,50 | 23,36 | 80,64 | 64,15 | 80,621 | 4,03 | 32,80 | 25,63 | 71,183 | 4,00 | 9,3253 | G | |
| D-207JZ | | | | | | 129,00 | 4,64 | 0,567 | 18,50 | 38,87 | 90,13 | 100,51 | 51,142 | 3,40 | 42,93 | 61,35 | 48,839 | 3,37 | 15,2935 | G | |
| D-207J-01 | 15,00 | 16,50 | 0,35 | 12,80 | 17,40 | 23,30 | 0,90 | 4,366 | 3,50 | 9,56 | 13,74 | 0,00 | 59,979 | 4,85 | 10,21 | 8,65 | 57,152 | 4,81 | 3,6204 | F | |
| D-207J-02 | | | | | | 35,00 | 1,25 | 2,778 | 5,50 | 13,31 | 21,69 | 0,00 | 60,257 | 4,37 | 14,34 | 13,56 | 57,402 | 4,33 | 4,9369 | F | |
| D-207J-03 | | | | | | 48,90 | 1,67 | 1,910 | 8,00 | 18,00 | 30,90 | 0,00 | 59,024 | 4,10 | 19,50 | 19,98 | 56,159 | 4,06 | 6,5825 | G | |
| D-207J-04 | | | | | | 52,50 | 1,76 | 1,798 | 8,50 | 18,94 | 33,56 | 0,00 | 60,338 | 4,07 | 20,54 | 20,93 | 57,458 | 4,02 | 6,9117 | G | |
| D-207J-05 | | | | | | 75,70 | 2,43 | 1,223 | 12,50 | 26,44 | 49,26 | 0,00 | 60,223 | 3,88 | 28,79 | 30,82 | 57,347 | 3,84 | 9,5447 | G | |
| D-207J-06 | | | | | | 110,00 | 3,45 | 0,826 | 18,50 | 37,69 | 72,31 | 83,64 | 59,731 | 3,74 | 41,16 | 45,86 | 56,863 | 3,70 | 13,4942 | G | |
| D-207J-20 | 14,50 | 16,00 | 0,35 | 12,30 | 16,80 | 35,00 | 1,55 | 2,115 | 8,00 | 17,88 | 17,12 | 0,00 | 36,199 | 3,85 | 19,32 | 15,60 | 33,158 | 3,81 | 6,3631 | F | |
| D-207J-21 | 14,00 | 15,50 | 0,35 | 11,80 | 16,50 | 29,00 | 0,78 | 5,370 | 3,50 | 10,45 | 18,55 | 0,00 | 99,615 | 5,77 | 13,20 | 5,62 | 84,847 | 5,20 | 3,3790 | F | |
| D-207J-22 | 13,50 | 15,00 | 0,35 | 11,30 | 15,70 | 80,00 | 1,81 | 1,790 | 10,50 | 24,50 | 55,50 | 42,22 | 99,346 | 4,79 | 32,80 | 16,94 | 84,489 | 4,71 | 7,6796 | G | |
| D-207J-25 | | | | | | 54,00 | 2,57 | 1,233 | 17,00 | 34,15 | 19,85 | 0,00 | 24,478 | 3,55 | 36,97 | 17,00 | 20,999 | 3,49 | 11,2562 | F | |
| D-207J-26 | | | | | | 55,00 | 1,75 | 1,906 | 11,00 | 23,15 | 31,85 | 0,00 | 60,685 | 4,27 | 24,98 | 22,86 | 57,207 | 4,22 | 7,7016 | F | |
| D-207J-27 | 70,00 | 2,16 | 1,497 | 14,00 | 28,65 | 41,35 | 18,08 | 61,910 | 4,18 | 30,98 | 28,77 | 58,424 | 4,13 | 9,4789 | F | | | | | | |
| D-207J-08 | 13,00 | 14,50 | 0,35 | 10,90 | 15,30 | 32,30 | 0,94 | 4,268 | 5,50 | 13,00 | 19,30 | 0,00 | 82,356 | 5,23 | 13,88 | 8,67 | 78,619 | 5,17 | 4,2787 | F | |
| D-207J-09 | | | | | | 50,00 | 1,32 | 2,762 | 8,50 | 18,46 | 31,54 | 0,00 | 87,101 | 4,94 | 19,82 | 12,69 | 83,349 | 4,89 | 5,9901 | F | |
| D-207J-10 | | | | | | 73,50 | 1,82 | 1,878 | 12,50 | 25,74 | 47,76 | 37,51 | 89,697 | 4,77 | 27,74 | 18,10 | 85,937 | 4,71 | 8,2721 | G | |
| D-207J-11 | | | | | | 97,00 | 2,33 | 1,423 | 16,50 | 33,01 | 63,99 | 74,70 | 91,035 | 4,68 | 35,64 | 23,49 | 87,298 | 4,62 | 10,5540 | G | |
| D-207J-30 | 12,50 | 14,00 | 0,35 | 10,30 | 14,90 | 20,50 | 0,63 | 7,545 | 3,50 | 9,32 | 11,18 | 0,00 | 84,334 | 6,04 | 9,86 | 5,12 | 80,274 | 5,98 | 3,0170 | F | |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-207J-31 | 1,50 | 12,50 | 14,00 | 0,35 | 10,30 | 14,90 | 28,00 | 0,93 | 4,401 | 6,00 | 13,84 | 14,16 | 0,00 | 62,329 | 5,09 | 14,76 | 10,83 | 58,269 | 5,03 | 4,3884 | F |
| D-207J-32 | | | | | | | 30,40 | 0,87 | 4,801 | 5,50 | 12,93 | 17,47 | 0,00 | 83,854 | 5,45 | 13,77 | 8,09 | 79,842 | 5,39 | 4,1141 | F |
| D-207J-33 | | | | | | | 31,00 | 0,75 | 5,868 | 4,50 | 12,00 | 19,00 | 0,00 | 111,492 | 6,17 | 15,20 | 5,72 | 92,714 | 6,10 | 3,5655 | G |
| D-207J-34 | | | | | | | 35,00 | 0,81 | 5,281 | 5,00 | 13,90 | 21,10 | 0,00 | 111,433 | 6,30 | 17,40 | 6,33 | 92,949 | 6,12 | 3,8398 | G |
| D-207J-35 | | | | | | | 40,60 | 1,11 | 3,521 | 7,50 | 16,55 | 24,05 | 0,00 | 84,686 | 5,18 | 17,70 | 10,94 | 80,626 | 5,12 | 5,2112 | F |
| D-207J-36 | | | | | | | 45,60 | 1,23 | 3,107 | 8,50 | 18,35 | 27,25 | 0,00 | 84,645 | 5,09 | 19,65 | 12,39 | 80,616 | 5,03 | 5,7597 | G |
| D-207J-37 | | | | | | | 62,00 | 1,35 | 2,780 | 9,50 | 22,00 | 40,00 | 0,00 | 111,183 | 5,49 | 28,50 | 12,01 | 93,116 | 5,30 | 6,3083 | G |
| D-207J-38 | | | | | | | 65,70 | 1,70 | 2,112 | 12,50 | 25,58 | 40,12 | 21,83 | 84,757 | 4,87 | 27,50 | 18,22 | 80,697 | 4,81 | 7,9539 | G |
| D-207J-39 | | | | | | | 95,80 | 2,41 | 1,427 | 18,50 | 36,42 | 59,38 | 75,13 | 84,762 | 4,71 | 39,26 | 26,96 | 80,702 | 4,65 | 11,2452 | G |
| D-207K | 12,30 | 13,80 | 0,35 | 10,20 | 14,40 | 23,00 | 0,97 | 4,264 | 6,50 | 14,71 | 8,29 | 0,00 | 35,354 | 4,65 | 15,69 | 7,29 | 31,169 | 4,59 | 4,5880 | F | |
| D-207KA | 11,00 | 12,50 | 0,30 | 8,90 | 13,30 | 17,80 | 0,52 | 11,071 | 3,50 | 9,20 | 8,60 | 0,00 | 95,227 | 7,20 | 9,68 | 3,86 | 89,896 | 7,12 | 2,6550 | F | |
| D-207KB | | | | | | 26,20 | 0,72 | 7,045 | 5,50 | 12,74 | 13,46 | 0,00 | 94,825 | 6,49 | 13,49 | 6,09 | 89,544 | 6,41 | 3,6204 | F | |
| D-207KC | | | | | | 38,80 | 1,01 | 4,559 | 8,50 | 18,05 | 20,75 | 0,00 | 94,576 | 6,04 | 19,20 | 9,43 | 89,349 | 5,96 | 5,0686 | F | |
| D-207KD | | | | | | 55,80 | 1,40 | 3,100 | 12,50 | 25,14 | 30,66 | 0,00 | 95,050 | 5,77 | 26,84 | 13,81 | 89,772 | 5,69 | 6,9994 | G | |
| D-207KE | | | | | | 80,90 | 1,99 | 2,095 | 18,50 | 35,76 | 45,14 | 61,65 | 94,539 | 5,58 | 38,27 | 20,53 | 89,289 | 5,50 | 9,8958 | G | |
| D-207K-02 | | | | | | 10,50 | 12,00 | 0,30 | 8,50 | 12,70 | 55,00 | 1,30 | 3,564 | 12,50 | 25,00 | 30,00 | 17,46 | 106,913 | 6,31 | 26,63 | 11,57 |
| D-207K-10 | 10,00 | 11,50 | 0,25 | 8,00 | 12,10 | 12,75 | 0,37 | 20,630 | 2,50 | 7,38 | 5,37 | 0,00 | 110,781 | 9,35 | 7,69 | 2,00 | 104,386 | 9,20 | 1,9748 | F | |
| D-207K-12 | | | | | | 19,50 | 0,55 | 11,461 | 4,50 | 10,88 | 8,62 | 0,00 | 98,793 | 7,80 | 11,50 | 4,10 | 91,688 | 7,70 | 2,8524 | F | |
| D-207K-03 | | | | | | 25,00 | 0,73 | 7,934 | 6,50 | 14,38 | 10,63 | 0,00 | 84,304 | 7,02 | 15,20 | 6,82 | 77,758 | 6,92 | 3,7301 | F | |
| D-207K-04 | | | | | | 38,00 | 0,90 | 6,068 | 8,50 | 17,88 | 20,13 | 0,00 | 122,110 | 7,29 | 19,60 | 6,63 | 111,643 | 7,19 | 4,6078 | F | |
| D-207K-05 | | | | | | 51,00 | 1,33 | 3,820 | 13,50 | 26,63 | 24,38 | 0,00 | 93,120 | 6,48 | 28,32 | 13,22 | 86,645 | 6,39 | 6,8020 | F | |
| D-207K-08 | 9,50 | 11,00 | 0,25 | 7,40 | 11,70 | 55,00 | 1,30 | 4,149 | 14,50 | 28,23 | 26,77 | 30,18 | 111,056 | 7,22 | 30,00 | 11,20 | 103,713 | 7,10 | 6,8788 | F | |
| D-207KF | | | | | | 81,00 | 1,99 | 2,673 | 22,50 | 42,16 | 38,84 | 67,33 | 103,850 | 6,88 | 44,87 | 18,71 | 96,593 | 6,77 | 10,2139 | G | |
| D-207KG | 8,50 | 10,00 | 0,25 | 6,40 | 10,70 | 14,00 | 0,39 | 23,994 | 3,50 | 9,03 | 4,97 | 0,00 | 119,303 | 11,18 | 9,42 | 2,20 | 109,894 | 11,04 | 2,0516 | F | |
| D-207KH | | | | | | 20,40 | 0,54 | 15,269 | 5,50 | 12,47 | 7,93 | 0,00 | 121,048 | 10,06 | 13,08 | 3,40 | 111,770 | 9,92 | 2,7976 | F | |
| D-207KJ | | | | | | 24,50 | 0,65 | 11,997 | 7,00 | 15,06 | 9,44 | 0,00 | 113,304 | 9,64 | 18,53 | 5,70 | 71,623 | 9,50 | 3,3571 | F | |
| D-207KK | | | | | | 29,90 | 0,76 | 9,880 | 8,50 | 17,64 | 12,26 | 0,00 | 121,137 | 9,33 | 18,59 | 5,26 | 111,743 | 9,18 | 3,9166 | F | |
| D-207K-06 | | | | | | 40,00 | 0,91 | 7,998 | 10,50 | 21,08 | 18,92 | 0,00 | 151,295 | 9,52 | 24,00 | 5,66 | 127,970 | 9,38 | 4,6626 | F | |
| D-207KL | | | | | | 42,50 | 1,05 | 6,718 | 12,50 | 24,53 | 17,97 | 0,00 | 120,742 | 8,88 | 25,92 | 7,75 | 111,391 | 8,74 | 5,4087 | G | |
| D-207KM | | | | | | 48,00 | 1,05 | 6,718 | 12,50 | 24,53 | 23,47 | 24,40 | 157,693 | 9,49 | 29,00 | 6,76 | 127,650 | 9,10 | 5,4087 | G | |
| D-207KN | | | | | | 61,50 | 1,49 | 4,539 | 18,50 | 34,86 | 26,64 | 46,28 | 120,924 | 8,58 | 36,92 | 11,45 | 111,580 | 8,43 | 7,6467 | G | |
| D-207KO | 67,70 | 1,64 | 4,097 | 20,50 | 38,31 | 29,39 | 54,35 | 120,415 | 8,51 | 40,59 | 12,74 | 111,058 | 8,37 | 8,3927 | G | | | | | | |
| D-207KP | 75,00 | 1,64 | 4,097 | 20,50 | 38,31 | 36,69 | 63,28 | 150,320 | 8,96 | 44,00 | 11,15 | 126,994 | 8,82 | 8,3927 | H | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | | weight one spring in gram | price group | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------|---------------------------|-------------|-------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-207J-31 | 1,50 | 12,50 | 14,00 | 0,35 | 10,30 | 14,90 | 28,00 | 1,09 | 3,780 | 6,00 | 13,84 | 14,16 | 0,00 | 53,534 | 4,95 | 14,76 | 8,38 | 50,047 | 4,90 | 4,3884 | K | | | | |
| VD-207J-32 | | | | | | | 30,40 | 1,02 | 4,124 | 5,50 | 12,93 | 17,47 | 0,00 | 72,022 | 5,27 | 13,77 | 7,68 | 68,576 | 5,22 | 4,1141 | K | | | | |
| VD-207J-33 | | | | | | | 31,00 | 0,88 | 5,040 | 4,50 | 12,00 | 19,00 | 0,00 | 95,760 | 5,93 | 14,75 | 4,24 | 81,900 | 5,80 | 3,5655 | K | | | | |
| VD-207J-34 | | | | | | | 35,00 | 0,95 | 4,536 | 5,00 | 13,75 | 21,25 | 0,00 | 96,390 | 5,91 | 16,95 | 4,72 | 81,875 | 5,86 | 3,8398 | K | | | | |
| VD-207J-35 | | | | | | | 40,60 | 1,29 | 3,024 | 7,50 | 16,55 | 24,05 | 0,00 | 72,737 | 5,00 | 17,70 | 10,47 | 69,250 | 4,95 | 5,2112 | K | | | | |
| VD-207J-36 | | | | | | | 45,60 | 1,43 | 2,668 | 8,50 | 18,35 | 27,25 | 0,00 | 72,701 | 4,91 | 19,65 | 11,51 | 69,241 | 4,86 | 5,7597 | L | | | | |
| VD-207J-37 | | | | | | | 62,00 | 1,57 | 2,387 | 9,50 | 21,70 | 40,30 | 0,00 | 96,211 | 5,25 | 27,70 | 8,97 | 81,887 | 5,10 | 6,3083 | L | | | | |
| VD-207J-38 | | | | | | | 65,70 | 1,98 | 1,814 | 12,50 | 25,58 | 40,12 | 0,00 | 72,797 | 4,69 | 27,49 | 16,91 | 69,328 | 4,64 | 7,9539 | L | | | | |
| VD-207J-39 | | | | | | | 95,80 | 2,81 | 1,226 | 18,50 | 36,42 | 59,38 | 74,54 | 72,802 | 4,53 | 39,26 | 25,02 | 69,315 | 4,48 | 11,2452 | L | | | | |
| VD-207K | 12,30 | 13,80 | 0,35 | 10,20 | 14,40 | 23,00 | 1,13 | 3,662 | 6,50 | 14,71 | 8,29 | 0,00 | 30,366 | 4,58 | 15,69 | 7,31 | 26,771 | 4,52 | 4,5880 | J | | | | | |
| VD-207KA | 11,00 | 12,50 | 0,30 | 8,90 | 13,30 | 17,80 | 0,61 | 9,509 | 3,50 | 9,20 | 8,60 | 0,00 | 81,790 | 7,00 | 9,68 | 3,58 | 77,212 | 6,93 | 2,6550 | J | | | | | |
| VD-207KB | | | | | | 26,20 | 0,84 | 6,051 | 5,50 | 12,74 | 13,46 | 0,00 | 81,444 | 6,29 | 13,49 | 5,66 | 76,909 | 5,93 | 3,6204 | J | | | | | |
| VD-207KC | | | | | | 38,80 | 1,18 | 3,915 | 8,50 | 18,05 | 20,75 | 0,00 | 81,231 | 5,84 | 19,20 | 8,77 | 76,742 | 5,77 | 5,0686 | J | | | | | |
| VD-207KD | | | | | | 55,80 | 1,63 | 2,662 | 12,50 | 25,14 | 30,66 | 0,00 | 81,638 | 5,57 | 26,84 | 12,82 | 77,105 | 5,50 | 6,9994 | K | | | | | |
| VD-207KE | | | | | | 80,90 | 2,31 | 1,799 | 18,50 | 35,76 | 45,14 | 61,07 | 81,199 | 5,38 | 38,27 | 19,10 | 76,690 | 5,31 | 9,8958 | K | | | | | |
| VD-207K-02 | | | | | | 10,50 | 12,00 | 0,30 | 8,50 | 12,70 | 55,00 | 1,54 | 3,061 | 12,50 | 25,00 | 30,00 | 0,00 | 91,827 | 6,08 | 26,63 | 10,39 | 86,847 | 6,01 | 6,6813 | J |
| VD-207K-10 | | | | | | 10,00 | 11,50 | 0,25 | 8,00 | 12,10 | 12,75 | 0,40 | 17,719 | 2,50 | 7,40 | 5,35 | 0,00 | 94,795 | 9,10 | 7,70 | 1,90 | 89,480 | 9,05 | 1,9748 | J |
| VD-207K-12 | | | | | | | | | | | 19,50 | 0,60 | 9,844 | 4,50 | 10,90 | 8,60 | 0,00 | 84,656 | 7,60 | 11,50 | 4,10 | 78,750 | 7,50 | 2,8524 | J |
| VD-207K-03 | | | | | | | | | | | 25,00 | 0,84 | 6,815 | 6,50 | 14,38 | 10,63 | 0,00 | 72,408 | 6,84 | 15,20 | 5,71 | 66,786 | 6,76 | 3,7301 | J |
| VD-207K-04 | 38,00 | 1,05 | 5,211 | 8,50 | 17,88 | | | | | | 20,13 | 0,00 | 104,879 | 7,03 | 19,10 | 5,42 | 98,495 | 6,95 | 4,6078 | J | | | | | |
| VD-207K-05 | 51,00 | 1,55 | 3,281 | 13,50 | 26,63 | | | | | | 24,38 | 0,00 | 79,980 | 6,29 | 28,32 | 11,86 | 74,419 | 6,20 | 6,8020 | J | | | | | |
| VD-207K-08 | 9,50 | 11,00 | 0,25 | 7,40 | 11,70 | 55,00 | 1,50 | 3,563 | 14,50 | 28,25 | 26,75 | 28,70 | 95,314 | 7,00 | 30,20 | 10,60 | 88,366 | 6,90 | 6,8788 | K | | | | | |
| VD-207KF | | | | | | 81,00 | 2,32 | 2,296 | 22,50 | 42,16 | 38,84 | 66,97 | 89,197 | 6,66 | 44,87 | 17,84 | 82,964 | 6,57 | 10,2139 | K | | | | | |
| VD-207KG | | | | | | 8,50 | 10,00 | 0,25 | 6,40 | 10,70 | 14,00 | 0,46 | 20,609 | 3,50 | 9,03 | 4,97 | 0,00 | 102,468 | 10,93 | 9,42 | 2,04 | 94,387 | 10,80 | 2,0516 | J |
| VD-207KH | 20,40 | 0,63 | 13,115 | 5,50 | 12,47 | | | | | | 7,93 | 0,00 | 103,967 | 9,81 | 13,08 | 3,14 | 95,999 | 9,68 | 2,7976 | J | | | | | |
| VD-207KJ | 24,50 | 0,76 | 10,304 | 7,00 | 15,06 | | | | | | 9,44 | 0,00 | 97,316 | 9,38 | 15,83 | 4,35 | 89,338 | 9,26 | 3,3571 | J | | | | | |
| VD-207KK | 29,90 | 0,89 | 8,486 | 8,50 | 17,64 | | | | | | 12,26 | 0,00 | 104,044 | 9,07 | 18,59 | 4,85 | 95,975 | 8,95 | 3,9166 | J | | | | | |
| VD-207K-06 | 40,00 | 1,06 | 6,870 | 10,50 | 21,08 | | | | | | 18,92 | 0,00 | 129,947 | 9,20 | 23,75 | 4,27 | 111,630 | 9,08 | 4,6626 | J | | | | | |
| VD-207KL | 42,50 | 1,23 | 5,770 | 12,50 | 24,53 | | | | | | 17,97 | 0,00 | 103,705 | 8,63 | 25,92 | 7,27 | 95,673 | 8,51 | 5,4087 | K | | | | | |
| VD-207KM | 48,00 | 1,23 | 5,770 | 12,50 | 24,53 | | | | | | 23,47 | 22,98 | 135,442 | 9,19 | 28,65 | 5,10 | 111,657 | 8,90 | 5,4087 | K | | | | | |
| VD-207KN | 61,50 | 1,74 | 3,899 | 18,50 | 34,86 | 26,64 | 45,81 | 103,861 | 8,32 | 36,92 | 10,58 | 95,836 | 8,20 | 7,6467 | K | | | | | | | | | | |
| VD-207KO | 67,70 | 1,94 | 3,519 | 20,50 | 38,31 | 29,39 | 53,98 | 103,424 | 8,25 | 40,59 | 11,80 | 95,388 | 8,13 | 8,3927 | K | | | | | | | | | | |
| VD-207KP | 75,00 | 1,91 | 3,519 | 20,50 | 38,31 | 36,69 | 62,98 | 129,109 | 8,64 | 43,25 | 8,33 | 111,714 | 8,48 | 8,3927 | L | | | | | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-207KQ | 1,50 | 8,50 | 10,00 | 0,25 | 6,40 | 10,70 | 260,00 | 6,40 | 0,981 | 73,50 | 129,59 | 130,41 | 256,85 | 127,984 | 8,20 | 145,90 | 29,95 | 111,973 | 8,05 | 28,1623 | N |
| VD-207KR | | 7,00 | 8,50 | 0,25 | 4,90 | 9,20 | 12,30 | 0,28 | 36,899 | 3,50 | 8,95 | 3,35 | 0,00 | 123,740 | 16,06 | 9,30 | 1,29 | 110,696 | 15,86 | 1,6895 | J |
| VD-207KS | | | | | | | 17,70 | 0,53 | 23,481 | 5,50 | 12,34 | 5,36 | 0,00 | 125,752 | 14,36 | 12,89 | 1,98 | 112,944 | 14,17 | 2,3039 | J |
| VD-207KT | | | | | | | 25,60 | 0,75 | 15,194 | 8,50 | 17,44 | 8,16 | 0,00 | 123,957 | 13,23 | 18,29 | 3,12 | 111,065 | 13,03 | 3,2254 | J |
| VD-207KU | | | | | | | 36,30 | 1,04 | 10,332 | 12,50 | 24,24 | 12,06 | 0,00 | 124,625 | 12,57 | 25,49 | 4,56 | 111,685 | 12,38 | 4,4542 | J |
| VD-207KV | | | | | | | 52,20 | 1,47 | 6,981 | 18,50 | 34,43 | 17,77 | 39,83 | 124,039 | 12,10 | 36,27 | 6,78 | 111,205 | 11,90 | 6,2973 | K |
| VD-207K-01 | 1,60 | 26,40 | 28,00 | 0,60 | 24,00 | 29,50 | 55,00 | 4,10 | 0,890 | 3,50 | 11,65 | 43,35 | 0,00 | 38,604 | 4,23 | 13,08 | 20,71 | 37,328 | 4,21 | 7,2498 | K |
| VD-207L | | | | | | | 68,50 | 4,10 | 0,890 | 3,50 | 11,65 | 56,85 | 0,00 | 50,625 | 4,41 | 13,08 | 16,92 | 49,349 | 4,39 | 7,2498 | K |
| VD-207L-01 | | | | | | | 85,00 | 5,66 | 0,567 | 5,50 | 16,47 | 68,53 | 0,00 | 38,830 | 3,79 | 18,71 | 32,55 | 37,563 | 3,77 | 9,8861 | K |
| VD-207M | | | | | | | 106,00 | 5,66 | 0,567 | 5,50 | 16,47 | 89,53 | 0,00 | 50,730 | 3,97 | 18,80 | 26,43 | 49,412 | 3,95 | 9,8861 | K |
| VD-207M-01 | | | | | | | 130,00 | 7,97 | 0,367 | 8,50 | 23,71 | 106,29 | 0,00 | 38,970 | 3,51 | 27,17 | 50,31 | 37,703 | 3,49 | 13,8406 | L |
| VD-207N | | | | | | | 181,00 | 8,73 | 0,328 | 9,50 | 26,13 | 154,87 | 128,14 | 50,807 | 3,63 | 30,30 | 45,59 | 49,439 | 3,61 | 15,1587 | L |
| VD-207N-01 | | | | | | | 206,00 | 11,79 | 0,231 | 13,50 | 35,78 | 170,22 | 162,19 | 39,296 | 3,31 | 61,50 | 56,52 | 33,359 | 3,29 | 20,4313 | L |
| VD-207O | | | | | | | 292,00 | 13,32 | 0,201 | 15,50 | 40,61 | 251,39 | 263,45 | 50,547 | 3,44 | 106,00 | 91,74 | 37,399 | 3,42 | 23,0676 | L |
| VD-207O-01 | | 22,00 | 23,60 | 0,45 | 19,70 | 24,40 | 19,50 | 1,80 | 2,394 | 2,25 | 8,20 | 11,30 | 0,00 | 27,047 | 4,90 | 8,95 | 10,50 | 25,252 | 4,90 | 4,6684 | J |
| VD-207P | | | | | | | 27,50 | 3,20 | 1,077 | 5,00 | 14,27 | 13,23 | 0,00 | 14,251 | 3,67 | 15,80 | 11,70 | 12,602 | 3,65 | 7,6892 | J |
| VD-207S | | | | | | | 60,00 | 4,50 | 0,634 | 8,50 | 22,05 | 37,95 | 0,00 | 24,044 | 3,40 | 24,70 | 35,00 | 22,365 | 3,40 | 11,5338 | J |
| VD-207T | | | | | | | 90,00 | 6,20 | 0,431 | 12,50 | 30,90 | 59,10 | 0,00 | 25,462 | 3,30 | 34,80 | 55,00 | 23,782 | 3,30 | 15,9276 | L |
| VD-207U | | 20,00 | 21,60 | 0,45 | 17,70 | 23,00 | 17,50 | 1,20 | 4,096 | 1,75 | 6,95 | 10,55 | 0,00 | 43,213 | 5,80 | 7,45 | 8,25 | 41,165 | 5,80 | 3,7447 | J |
| VD-207W | | | | | | | 25,00 | 1,50 | 2,867 | 2,50 | 8,55 | 16,45 | 0,00 | 47,165 | 5,10 | 9,30 | 10,80 | 45,015 | 5,10 | 4,4937 | J |
| VD-208 | | | | | | | 48,00 | 1,92 | 2,048 | 3,50 | 13,30 | 34,70 | 0,00 | 71,066 | 5,07 | 16,95 | 8,20 | 63,590 | 5,00 | 5,4923 | J |
| VD-209 | | | | | | | 73,50 | 2,65 | 1,303 | 5,50 | 18,95 | 54,55 | 0,00 | 71,094 | 4,59 | 26,65 | 12,90 | 61,058 | 4,50 | 7,4895 | K |
| VD-210 | | | | | | | 110,00 | 3,73 | 0,843 | 8,50 | 25,65 | 84,35 | 45,98 | 71,132 | 4,26 | 34,50 | 19,90 | 63,669 | 4,20 | 10,4853 | K |
| VD-211 | | | | | | | 165,00 | 5,16 | 0,573 | 12,50 | 41,20 | 123,80 | 134,18 | 70,992 | 4,12 | 54,00 | 29,32 | 63,652 | 4,05 | 14,4797 | L |
| VD-211A | | | | | | | 165,00 | 7,30 | 0,387 | 18,50 | 42,70 | 122,30 | 134,18 | 47,387 | 3,54 | 47,65 | 62,06 | 45,468 | 3,51 | 20,4712 | M |
| VD-212 | | | | | | | 240,00 | 7,30 | 0,387 | 18,50 | 56,30 | 183,70 | 220,26 | 71,176 | 3,98 | 75,70 | 42,35 | 63,660 | 3,90 | 20,4712 | M |
| VD-212A | | | | | | | 240,00 | 8,73 | 0,319 | 22,50 | 51,24 | 188,76 | 220,26 | 60,136 | 3,68 | 57,26 | 69,84 | 58,217 | 3,65 | 24,4656 | M |
| VD-212B | | 18,20 | 19,80 | 0,45 | 15,90 | 20,80 | 29,00 | 1,50 | 2,718 | 3,50 | 10,45 | 18,55 | 0,00 | 50,422 | 4,83 | 11,28 | 9,72 | 48,158 | 4,79 | 4,9980 | J |
| VD-212C | | | | | | | 44,00 | 2,07 | 1,729 | 5,50 | 14,59 | 29,41 | 0,00 | 50,867 | 4,34 | 15,89 | 15,27 | 48,615 | 4,31 | 6,8154 | J |
| VD-212D | | | | | | | 66,00 | 2,91 | 1,119 | 8,50 | 20,80 | 45,20 | 0,00 | 50,582 | 4,02 | 22,80 | 23,61 | 48,344 | 3,98 | 9,5416 | K |
| VD-212E | | | | | | | 104,00 | 4,31 | 0,705 | 13,50 | 31,15 | 72,85 | 52,13 | 51,328 | 3,81 | 34,33 | 37,49 | 49,089 | 3,77 | 14,0852 | K |
| VD-212G | | 16,00 | 17,60 | 0,35 | 13,80 | 18,60 | 15,50 | 0,70 | 8,000 | 1,75 | 6,70 | 8,80 | 0,00 | 70,400 | 6,80 | 7,10 | 3,70 | 67,200 | 6,80 | 2,9958 | J |
| VD-212H | | | | | | | 22,50 | 0,80 | 5,600 | 2,50 | 8,20 | 14,30 | 0,00 | 80,080 | 6,20 | 8,75 | 4,10 | 77,000 | 6,20 | 3,5949 | J |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-207KQ | 1,50 | 8,50 | 10,00 | 0,25 | 6,40 | 10,70 | 260,00 | 5,50 | 1,143 | 73,50 | 129,59 | 130,41 | 256,92 | 149,010 | 8,52 | 148,50 | 39,81 | 127,398 | 8,38 | 28,1623 | M |
| D-207KR | | 7,00 | 8,50 | 0,25 | 4,90 | 9,20 | 12,30 | 0,33 | 42,961 | 3,50 | 8,95 | 3,35 | 0,00 | 144,068 | 16,36 | 9,30 | 1,40 | 128,882 | 16,14 | 1,6895 | F |
| D-207KS | | | | | | | 17,70 | 0,46 | 27,339 | 5,50 | 12,34 | 5,36 | 0,00 | 146,412 | 14,67 | 12,89 | 2,16 | 131,499 | 14,45 | 2,3039 | F |
| D-207KT | | | | | | | 25,60 | 0,64 | 17,690 | 8,50 | 17,44 | 8,16 | 0,00 | 144,321 | 13,53 | 18,29 | 3,38 | 129,311 | 13,31 | 3,2254 | F |
| D-207KU | | | | | | | 36,30 | 0,89 | 12,029 | 12,50 | 24,24 | 12,06 | 9,41 | 145,099 | 12,88 | 25,49 | 4,95 | 130,033 | 12,65 | 4,4542 | F |
| D-207KV | | | | | | | 52,20 | 1,26 | 8,128 | 18,50 | 34,43 | 17,77 | 40,18 | 144,417 | 12,40 | 36,27 | 7,35 | 129,474 | 12,18 | 6,2973 | G |
| D-207K-01 | 1,60 | 26,40 | 28,00 | 0,60 | 24,00 | 29,50 | 55,00 | 3,52 | 1,037 | 3,50 | 11,65 | 43,35 | 0,00 | 44,946 | 4,32 | 13,08 | 25,30 | 43,460 | 4,30 | 7,2498 | F |
| D-207L | | | | | | | 68,50 | 3,52 | 1,037 | 3,50 | 11,65 | 56,85 | 0,00 | 58,942 | 4,53 | 13,08 | 19,85 | 57,456 | 4,51 | 7,2498 | G |
| D-207L-01 | | | | | | | 85,00 | 4,86 | 0,660 | 5,50 | 16,47 | 68,53 | 0,00 | 45,210 | 4,86 | 18,71 | 39,59 | 43,734 | 3,86 | 9,8861 | G |
| D-207M | | | | | | | 106,00 | 4,86 | 0,660 | 5,50 | 16,47 | 89,53 | 0,00 | 59,064 | 4,09 | 18,71 | 31,10 | 57,589 | 4,07 | 9,8861 | G |
| D-207M-01 | | | | | | | 130,00 | 6,84 | 0,427 | 8,50 | 23,71 | 106,29 | 0,00 | 45,373 | 3,60 | 27,17 | 61,04 | 43,897 | 3,58 | 13,8406 | G |
| D-207N | | | | | | | 181,00 | 7,50 | 0,382 | 9,50 | 26,13 | 154,87 | 129,80 | 59,154 | 3,75 | 31,00 | 54,05 | 57,293 | 3,73 | 15,1587 | H |
| D-207N-01 | | | | | | | 206,00 | 6,84 | 0,269 | 13,50 | 35,78 | 170,22 | 163,30 | 45,752 | 3,97 | 72,00 | 76,92 | 36,017 | 3,65 | 20,4313 | H |
| D-207O | | | | | | | 292,00 | 11,44 | 0,234 | 15,50 | 40,61 | 251,39 | 264,00 | 58,851 | 3,56 | 106,00 | 111,96 | 43,543 | 3,54 | 23,0676 | H |
| D-207O-01 | | 22,00 | 23,60 | 0,45 | 19,70 | 24,40 | 19,50 | 1,60 | 2,787 | 2,25 | 8,18 | 11,32 | 0,00 | 31,546 | 4,97 | 8,90 | 10,50 | 29,539 | 4,94 | 4,6684 | F |
| D-207P | | | | | | | 27,50 | 2,75 | 1,254 | 5,00 | 14,27 | 13,23 | 0,00 | 16,592 | 3,71 | 15,80 | 11,70 | 14,672 | 3,68 | 7,6892 | F |
| D-207S | | | | | | | 60,00 | 4,00 | 0,738 | 8,50 | 22,02 | 37,98 | 0,00 | 28,017 | 3,48 | 24,70 | 35,00 | 26,040 | 3,45 | 11,5338 | F |
| D-207T | | | | | | | 90,00 | 5,20 | 0,502 | 12,50 | 30,87 | 59,13 | 0,00 | 29,660 | 3,33 | 34,80 | 55,00 | 27,689 | 3,30 | 15,9276 | G |
| D-207U | | 20,00 | 21,60 | 0,45 | 17,70 | 23,00 | 17,50 | 1,00 | 4,769 | 1,75 | 6,94 | 10,56 | 0,00 | 50,360 | 5,88 | 7,50 | 7,70 | 47,689 | 5,80 | 3,7447 | F |
| D-207W | | | | | | | 25,00 | 1,30 | 3,338 | 2,50 | 8,54 | 16,46 | 0,00 | 54,947 | 5,25 | 9,30 | 10,40 | 52,410 | 5,20 | 4,4937 | F |
| D-208 | | | | | | | 48,00 | 1,65 | 2,384 | 3,50 | 13,10 | 34,90 | 0,00 | 83,218 | 5,26 | 17,23 | 11,22 | 73,370 | 5,23 | 5,4923 | F |
| D-209 | | | | | | | 73,50 | 2,27 | 1,517 | 5,50 | 18,60 | 54,90 | 0,00 | 83,304 | 4,78 | 25,00 | 17,58 | 73,593 | 4,75 | 7,4895 | G |
| D-210 | | | | | | | 110,00 | 3,20 | 0,982 | 8,50 | 25,10 | 84,90 | 50,43 | 83,358 | 4,45 | 34,70 | 27,01 | 73,932 | 4,41 | 10,4853 | G |
| D-211 | | | | | | | 165,00 | 4,43 | 0,668 | 12,50 | 40,50 | 124,50 | 134,90 | 83,122 | 4,31 | 54,00 | 39,60 | 74,109 | 4,28 | 14,4797 | H |
| D-211A | | | | | | | 165,00 | 6,27 | 0,451 | 18,50 | 42,70 | 122,30 | 134,90 | 55,172 | 3,66 | 47,65 | 77,62 | 52,938 | 3,62 | 20,4712 | J |
| D-212 | | | | | | | 240,00 | 6,27 | 0,451 | 18,50 | 55,30 | 184,70 | 220,70 | 83,321 | 4,16 | 76,00 | 58,77 | 73,983 | 4,16 | 20,4712 | H |
| D-212A | | | | | | | 240,00 | 7,50 | 0,371 | 22,50 | 51,24 | 188,76 | 220,70 | 70,015 | 3,83 | 57,26 | 78,20 | 67,781 | 3,80 | 24,4656 | J |
| D-212B | | 18,20 | 19,80 | 0,45 | 15,90 | 20,80 | 29,00 | 1,29 | 3,164 | 3,50 | 10,45 | 18,55 | 0,00 | 58,706 | 4,95 | 11,28 | 12,23 | 56,070 | 4,91 | 4,9980 | F |
| D-212C | | | | | | | 44,00 | 1,78 | 2,014 | 5,50 | 14,59 | 29,41 | 0,00 | 59,224 | 4,46 | 15,89 | 19,11 | 56,602 | 4,43 | 6,8154 | F |
| D-212D | | | | | | | 66,00 | 2,50 | 1,303 | 8,50 | 20,80 | 45,20 | 0,00 | 58,892 | 4,14 | 22,80 | 29,63 | 56,286 | 4,10 | 9,5416 | G |
| D-212E | | | | | | | 104,00 | 3,70 | 0,820 | 13,50 | 31,15 | 72,85 | 54,88 | 59,761 | 3,93 | 34,33 | 46,65 | 57,154 | 3,89 | 14,0852 | G |
| D-212G | | 16,00 | 17,60 | 0,35 | 13,80 | 18,60 | 15,50 | 0,60 | 9,314 | 1,75 | 6,70 | 8,80 | 0,00 | 81,966 | 6,98 | 7,10 | 3,90 | 78,240 | 6,90 | 2,9958 | F |
| D-212H | | | | | | | 22,50 | 0,70 | 6,520 | 2,50 | 8,20 | 14,30 | 0,00 | 93,236 | 6,37 | 8,80 | 5,00 | 89,324 | 3,10 | 3,5949 | F |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-213 | 1,60 | 16,00 | 17,60 | 0,35 | 13,80 | 18,60 | 34,00 | 0,95 | 4,657 | 3,50 | 11,65 | 22,35 | 0,00 | 104,087 | 6,07 | 14,85 | 7,02 | 89,184 | 6,02 | 4,3938 | F |
| D-214 | | | | | | | 51,10 | 1,31 | 2,964 | 5,50 | 15,95 | 35,15 | 0,00 | 104,172 | 5,51 | 20,80 | 10,94 | 89,798 | 5,46 | 5,9916 | F |
| D-215 | | | | | | | 77,50 | 1,84 | 1,918 | 8,50 | 23,35 | 54,15 | 0,00 | 103,841 | 5,18 | 30,70 | 16,92 | 89,746 | 5,13 | 8,3882 | G |
| D-216 | | | | | | | 110,00 | 2,55 | 1,304 | 12,50 | 30,10 | 79,90 | 79,11 | 104,190 | 4,92 | 41,00 | 24,81 | 89,976 | 4,87 | 11,5837 | G |
| D-216A | | | | | | | 110,00 | 3,60 | 0,881 | 18,50 | 40,20 | 69,80 | 79,11 | 61,499 | 4,10 | 43,90 | 51,28 | 58,239 | 4,05 | 16,3770 | H |
| D-217 | | | | | | | 165,00 | 3,60 | 0,881 | 18,50 | 46,90 | 118,10 | 146,60 | 104,056 | 4,83 | 63,00 | 36,78 | 89,870 | 4,78 | 16,3770 | H |
| D-217A | | | | | | | 165,00 | 4,31 | 0,724 | 22,50 | 48,20 | 116,80 | 146,60 | 84,615 | 4,39 | 52,70 | 49,50 | 81,355 | 4,34 | 19,5725 | J |
| D-217A-10 | | 15,40 | 17,00 | 0,35 | 13,20 | 17,90 | 14,50 | 0,55 | 10,446 | 1,75 | 6,67 | 7,83 | 0,00 | 81,792 | 7,16 | 7,10 | 3,75 | 77,300 | 7,10 | 2,8834 | G |
| D-217A-12 | | | | | | | 22,00 | 0,70 | 6,647 | 2,75 | 8,65 | 13,35 | 0,00 | 88,743 | 6,28 | 9,20 | 5,60 | 85,087 | 6,20 | 3,6524 | G |
| D-217B | | | | | | | 28,70 | 0,87 | 5,223 | 3,50 | 10,14 | 18,56 | 0,00 | 96,948 | 6,00 | 10,81 | 6,37 | 93,439 | 5,95 | 4,2291 | G |
| D-217C | | | | | | | 43,30 | 1,20 | 3,324 | 5,50 | 14,10 | 29,20 | 0,00 | 97,043 | 5,45 | 15,50 | 10,14 | 92,399 | 5,40 | 5,7669 | G |
| D-217D | | | | | | | 72,40 | 1,86 | 1,924 | 9,50 | 22,03 | 50,37 | 0,00 | 96,920 | 5,02 | 23,85 | 17,30 | 93,422 | 4,97 | 8,8426 | G |
| D-217E | | | | | | | 116,00 | 2,83 | 1,179 | 15,50 | 33,93 | 82,07 | 89,93 | 96,796 | 4,79 | 36,90 | 28,28 | 93,289 | 4,74 | 13,4561 | H |
| D-217F | | 13,50 | 15,10 | 0,35 | 11,30 | 15,80 | 47,00 | 1,69 | 2,360 | 11,50 | 25,40 | 21,60 | 0,00 | 50,957 | 4,76 | 27,30 | 19,70 | 46,485 | 4,69 | 9,0997 | H |
| D-217F-10 | | 12,50 | 14,10 | 0,30 | 10,40 | 14,70 | 12,50 | 0,40 | 15,193 | 2,25 | 7,49 | 5,01 | 0,00 | 76,115 | 7,99 | 7,90 | 3,65 | 69,886 | 7,90 | 2,6525 | F |
| D-217G | | | | | | | 17,00 | 0,60 | 9,767 | 3,50 | 9,87 | 7,13 | 0,00 | 69,611 | 6,88 | 10,41 | 6,02 | 64,363 | 6,80 | 3,4327 | F |
| D-218 | | | | | | | 24,00 | 0,60 | 9,767 | 3,50 | 10,35 | 13,65 | 0,00 | 133,316 | 7,90 | 12,70 | 4,12 | 110,364 | 7,82 | 3,4327 | F |
| D-218A | | | | | | | 26,00 | 0,82 | 6,215 | 5,50 | 13,69 | 12,31 | 0,00 | 76,536 | 6,27 | 14,54 | 9,02 | 71,226 | 6,19 | 4,6809 | F |
| D-219 | | | | | | | 36,00 | 0,82 | 6,215 | 5,50 | 14,55 | 21,45 | 0,00 | 133,316 | 7,20 | 18,30 | 6,40 | 110,009 | 7,12 | 4,6809 | F |
| D-219A | | | | | | | 38,00 | 1,16 | 4,022 | 8,50 | 19,41 | 18,59 | 0,00 | 74,781 | 5,79 | 20,71 | 14,11 | 69,533 | 5,71 | 6,5533 | F |
| D-220 | | | | | | | 53,50 | 1,16 | 4,022 | 8,50 | 20,30 | 33,20 | 0,00 | 133,517 | 6,72 | 26,20 | 10,06 | 109,790 | 6,64 | 6,5533 | F |
| D-220A | | | | | | | 59,00 | 1,72 | 2,532 | 13,50 | 28,94 | 30,06 | 0,00 | 76,122 | 5,49 | 31,01 | 22,19 | 70,874 | 5,41 | 9,6739 | G |
| D-221 | | | | | | | 78,00 | 1,61 | 2,735 | 12,50 | 29,30 | 48,70 | 49,73 | 133,179 | 6,48 | 37,50 | 14,65 | 110,755 | 6,41 | 9,0498 | G |
| D-221A | | | | | | | 78,00 | 2,27 | 1,848 | 18,50 | 38,47 | 39,53 | 49,73 | 73,042 | 5,30 | 41,31 | 31,08 | 67,794 | 5,22 | 12,7945 | H |
| D-222 | | | | | | | 115,00 | 2,27 | 1,848 | 18,50 | 42,80 | 72,20 | 98,62 | 133,408 | 6,32 | 55,00 | 21,66 | 110,866 | 6,25 | 12,7945 | H |
| D-222A | | | | | | | 115,00 | 2,72 | 1,519 | 22,50 | 46,10 | 68,90 | 98,62 | 104,684 | 5,70 | 49,55 | 29,39 | 99,436 | 5,62 | 15,2910 | J |
| D-222A-10 | | 11,10 | 12,70 | 0,30 | 9,00 | 13,30 | 12,50 | 0,40 | 21,697 | 2,25 | 7,42 | 5,08 | 0,00 | 110,220 | 9,97 | 7,80 | 2,35 | 101,975 | 9,85 | 2,3554 | F |
| D-222A-12 | | | | | | | 17,00 | 0,50 | 13,948 | 3,50 | 9,76 | 7,24 | 0,00 | 100,983 | 8,60 | 10,30 | 4,00 | 93,451 | 8,48 | 3,0482 | F |
| D-222A-14 | | | | | | | 26,00 | 0,70 | 8,876 | 5,50 | 13,52 | 12,48 | 0,00 | 110,772 | 7,88 | 14,30 | 5,70 | 103,849 | 7,78 | 4,1567 | F |
| D-222B | | | | | | | 35,00 | 0,99 | 5,743 | 8,50 | 19,14 | 15,86 | 0,00 | 91,078 | 7,03 | 20,31 | 10,35 | 84,369 | 6,93 | 5,8193 | F |
| D-222C | | | | | | | 41,00 | 1,08 | 5,139 | 9,50 | 21,02 | 19,98 | 0,00 | 102,685 | 7,10 | 22,33 | 10,66 | 95,940 | 7,00 | 6,3735 | F |
| D-222D | | | | | | | 54,00 | 1,37 | 3,905 | 12,50 | 26,64 | 27,36 | 0,00 | 106,837 | 6,94 | 28,36 | 13,59 | 100,135 | 6,84 | 8,0362 | F |
| D-222E | | | | | | | 67,00 | 1,65 | 3,150 | 15,50 | 32,27 | 34,73 | 40,31 | 109,382 | 6,84 | 34,41 | 16,53 | 102,643 | 6,74 | 9,6989 | G |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-213 | 1,60 | 16,00 | 17,60 | 0,35 | 13,80 | 18,60 | 34,00 | 1,10 | 4,000 | 3,50 | 11,85 | 22,15 | 0,00 | 88,600 | 5,84 | 14,65 | 5,12 | 77,400 | 5,56 | 4,3938 | J |
| VD-214 | | | | | | | 51,10 | 1,52 | 2,545 | 5,50 | 16,25 | 34,85 | 0,00 | 88,709 | 5,20 | 20,65 | 8,04 | 77,509 | 5,02 | 5,9916 | J |
| VD-215 | | | | | | | 77,50 | 2,14 | 1,647 | 8,50 | 23,65 | 53,85 | 0,00 | 88,694 | 4,90 | 30,40 | 12,41 | 77,576 | 4,68 | 8,3882 | K |
| VD-216 | | | | | | | 110,00 | 2,96 | 1,120 | 12,50 | 30,65 | 79,35 | 78,10 | 88,872 | 4,69 | 40,75 | 18,25 | 77,560 | 4,48 | 11,5837 | K |
| VD-216A | | | | | | | 110,00 | 4,20 | 0,757 | 18,50 | 40,20 | 69,80 | 78,10 | 52,822 | 3,97 | 43,90 | 39,70 | 50,022 | 3,93 | 16,3770 | L |
| VD-217 | | | | | | | 165,00 | 4,20 | 0,757 | 18,50 | 47,65 | 117,35 | 146,24 | 88,805 | 4,50 | 62,55 | 26,98 | 77,530 | 4,33 | 16,3770 | L |
| VD-217A | | | | | | | 165,00 | 5,02 | 0,622 | 22,50 | 48,20 | 116,80 | 146,24 | 72,676 | 4,21 | 52,70 | 44,59 | 69,876 | 4,17 | 19,5725 | M |
| VD-217A-10 | 15,40 | 17,00 | 0,35 | 13,20 | 17,90 | 14,50 | 0,60 | 8,972 | 1,75 | 6,70 | 7,80 | 0,00 | 69,981 | 7,00 | 7,10 | 3,70 | 66,393 | 6,95 | 2,8834 | J | |
| VD-217A-12 | | | | | | 22,00 | 0,80 | 5,709 | 2,75 | 8,70 | 13,30 | 0,00 | 75,935 | 6,10 | 9,20 | 5,00 | 73,081 | 6,10 | 3,6524 | J | |
| VD-217B | | | | | | 28,70 | 1,01 | 4,486 | 3,50 | 10,14 | 18,56 | 0,00 | 83,268 | 5,80 | 10,85 | 5,42 | 80,075 | 5,75 | 4,2291 | J | |
| VD-217C | | | | | | 43,30 | 1,40 | 2,855 | 5,50 | 14,10 | 29,20 | 0,00 | 83,350 | 5,25 | 15,25 | 8,49 | 80,075 | 5,20 | 5,7669 | J | |
| VD-217D | | | | | | 72,40 | 2,16 | 1,653 | 9,50 | 22,03 | 50,37 | 0,00 | 83,244 | 4,82 | 23,90 | 14,70 | 80,157 | 4,77 | 8,8426 | J | |
| VD-217E | | | | | | 116,00 | 3,30 | 1,013 | 15,50 | 33,93 | 82,07 | 89,17 | 83,138 | 4,59 | 36,90 | 24,06 | 80,125 | 4,54 | 13,4561 | K | |
| VD-217F | | | | | | 13,50 | 15,10 | 0,35 | 11,30 | 15,80 | 47,00 | 1,97 | 2,027 | 11,50 | 25,40 | 21,60 | 0,00 | 43,767 | 4,65 | 27,30 | 17,36 |
| VD-217F-10 | 12,50 | 14,10 | 0,30 | 10,40 | 14,70 | 12,50 | 0,60 | 13,049 | 2,25 | 7,50 | 5,00 | 0,00 | 65,245 | 7,80 | 7,90 | 3,90 | 60,025 | 7,80 | 2,6525 | J | |
| VD-217G | | | | | | 17,00 | 0,70 | 8,389 | 3,50 | 9,87 | 7,13 | 0,00 | 59,788 | 6,73 | 10,41 | 4,49 | 55,281 | 6,66 | 3,4327 | J | |
| VD-218 | | | | | | 24,00 | 0,70 | 8,389 | 3,50 | 10,45 | 13,55 | 0,00 | 113,666 | 7,60 | 12,60 | 3,04 | 95,630 | 7,26 | 3,4327 | J | |
| VD-218A | | | | | | 26,00 | 0,96 | 5,338 | 5,50 | 13,69 | 12,31 | 0,00 | 65,736 | 6,11 | 14,54 | 8,97 | 61,176 | 6,04 | 4,6809 | J | |
| VD-219 | | | | | | 36,00 | 0,96 | 5,338 | 5,50 | 14,70 | 21,30 | 0,00 | 113,704 | 6,90 | 18,10 | 4,73 | 95,554 | 6,55 | 4,6809 | J | |
| VD-219A | | | | | | 38,00 | 1,35 | 3,454 | 8,50 | 19,41 | 18,59 | 0,00 | 64,229 | 5,63 | 20,71 | 10,91 | 59,722 | 5,56 | 6,5533 | J | |
| VD-220 | | | | | | 53,50 | 1,35 | 3,454 | 8,50 | 20,65 | 32,85 | 0,00 | 113,468 | 6,43 | 25,80 | 7,29 | 95,679 | 6,09 | 6,5533 | J | |
| VD-220A | 59,00 | 2,00 | 2,175 | 13,50 | 28,94 | 30,06 | 0,00 | 65,381 | 5,33 | 31,01 | 17,32 | 60,873 | 5,26 | 9,6739 | K | | | | | | |
| VD-221 | 78,00 | 1,87 | 2,349 | 12,50 | 29,75 | 48,25 | 48,62 | 113,330 | 6,19 | 37,30 | 10,75 | 95,597 | 5,82 | 9,0498 | K | | | | | | |
| VD-221A | 78,00 | 2,65 | 1,587 | 18,50 | 38,47 | 39,53 | 48,61 | 62,736 | 5,14 | 41,31 | 23,74 | 58,228 | 5,08 | 12,7945 | L | | | | | | |
| VD-222 | 115,00 | 2,65 | 1,587 | 18,50 | 43,75 | 71,25 | 98,21 | 113,076 | 6,02 | 54,70 | 14,50 | 95,698 | 5,63 | 12,7945 | L | | | | | | |
| VD-222A | 115,00 | 3,17 | 1,305 | 22,50 | 46,10 | 68,90 | 98,21 | 89,913 | 5,48 | 49,55 | 26,59 | 85,405 | 5,41 | 15,2910 | L | | | | | | |
| VD-222A-10 | 11,10 | 12,70 | 0,30 | 9,00 | 13,30 | 12,50 | 0,45 | 18,635 | 2,25 | 7,45 | 5,05 | 0,00 | 94,108 | 9,70 | 7,80 | 2,30 | 87,586 | 9,70 | 2,3554 | J | |
| VD-222A-12 | | | | | | 17,00 | 0,60 | 11,980 | 3,50 | 9,80 | 7,20 | 0,00 | 86,255 | 8,30 | 10,35 | 4,10 | 79,666 | 8,30 | 3,0482 | J | |
| VD-222A-14 | | | | | | 26,00 | 0,80 | 7,624 | 5,50 | 13,55 | 12,45 | 0,00 | 94,913 | 7,60 | 14,35 | 5,60 | 88,814 | 7,60 | 4,1567 | J | |
| VD-222B | | | | | | 35,00 | 1,15 | 4,933 | 8,50 | 19,14 | 15,86 | 0,00 | 78,226 | 6,84 | 20,31 | 8,55 | 72,464 | 6,75 | 5,8193 | J | |
| VD-222C | | | | | | 41,00 | 1,26 | 4,414 | 9,50 | 21,02 | 19,98 | 0,00 | 88,196 | 6,88 | 22,33 | 9,56 | 82,402 | 6,79 | 6,3735 | J | |
| VD-222D | | | | | | 54,00 | 1,59 | 3,354 | 12,50 | 26,64 | 27,36 | 0,00 | 91,762 | 6,71 | 28,36 | 12,58 | 86,006 | 6,62 | 8,0362 | J | |
| VD-222E | | | | | | 67,00 | 1,92 | 2,705 | 15,50 | 32,27 | 34,73 | 39,13 | 93,948 | 6,61 | 34,41 | 15,60 | 88,160 | 6,52 | 9,6989 | K | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-222F | 1,60 | 11,10 | 12,70 | 0,30 | 9,00 | 13,30 | 79,00 | 2,25 | 2,266 | 18,50 | 37,90 | 41,10 | 58,01 | 93,158 | 6,50 | 40,45 | 18,62 | 87,372 | 6,41 | 11,3615 | L |
| VD-222G | | 10,00 | 11,60 | 0,25 | 7,90 | 12,20 | 11,50 | 0,35 | 32,768 | 1,75 | 7,22 | 4,28 | 0,00 | 140,247 | 13,30 | 8,10 | 1,20 | 111,411 | 12,90 | 1,8724 | J |
| VD-222H | | | | | | | 14,00 | 0,40 | 22,938 | 2,50 | 7,90 | 6,10 | 0,00 | 139,919 | 11,80 | 9,00 | 1,60 | 114,688 | 11,50 | 2,2468 | J |
| VD-223 | | | | | | | 18,50 | 0,53 | 16,384 | 3,50 | 9,85 | 8,65 | 0,00 | 141,722 | 10,77 | 11,50 | 1,88 | 114,688 | 10,31 | 2,7461 | J |
| VD-224 | | | | | | | 27,00 | 0,72 | 10,426 | 5,50 | 13,40 | 13,60 | 0,00 | 141,842 | 9,68 | 16,00 | 2,92 | 114,688 | 9,26 | 3,7447 | J |
| VD-225 | | | | | | | 40,50 | 1,02 | 6,746 | 8,50 | 19,45 | 21,05 | 0,00 | 142,011 | 9,06 | 23,50 | 4,52 | 114,688 | 8,59 | 5,2426 | J |
| VD-225A | | | | | | | 53,00 | 1,41 | 4,588 | 12,50 | 26,37 | 26,63 | 0,00 | 122,157 | 8,31 | 28,00 | 7,58 | 114,688 | 8,20 | 7,2398 | K |
| VD-226 | | | | | | | 58,50 | 1,41 | 4,588 | 12,50 | 27,65 | 30,85 | 31,61 | 141,525 | 8,68 | 33,50 | 6,62 | 114,688 | 8,19 | 7,2398 | K |
| VD-227 | | | | | | | 85,00 | 2,00 | 3,100 | 18,50 | 39,20 | 45,80 | 70,55 | 141,965 | 7,18 | 48,00 | 9,78 | 114,688 | 7,07 | 10,2356 | L |
| VD-227A | | | | | | | 85,00 | 2,39 | 2,549 | 22,50 | 44,91 | 40,09 | 70,17 | 102,176 | 7,63 | 47,77 | 18,18 | 94,885 | 7,52 | 12,2328 | L |
| VD-227A-02 | | 9,90 | 11,50 | 0,25 | 7,80 | 12,10 | 25,00 | 0,77 | 9,850 | 6,00 | 14,31 | 10,69 | 0,00 | 105,282 | 9,24 | 15,07 | 4,55 | 97,809 | 9,13 | 3,9544 | K |
| VD-227A-03 | | | | | | | 32,00 | 0,91 | 7,880 | 7,50 | 17,09 | 14,91 | 0,00 | 117,496 | 8,95 | 18,04 | 4,85 | 110,004 | 8,84 | 4,6959 | K |
| VD-227A-04 | | | | | | | 38,00 | 1,11 | 6,221 | 9,50 | 20,79 | 17,21 | 0,00 | 107,045 | 8,49 | 21,99 | 7,06 | 99,598 | 8,38 | 5,6845 | K |
| VD-227A-05 | | | | | | | 44,00 | 1,35 | 4,925 | 12,00 | 25,42 | 18,58 | 0,00 | 91,493 | 8,08 | 26,93 | 10,63 | 84,069 | 7,97 | 6,9203 | L |
| VD-227A-06 | | | | | | | 51,00 | 1,45 | 4,546 | 13,00 | 27,27 | 23,73 | 0,00 | 107,859 | 8,25 | 28,91 | 9,56 | 100,423 | 8,14 | 7,4146 | L |
| VD-227A-07 | | | | | | | 64,00 | 1,79 | 3,582 | 16,50 | 33,76 | 30,24 | 42,16 | 108,327 | 8,02 | 35,84 | 12,06 | 100,863 | 7,91 | 9,1446 | L |
| VD-227A-08 | | | | | | | 76,00 | 2,22 | 2,814 | 21,00 | 42,09 | 33,91 | 59,20 | 95,433 | 7,72 | 44,73 | 16,68 | 88,002 | 7,60 | 11,3690 | L |
| VD-227B | | 9,60 | 11,20 | 0,25 | 7,50 | 11,80 | 45,00 | 1,26 | 5,636 | 11,50 | 24,43 | 20,57 | 0,00 | 115,914 | 8,85 | 25,85 | 7,41 | 107,931 | 8,72 | 6,4709 | L |
| VD-227C | | 9,40 | 11,00 | 0,25 | 7,30 | 11,60 | 15,70 | 0,49 | 19,726 | 3,50 | 9,65 | 6,05 | 0,00 | 119,343 | 11,52 | 10,08 | 1,14 | 110,859 | 11,39 | 2,5814 | J |
| VD-227D | | | | | | | 22,80 | 0,68 | 12,553 | 5,50 | 13,34 | 9,46 | 0,00 | 118,805 | 10,33 | 14,01 | 3,35 | 110,339 | 10,20 | 3,5201 | J |
| VD-227E | | | | | | | 37,10 | 1,05 | 7,267 | 9,50 | 20,71 | 16,39 | 0,00 | 119,135 | 9,42 | 21,87 | 5,77 | 110,683 | 9,30 | 5,3974 | J |
| VD-227F | | | | | | | 58,10 | 1,60 | 4,454 | 15,50 | 31,76 | 26,34 | 36,28 | 117,307 | 8,93 | 33,64 | 9,62 | 108,950 | 8,80 | 8,2135 | K |
| VD-227G | | 8,00 | 9,60 | 0,25 | 5,90 | 10,10 | 12,00 | 0,43 | 32,000 | 3,50 | 9,57 | 2,43 | 0,00 | 77,760 | 14,82 | 9,96 | 1,78 | 65,280 | 14,63 | 2,1969 | J |
| VD-228 | | | | | | | 14,50 | 0,43 | 32,000 | 3,50 | 9,57 | 4,93 | 0,00 | 157,760 | 16,02 | 10,30 | 1,13 | 134,400 | 15,83 | 2,1969 | J |
| VD-228A | | | | | | | 18,00 | 0,59 | 20,364 | 5,50 | 13,21 | 4,79 | 0,00 | 97,542 | 13,45 | 13,82 | 2,81 | 85,120 | 13,27 | 2,9958 | J |
| VD-229 | | | | | | | 21,50 | 0,59 | 20,364 | 5,50 | 13,21 | 8,29 | 0,00 | 168,815 | 14,52 | 14,85 | 1,80 | 135,418 | 14,01 | 2,9958 | J |
| VD-229A | | | | | | | 27,00 | 0,83 | 13,176 | 8,50 | 18,67 | 8,33 | 0,00 | 109,760 | 12,57 | 19,61 | 4,34 | 97,374 | 12,39 | 4,1941 | J |
| VD-230 | | | | | | | 31,50 | 0,83 | 13,176 | 8,50 | 18,67 | 12,83 | 0,00 | 169,054 | 13,46 | 21,20 | 2,74 | 135,718 | 12,95 | 4,1941 | J |
| VD-230A | | | | | | | 40,00 | 1,23 | 8,296 | 13,50 | 27,77 | 12,23 | 0,00 | 101,464 | 11,71 | 29,26 | 7,24 | 89,102 | 11,52 | 6,1913 | J |
| VD-231 | | | | | | | 45,00 | 1,15 | 8,960 | 12,50 | 25,95 | 19,05 | 21,10 | 170,688 | 12,85 | 29,85 | 4,03 | 135,744 | 12,32 | 5,7919 | J |
| VD-231A | | | | | | | 45,00 | 1,63 | 6,054 | 18,50 | 36,87 | 8,13 | 21,10 | 49,219 | 10,58 | 38,91 | 6,09 | 36,869 | 10,39 | 8,1885 | K |
| VD-231B | | | | | | | 56,00 | 1,63 | 6,054 | 18,50 | 36,87 | 19,13 | 40,49 | 115,814 | 11,58 | 38,91 | 9,45 | 103,464 | 11,39 | 8,1885 | K |
| VD-232 | | | | | | | 65,50 | 1,63 | 6,054 | 18,50 | 36,87 | 28,63 | 53,05 | 173,328 | 12,44 | 43,05 | 5,94 | 135,914 | 11,87 | 8,1885 | K |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-222F | 1,60 | 11,10 | 12,70 | 0,30 | 9,00 | 13,30 | 79,00 | 1,93 | 2,639 | 18,50 | 37,90 | 41,10 | 58,64 | 108,463 | 6,73 | 40,45 | 19,87 | 101,726 | 6,63 | 11,3615 | G |
| D-222G | | 10,00 | 11,60 | 0,25 | 7,90 | 12,20 | 11,50 | 0,30 | 38,151 | 1,75 | 7,37 | 4,13 | 0,00 | 157,565 | 13,00 | 7,00 | 1,20 | 171,681 | 13,22 | 1,8724 | F |
| D-222H | | | | | | | 14,00 | 0,35 | 26,706 | 2,50 | 7,83 | 6,17 | 0,00 | 164,776 | 11,90 | 8,50 | 1,70 | 146,883 | 11,70 | 2,2468 | F |
| D-223 | | | | | | | 18,50 | 0,45 | 19,076 | 3,50 | 9,80 | 8,70 | 0,00 | 165,958 | 11,12 | 11,50 | 2,50 | 133,530 | 10,99 | 2,7461 | F |
| D-224 | | | | | | | 27,00 | 0,62 | 12,139 | 5,50 | 13,40 | 13,60 | 0,00 | 165,144 | 10,03 | 16,00 | 3,93 | 133,530 | 9,89 | 3,7447 | F |
| D-225 | | | | | | | 40,50 | 0,88 | 7,855 | 8,50 | 19,32 | 21,18 | 0,00 | 166,362 | 9,42 | 23,50 | 6,08 | 133,530 | 9,29 | 5,2426 | F |
| D-225A | | | | | | | 53,00 | 1,21 | 5,341 | 12,50 | 26,37 | 26,63 | 19,26 | 142,226 | 8,60 | 27,96 | 8,92 | 133,743 | 8,49 | 7,2398 | G |
| D-226 | | | | | | | 58,50 | 1,21 | 5,341 | 12,50 | 27,20 | 31,30 | 32,88 | 167,179 | 9,05 | 33,60 | 8,98 | 132,995 | 8,93 | 7,2398 | G |
| D-227 | | | | | | | 85,00 | 1,72 | 3,609 | 18,50 | 39,00 | 46,00 | 70,55 | 166,010 | 8,77 | 48,00 | 13,23 | 133,530 | 8,64 | 10,2356 | G |
| D-227A | | | | | | | 85,00 | 2,05 | 2,967 | 22,50 | 44,91 | 40,09 | 70,55 | 118,962 | 7,88 | 47,77 | 19,23 | 110,473 | 7,75 | 12,2328 | H |
| D-227A-02 | | 9,90 | 11,50 | 0,25 | 7,80 | 12,10 | 25,00 | 0,66 | 11,468 | 6,00 | 14,31 | 10,69 | 0,00 | 122,579 | 9,52 | 15,07 | 4,93 | 113,878 | 9,39 | 3,9544 | G |
| D-227A-03 | | | | | | | 32,00 | 0,78 | 9,174 | 7,50 | 17,09 | 14,91 | 0,00 | 136,799 | 9,24 | 18,04 | 5,53 | 128,076 | 9,10 | 4,6959 | G |
| D-227A-04 | | | | | | | 38,00 | 0,95 | 7,243 | 9,50 | 20,79 | 17,21 | 0,00 | 124,631 | 8,76 | 21,99 | 7,68 | 115,960 | 8,63 | 5,6845 | G |
| D-227A-05 | | | | | | | 44,00 | 1,16 | 5,734 | 12,00 | 25,42 | 18,58 | 0,00 | 106,523 | 8,31 | 26,93 | 10,98 | 97,880 | 8,18 | 6,9203 | H |
| D-227A-06 | | | | | | | 51,00 | 1,24 | 5,293 | 13,00 | 27,27 | 23,73 | 0,00 | 125,578 | 8,52 | 28,91 | 10,44 | 116,921 | 8,39 | 7,4146 | H |
| D-227A-07 | | | | | | | 64,00 | 1,53 | 4,170 | 16,50 | 33,76 | 30,24 | 42,93 | 126,123 | 8,29 | 35,84 | 13,20 | 117,433 | 8,16 | 9,1446 | H |
| D-227A-08 | | | | | | | 76,00 | 1,91 | 3,277 | 21,00 | 42,09 | 33,91 | 59,67 | 111,111 | 7,96 | 44,73 | 18,65 | 102,459 | 7,83 | 11,3690 | H |
| D-227B | | 9,60 | 11,20 | 0,25 | 7,50 | 11,80 | 45,00 | 1,08 | 6,562 | 11,50 | 24,43 | 20,57 | 0,00 | 134,957 | 9,13 | 25,85 | 8,26 | 125,662 | 8,99 | 6,4709 | H |
| D-227C | | 9,40 | 11,00 | 0,25 | 7,30 | 11,60 | 15,70 | 0,42 | 22,967 | 3,50 | 9,65 | 6,05 | 0,00 | 138,949 | 11,81 | 10,08 | 2,38 | 129,072 | 11,67 | 2,5814 | F |
| D-227D | | | | | | | 22,80 | 0,58 | 14,615 | 5,50 | 13,34 | 9,46 | 0,00 | 138,323 | 10,62 | 14,01 | 3,75 | 128,467 | 10,47 | 3,5201 | G |
| D-227E | | | | | | | 37,10 | 0,98 | 8,461 | 9,50 | 20,71 | 16,39 | 0,00 | 138,708 | 9,72 | 21,87 | 6,46 | 128,867 | 9,57 | 5,3974 | G |
| D-227F | | | | | | | 58,10 | 1,38 | 5,186 | 15,50 | 31,76 | 26,34 | 36,48 | 136,579 | 9,18 | 33,64 | 10,70 | 126,849 | 9,04 | 8,2135 | G |
| D-227G | | 8,00 | 9,60 | 0,25 | 5,90 | 10,10 | 12,00 | 0,37 | 37,257 | 3,50 | 9,57 | 2,43 | 0,00 | 90,535 | 15,01 | 9,96 | 2,04 | 76,005 | 14,79 | 2,1969 | F |
| D-228 | | | | | | | 14,50 | 0,37 | 37,257 | 3,50 | 9,57 | 4,93 | 0,00 | 183,678 | 16,41 | 10,30 | 1,54 | 156,480 | 16,19 | 2,1969 | F |
| D-228A | | | | | | | 18,00 | 0,51 | 23,709 | 5,50 | 13,21 | 4,79 | 0,00 | 113,567 | 13,70 | 13,82 | 3,40 | 99,104 | 13,48 | 2,9958 | F |
| D-229 | | | | | | | 21,50 | 0,51 | 23,709 | 5,50 | 13,21 | 8,29 | 0,00 | 196,548 | 14,94 | 14,90 | 2,42 | 156,480 | 14,72 | 2,9958 | F |
| D-229A | | | | | | | 27,00 | 0,71 | 15,341 | 8,50 | 18,67 | 8,33 | 0,00 | 127,792 | 12,84 | 19,61 | 4,87 | 113,371 | 12,63 | 4,1941 | F |
| D-230 | | | | | | | 31,50 | 0,71 | 15,341 | 8,50 | 18,67 | 12,83 | 0,00 | 196,827 | 13,88 | 21,20 | 3,70 | 158,014 | 13,66 | 4,1941 | F |
| D-230A | | | | | | | 40,00 | 1,05 | 9,659 | 13,50 | 27,77 | 12,23 | 0,00 | 118,133 | 11,96 | 29,26 | 8,14 | 103,740 | 11,74 | 6,1913 | F |
| D-231 | | | | | | | 45,00 | 0,99 | 10,432 | 12,50 | 25,95 | 19,05 | 22,64 | 198,730 | 13,27 | 29,90 | 5,45 | 157,523 | 13,05 | 5,7919 | F |
| D-231A | | | | | | | 45,00 | 1,40 | 7,049 | 18,50 | 36,87 | 8,13 | 22,64 | 57,306 | 10,70 | 38,91 | 6,09 | 42,926 | 10,48 | 8,1885 | G |
| D-231B | | | | | | | 56,00 | 1,40 | 7,049 | 18,50 | 36,87 | 19,13 | 40,97 | 134,841 | 11,86 | 38,91 | 10,20 | 120,461 | 11,65 | 8,1885 | G |
| D-232 | | | | | | | 65,50 | 1,40 | 7,049 | 18,50 | 36,87 | 28,63 | 53,38 | 201,803 | 12,87 | 43,20 | 8,09 | 157,185 | 12,65 | 8,1885 | G |

Compression springs

Music wire EN 10270-1-DH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-232A | 1,60 | 8,00 | 9,60 | 0,25 | 5,90 | 10,10 | 65,50 | 1,67 | 5,796 | 22,50 | 44,15 | 21,35 | 53,38 | 123,735 | 11,53 | 56,63 | 8,87 | 51,407 | 11,31 | 9,7862 | H |
| D-232A-02 | | 7,40 | 9,00 | 0,25 | 5,30 | 9,50 | 25,00 | 0,64 | 20,595 | 8,00 | 17,69 | 7,31 | 0,00 | 150,535 | 15,58 | 18,54 | 3,58 | 133,044 | 15,32 | 3,6948 | G |
| D-232A-03 | | | | | | | 32,00 | 0,80 | 15,691 | 10,50 | 22,22 | 9,78 | 0,00 | 153,477 | 14,79 | 23,33 | 4,62 | 136,045 | 14,52 | 4,6185 | G |
| D-232A-04 | | | | | | | 38,00 | 0,92 | 13,181 | 12,50 | 25,84 | 12,16 | 0,00 | 160,256 | 14,58 | 27,16 | 5,29 | 142,880 | 14,32 | 5,3575 | G |
| D-232A-05 | | | | | | | 44,00 | 1,08 | 10,984 | 15,00 | 30,37 | 13,63 | 25,72 | 149,711 | 14,28 | 31,96 | 6,74 | 132,248 | 14,02 | 6,2812 | H |
| D-232A-06 | | | | | | | 51,00 | 1,21 | 9,692 | 17,00 | 33,99 | 17,01 | 36,77 | 164,831 | 14,33 | 35,79 | 7,01 | 147,412 | 14,07 | 7,0201 | H |
| D-232A-07 | | | | | | | 64,00 | 1,47 | 7,846 | 21,00 | 41,24 | 22,76 | 53,54 | 178,584 | 14,29 | 43,46 | 7,95 | 161,151 | 14,03 | 8,4981 | H |
| D-232A-08 | | | | | | | 76,00 | 1,85 | 6,102 | 27,00 | 52,11 | 23,89 | 67,48 | 145,806 | 13,56 | 54,96 | 12,40 | 128,391 | 13,29 | 10,7149 | J |
| D-232B | | 6,40 | 8,00 | 0,20 | 4,40 | 8,50 | 12,00 | 0,30 | 72,768 | 3,50 | 9,49 | 2,51 | 0,00 | 182,327 | 24,91 | 9,84 | 1,06 | 157,179 | 24,53 | 1,7575 | F |
| D-232C | | | | | | | 17,00 | 0,42 | 46,307 | 5,50 | 13,09 | 3,91 | 0,00 | 181,004 | 22,19 | 13,64 | 1,68 | 155,591 | 21,81 | 2,3966 | F |
| D-232D | | | | | | | 27,10 | 0,65 | 26,809 | 9,50 | 20,28 | 6,82 | 0,00 | 182,710 | 20,15 | 21,22 | 2,88 | 157,638 | 19,77 | 3,6748 | G |
| D-232E | | | | | | | 42,20 | 0,99 | 16,431 | 15,50 | 31,08 | 11,12 | 29,01 | 182,797 | 19,01 | 32,62 | 4,70 | 157,413 | 18,63 | 5,5921 | G |
| D-233E-10 | 1,75 | 18,25 | 20,00 | 0,45 | 15,70 | 21,10 | 40,00 | 1,43 | 3,144 | 5,00 | 14,55 | 25,45 | 0,00 | 80,003 | 5,72 | 15,70 | 15,33 | 76,395 | 5,67 | 7,6306 | H |
| D-233E-20 | | 8,25 | 10,00 | 0,25 | 5,90 | 10,60 | 31,00 | 0,83 | 17,016 | 10,00 | 23,33 | 7,67 | 0,00 | 130,455 | 16,23 | 24,50 | 6,14 | 110,604 | 15,93 | 5,9133 | H |
| D-233E-22 | 1,80 | 28,20 | 30,00 | 0,60 | 25,60 | 32,00 | 42,00 | 2,50 | 2,119 | 2,25 | 9,55 | 32,45 | 0,00 | 68,777 | 6,30 | 10,50 | 14,50 | 66,763 | 6,32 | 7,5736 | G |
| D-232F | | | | | | | 69,10 | 3,32 | 1,363 | 3,50 | 12,85 | 56,25 | 0,00 | 76,642 | 5,68 | 14,33 | 20,80 | 74,625 | 5,65 | 9,8011 | G |
| D-232G | | | | | | | 107,00 | 4,59 | 0,867 | 5,50 | 18,13 | 88,87 | 0,00 | 77,051 | 5,13 | 20,45 | 32,52 | 75,044 | 5,10 | 13,3652 | H |
| D-232H | | | | | | | 181,00 | 7,08 | 0,502 | 9,50 | 28,71 | 152,29 | 120,20 | 76,449 | 4,70 | 32,72 | 56,62 | 74,434 | 4,67 | 20,4933 | J |
| D-232J | | | | | | | 294,00 | 10,80 | 0,308 | 15,50 | 44,56 | 249,44 | 262,10 | 76,743 | 4,48 | 51,09 | 91,92 | 74,735 | 4,45 | 31,1855 | K |
| D-232J-02 | | 18,20 | 20,00 | 0,45 | 15,70 | 21,00 | 22,00 | 0,80 | 7,096 | 2,50 | 9,24 | 12,76 | 0,00 | 90,543 | 7,30 | 9,90 | 7,10 | 85,860 | 7,30 | 5,1755 | G |
| D-232K | | | | | | | 34,10 | 1,05 | 5,068 | 3,50 | 11,50 | 22,60 | 0,00 | 114,567 | 7,06 | 12,30 | 8,29 | 110,492 | 7,00 | 6,3256 | G |
| D-232L | | | | | | | 51,50 | 1,45 | 3,225 | 5,50 | 16,01 | 35,49 | 0,00 | 114,475 | 6,41 | 17,27 | 13,04 | 110,405 | 6,35 | 8,6258 | G |
| D-232L-01 | | | | | | | 56,00 | 1,65 | 2,729 | 6,50 | 18,26 | 37,74 | 0,00 | 102,987 | 6,05 | 19,74 | 16,99 | 98,960 | 5,99 | 9,7759 | G |
| D-232L-02 | | | | | | | 69,00 | 2,05 | 2,087 | 8,50 | 22,78 | 46,22 | 0,00 | 96,469 | 5,72 | 24,72 | 23,41 | 92,413 | 5,66 | 12,0761 | H |
| D-232M | | | | | | | 86,30 | 2,24 | 1,867 | 9,50 | 25,03 | 61,27 | 0,00 | 114,407 | 5,91 | 27,20 | 22,54 | 110,359 | 5,85 | 13,2262 | H |
| D-232M-01 | | | | | | | 100,00 | 2,83 | 1,419 | 12,50 | 31,80 | 68,20 | 45,64 | 96,787 | 5,47 | 34,65 | 34,34 | 92,743 | 5,41 | 16,6765 | H |
| D-232M-02 | | | | | | | 118,00 | 3,23 | 1,223 | 14,50 | 36,31 | 81,69 | 79,46 | 99,938 | 5,45 | 39,62 | 38,86 | 95,892 | 5,39 | 18,9767 | H |
| D-232N | | | | | | | 139,00 | 3,42 | 1,144 | 15,50 | 38,57 | 100,43 | 108,70 | 114,943 | 5,64 | 42,11 | 36,60 | 110,890 | 5,58 | 20,1268 | J |
| D-232N-02 | | 16,20 | 18,00 | 0,45 | 13,70 | 18,90 | 19,00 | 0,70 | 10,062 | 2,50 | 9,10 | 9,90 | 0,00 | 99,611 | 8,10 | 9,70 | 5,60 | 93,574 | 8,10 | 4,6067 | H |
| D-232N-04 | | | | | | | 28,00 | 0,80 | 6,708 | 3,75 | 11,85 | 16,15 | 0,00 | 108,331 | 7,40 | 12,60 | 7,90 | 103,300 | 7,36 | 5,8864 | H |
| D-232O | | | | | | | 45,00 | 1,22 | 4,192 | 6,00 | 16,79 | 28,21 | 0,00 | 118,258 | 6,94 | 17,99 | 11,89 | 113,236 | 6,86 | 8,1897 | H |
| D-232P | | 14,20 | 16,00 | 0,30 | 11,90 | 16,70 | 40,00 | 1,03 | 5,746 | 6,50 | 17,56 | 22,44 | 0,00 | 128,932 | 7,87 | 18,69 | 9,97 | 122,451 | 7,77 | 7,6273 | G |
| D-232Q | | | | | | | 52,00 | 1,40 | 3,932 | 9,50 | 24,01 | 27,99 | 0,00 | 110,060 | 7,16 | 25,67 | 16,38 | 103,519 | 7,07 | 10,3193 | G |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-232A | 1,60 | 8,00 | 9,60 | 0,25 | 5,90 | 10,10 | 65,50 | 1,94 | 4,978 | 22,50 | 44,15 | 21,35 | 53,05 | 106,276 | 11,27 | 56,63 | 8,87 | 44,153 | 11,08 | 9,7862 | K |
| VD-232A-02 | | 7,40 | 9,00 | 0,25 | 5,30 | 9,50 | 25,00 | 0,74 | 17,689 | 8,00 | 17,69 | 7,31 | 0,00 | 129,294 | 15,23 | 18,54 | 3,38 | 114,271 | 15,01 | 3,6948 | J |
| VD-232A-03 | | | | | | | 32,00 | 0,93 | 13,477 | 10,50 | 22,22 | 9,78 | 0,00 | 131,821 | 14,46 | 23,33 | 4,34 | 116,848 | 14,24 | 4,6185 | J |
| VD-232A-04 | | | | | | | 38,00 | 1,08 | 11,321 | 12,50 | 25,84 | 12,16 | 0,00 | 137,643 | 14,24 | 27,16 | 4,88 | 122,719 | 14,02 | 5,3575 | K |
| VD-232A-05 | | | | | | | 44,00 | 1,26 | 9,434 | 15,00 | 30,37 | 13,63 | 24,80 | 128,587 | 13,95 | 31,96 | 6,49 | 113,587 | 13,72 | 6,2812 | K |
| VD-232A-06 | | | | | | | 51,00 | 1,41 | 8,324 | 17,00 | 33,99 | 17,01 | 36,30 | 141,572 | 13,97 | 35,79 | 6,38 | 126,611 | 13,74 | 7,0201 | K |
| VD-232A-07 | | | | | | | 64,00 | 1,71 | 6,739 | 21,00 | 41,24 | 22,76 | 53,27 | 153,385 | 13,90 | 43,46 | 6,93 | 138,412 | 13,67 | 8,4981 | L |
| VD-232A-08 | | | | | | | 76,00 | 2,16 | 5,241 | 27,00 | 52,11 | 23,89 | 67,28 | 125,232 | 13,24 | 54,96 | 11,84 | 110,274 | 13,01 | 10,7149 | L |
| VD-232B | | 6,40 | 8,00 | 0,20 | 4,40 | 8,50 | 12,00 | 0,35 | 62,500 | 3,50 | 9,49 | 2,51 | 0,00 | 156,600 | 24,53 | 9,84 | 0,98 | 135,000 | 24,20 | 1,7575 | J |
| VD-232C | | | | | | | 17,00 | 0,49 | 39,773 | 5,50 | 13,09 | 3,91 | 0,00 | 155,464 | 21,81 | 13,64 | 1,56 | 133,636 | 21,48 | 2,3966 | J |
| VD-232D | | | | | | | 27,10 | 0,76 | 23,026 | 9,50 | 20,28 | 6,82 | 0,00 | 156,929 | 19,76 | 21,22 | 2,65 | 135,395 | 19,43 | 3,6748 | J |
| VD-232E | | | | | | | 42,20 | 1,15 | 14,113 | 15,50 | 31,08 | 11,12 | 28,55 | 157,003 | 18,63 | 32,62 | 4,34 | 135,202 | 18,30 | 5,5921 | K |
| VD-233E-10 | 1,75 | 18,25 | 20,00 | 0,45 | 15,70 | 21,10 | 40,00 | 1,66 | 2,700 | 5,00 | 14,55 | 25,45 | 0,00 | 68,714 | 5,55 | 15,70 | 12,50 | 65,616 | 5,50 | 7,6306 | L |
| VD-233E-20 | | 8,25 | 10,00 | 0,25 | 5,90 | 10,60 | 31,00 | 0,96 | 14,615 | 10,00 | 23,33 | 7,67 | 0,00 | 112,047 | 15,93 | 24,50 | 4,85 | 94,997 | 15,67 | 5,9133 | L |
| VD-233E-22 | 1,80 | 28,20 | 30,00 | 0,60 | 25,60 | 32,00 | 42,00 | 2,50 | 1,820 | 2,25 | 9,55 | 32,45 | 0,00 | 59,072 | 6,20 | 10,55 | 12,90 | 57,252 | 6,20 | 7,5736 | K |
| VD-232F | | | | | | | 69,10 | 3,87 | 1,170 | 3,50 | 12,85 | 56,25 | 0,00 | 65,828 | 5,52 | 14,65 | 17,68 | 63,721 | 5,49 | 9,8011 | K |
| VD-232G | | | | | | | 107,00 | 5,34 | 0,745 | 5,50 | 18,13 | 88,87 | 0,00 | 66,179 | 4,97 | 21,40 | 27,49 | 63,747 | 4,95 | 13,3652 | L |
| VD-232H | | | | | | | 181,00 | 8,25 | 0,431 | 9,50 | 28,71 | 152,29 | 118,00 | 65,662 | 4,54 | 33,15 | 48,21 | 63,745 | 4,51 | 20,4933 | M |
| VD-232J | | | | | | | 294,00 | 12,58 | 0,264 | 15,50 | 44,56 | 249,44 | 261,35 | 65,915 | 4,31 | 52,75 | 78,20 | 63,751 | 4,29 | 31,1855 | N |
| VD-232J-02 | | 18,20 | 20,00 | 0,45 | 15,70 | 21,00 | 22,00 | 1,00 | 6,095 | 2,50 | 9,25 | 12,75 | 0,00 | 77,706 | 7,20 | 9,90 | 7,00 | 73,744 | 7,20 | 5,1755 | K |
| VD-232K | | | | | | | 34,10 | 1,23 | 4,353 | 3,50 | 11,50 | 22,60 | 0,00 | 98,401 | 6,81 | 12,40 | 7,05 | 94,466 | 6,76 | 6,3256 | K |
| VD-232L | | | | | | | 51,50 | 1,69 | 2,770 | 5,50 | 16,01 | 35,49 | 0,00 | 98,322 | 6,16 | 17,45 | 11,09 | 94,328 | 6,11 | 8,6258 | K |
| VD-232L-01 | | | | | | | 56,00 | 1,92 | 2,344 | 6,50 | 18,26 | 37,74 | 0,00 | 88,455 | 5,84 | 19,74 | 15,67 | 84,996 | 5,78 | 9,7759 | K |
| VD-232L-02 | | | | | | | 69,00 | 2,38 | 1,793 | 8,50 | 22,78 | 46,22 | 0,00 | 82,857 | 5,52 | 24,72 | 20,49 | 79,373 | 5,46 | 12,0761 | K |
| VD-232M | | | | | | | 86,30 | 2,61 | 1,604 | 9,50 | 25,03 | 61,27 | 0,00 | 98,263 | 5,66 | 27,45 | 19,16 | 94,386 | 5,61 | 13,2262 | L |
| VD-232M-01 | | | | | | | 100,00 | 3,30 | 1,219 | 12,50 | 31,80 | 68,20 | 41,53 | 83,130 | 5,27 | 34,65 | 30,14 | 79,656 | 5,22 | 16,6765 | L |
| VD-232M-02 | | | | | | | 118,00 | 3,76 | 1,051 | 14,50 | 36,31 | 81,69 | 78,05 | 85,836 | 5,24 | 39,62 | 34,96 | 82,361 | 5,18 | 18,9767 | L |
| VD-232N | | | | | | | 139,00 | 3,99 | 0,983 | 15,50 | 38,57 | 100,43 | 107,90 | 98,724 | 5,40 | 42,95 | 31,01 | 94,417 | 5,35 | 20,1268 | M |
| VD-232N-02 | | 16,20 | 18,00 | 0,45 | 13,70 | 18,90 | 19,00 | 0,80 | 8,642 | 2,50 | 9,10 | 9,90 | 0,00 | 85,556 | 8,00 | 9,65 | 5,50 | 80,802 | 7,90 | 4,6067 | J |
| VD-232N-04 | | | | | | | 28,00 | 1,00 | 5,761 | 3,75 | 11,85 | 16,15 | 0,00 | 93,045 | 7,20 | 12,65 | 7,30 | 88,436 | 7,20 | 5,8864 | J |
| VD-232O | | | | | | | 45,00 | 1,42 | 3,601 | 6,00 | 16,79 | 28,21 | 0,00 | 101,571 | 6,68 | 17,99 | 10,59 | 97,258 | 6,61 | 8,1897 | K |
| VD-232P | | 14,20 | 16,00 | 0,30 | 11,90 | 16,70 | 40,00 | 1,20 | 4,935 | 6,50 | 17,56 | 22,44 | 0,00 | 110,739 | 7,59 | 18,69 | 9,03 | 105,173 | 7,51 | 7,6273 | K |
| VD-232Q | | | | | | | 52,00 | 1,63 | 3,377 | 9,50 | 24,01 | 27,99 | 0,00 | 94,530 | 6,93 | 25,67 | 13,74 | 88,912 | 6,85 | 10,3193 | K |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|---------|--------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-232R | 1,80 | 14,20 | 16,00 | 0,30 | 11,90 | 16,70 | 64,00 | 1,92 | 2,790 | 11,50 | 28,30 | 35,70 | 0,00 | 99,581 | 6,85 | 30,30 | 16,64 | 94,008 | 6,76 | 12,1140 | K | | | | | |
| VD-232S | | | | | | | 80,00 | 2,35 | 2,212 | 14,50 | 34,75 | 45,25 | 37,92 | 100,119 | 6,70 | 37,28 | 20,98 | 94,514 | 6,61 | 14,8060 | L | | | | | |
| VD-232T | | | | | | | 93,00 | 2,63 | 1,944 | 16,50 | 39,04 | 53,96 | 62,36 | 104,906 | 6,69 | 41,91 | 23,87 | 99,331 | 6,61 | 16,6007 | L | | | | | |
| VD-233T-10 | 13,20 | 15,00 | 0,30 | 10,80 | 15,70 | 130,00 | 3,85 | 1,426 | 28,00 | 63,11 | 66,89 | 113,66 | 95,413 | 6,94 | 67,66 | 34,72 | 88,917 | 6,84 | 25,0242 | L | | | | | | |
| VD-233T-12 | | | | | | | 12,00 | 0,50 | 26,152 | 2,50 | 8,85 | 3,15 | 0,00 | 82,379 | 13,20 | 9,25 | 2,70 | 71,918 | 13,10 | 3,1849 | J | | | | | |
| VD-233T-14 | | | | | | | 19,00 | 0,60 | 14,529 | 4,50 | 13,00 | 6,00 | 0,00 | 87,173 | 11,10 | 13,70 | 5,30 | 77,003 | 11,00 | 4,6004 | J | | | | | |
| VD-233 | | | | | | | 28,00 | 1,00 | 8,717 | 7,50 | 19,23 | 8,77 | 0,00 | 76,416 | 9,83 | 20,30 | 6,60 | 67,123 | 9,68 | 6,7237 | J | | | | | |
| VD-233A-01 | | | | | | | 60,00 | 2,53 | 2,972 | 22,00 | 49,46 | 10,54 | 19,30 | 31,324 | 8,03 | 52,59 | 7,41 | 22,021 | 7,89 | 16,9861 | K | | | | | |
| VD-233A-05 | | | | | | | 10,20 | 12,00 | 0,30 | 7,90 | 12,60 | 12,00 | 0,40 | 38,469 | 2,25 | 8,25 | 3,75 | 0,00 | 144,260 | 17,20 | 8,60 | 1,60 | 130,796 | 17,00 | 2,7394 | J |
| VD-233A | | | | | | | | | | | | 16,90 | 0,52 | 24,730 | 3,50 | 10,83 | 6,07 | 0,00 | 150,028 | 14,83 | 11,30 | 2,32 | 138,490 | 14,66 | 3,5451 | J |
| VD-233B | 24,60 | 0,71 | 15,737 | 5,50 | 14,97 | 9,63 | | | | | | 0,00 | 151,601 | 13,52 | 15,71 | 3,60 | 139,906 | 13,34 | 4,8342 | J | | | | | | |
| VD-234 | 32,00 | 1,01 | 10,183 | 8,50 | 21,17 | 10,83 | | | | | | 0,00 | 110,314 | 11,90 | 22,31 | 6,20 | 98,674 | 11,72 | 6,7679 | J | | | | | | |
| VD-234A | 39,80 | 1,10 | 9,111 | 9,50 | 23,23 | 16,57 | | | | | | 0,00 | 150,939 | 12,31 | 24,50 | 6,25 | 139,401 | 12,14 | 7,4125 | K | | | | | | |
| VD-234B | 62,70 | 1,68 | 5,584 | 15,50 | 35,63 | 27,07 | | | | | | 38,01 | 151,144 | 11,66 | 37,70 | 10,14 | 139,607 | 11,49 | 11,2799 | K | | | | | | |
| VD-234BA-10 | 9,20 | 11,00 | 0,25 | 6,90 | 11,50 | 12,50 | | | | | | 0,40 | 47,184 | 2,50 | 8,75 | 3,75 | 0,00 | 176,940 | 20,60 | 9,10 | 1,20 | 160,426 | 20,40 | 2,6162 | J | |
| VD-234BA-12 | | | | | | 17,50 | 0,60 | 26,213 | 4,50 | 12,85 | 4,65 | 0,00 | 121,892 | 16,50 | 13,45 | 3,40 | 106,164 | 16,40 | 3,7789 | J | | | | | | |
| VD-234BA | | | | | | 24,00 | 0,74 | 18,148 | 6,50 | 16,93 | 7,07 | 0,00 | 128,332 | 15,36 | 17,75 | 3,80 | 113,423 | 15,14 | 4,9416 | J | | | | | | |
| VD-234BB | | | | | | 32,00 | 1,01 | 12,417 | 9,50 | 23,08 | 8,92 | 0,00 | 110,757 | 14,15 | 24,27 | 5,55 | 95,982 | 13,93 | 6,6858 | J | | | | | | |
| VD-234BC | | | | | | 42,00 | 1,18 | 10,257 | 11,50 | 27,18 | 14,82 | 0,00 | 152,003 | 14,25 | 28,62 | 6,72 | 137,244 | 14,03 | 7,8485 | K | | | | | | |
| VD-234BD | | | | | | 55,00 | 1,53 | 7,610 | 15,50 | 35,38 | 19,62 | 32,46 | 149,290 | 13,92 | 37,32 | 9,06 | 134,550 | 13,70 | 10,1740 | K | | | | | | |
| VD-234BE | | | | | | 67,00 | 1,89 | 6,049 | 19,50 | 43,59 | 23,41 | 50,18 | 141,640 | 13,53 | 46,04 | 11,39 | 126,792 | 13,31 | 12,4995 | K | | | | | | |
| VD-234B-01 | | | | | | 7,70 | 9,50 | 0,25 | 5,30 | 10,20 | 32,00 | 0,79 | 23,670 | 8,50 | 21,25 | 10,75 | 0,00 | 254,458 | 22,69 | 24,15 | 2,25 | 185,813 | 21,20 | 5,1091 | L | |
| VD-234B-02 | | | | | | 7,40 | 9,20 | 0,25 | 5,10 | 9,70 | 25,00 | 0,69 | 30,223 | 7,50 | 18,79 | 6,21 | 0,00 | 187,619 | 23,73 | 19,64 | 2,62 | 161,997 | 23,34 | 4,4424 | J | |
| VD-234B-03 | | | | | | | | | | | 32,00 | 0,88 | 22,667 | 10,00 | 23,86 | 8,14 | 0,00 | 184,596 | 22,94 | 24,98 | 3,56 | 159,126 | 22,55 | 5,6115 | J | |
| VD-234B-04 | 38,00 | 1,02 | 18,890 | 12,00 | 27,91 | | | | | | 10,09 | 0,00 | 190,641 | 22,45 | 29,26 | 4,10 | 165,095 | 22,06 | 6,5467 | J | | | | | | |
| VD-234B-05 | 44,00 | 1,21 | 15,633 | 14,50 | 32,97 | | | | | | 11,03 | 0,00 | 172,403 | 21,46 | 34,61 | 5,37 | 146,791 | 21,07 | 7,7158 | K | | | | | | |
| VD-234B-06 | 51,00 | 1,43 | 12,953 | 17,50 | 39,05 | | | | | | 11,95 | 36,30 | 154,805 | 20,81 | 41,03 | 6,48 | 129,140 | 20,43 | 9,1187 | K | | | | | | |
| VD-234B-07 | 64,00 | 1,68 | 10,794 | 21,00 | 46,14 | | | | | | 17,86 | 53,27 | 192,800 | 21,22 | 48,51 | 7,07 | 167,200 | 20,84 | 10,7554 | K | | | | | | |
| VD-234B-08 | 76,00 | 1,98 | 9,067 | 25,00 | 54,24 | | | | | | 21,76 | 67,28 | 197,290 | 21,02 | 57,06 | 8,15 | 171,729 | 20,63 | 12,6259 | L | | | | | | |
| VD-234C | 7,20 | 9,00 | 0,20 | 5,00 | 9,50 | 13,40 | 0,39 | 70,313 | 3,50 | 10,68 | 2,72 | 0,00 | 191,166 | 29,96 | 11,07 | 1,16 | 163,828 | 29,55 | 2,5024 | J | | | | | | |
| VD-234D | | | | | | 19,00 | 0,53 | 44,744 | 5,50 | 14,73 | 4,27 | 0,00 | 191,166 | 26,66 | 15,35 | 1,82 | 163,317 | 26,24 | 3,4124 | J | | | | | | |
| VD-234D-10 | | | | | | 26,00 | 0,68 | 32,813 | 7,50 | 18,77 | 7,23 | 0,00 | 237,103 | 25,76 | 20,05 | 1,71 | 195,234 | 25,34 | 4,3224 | K | | | | | | |
| VD-234E | | | | | | 30,30 | 0,82 | 25,905 | 9,50 | 22,82 | 7,48 | 0,00 | 193,756 | 24,17 | 23,88 | 3,09 | 166,308 | 23,76 | 5,2323 | K | | | | | | |
| VD-234F | | | | | | 47,10 | 1,25 | 15,877 | 15,50 | 34,96 | 12,14 | 31,54 | 192,753 | 22,77 | 36,69 | 5,07 | 165,280 | 22,36 | 7,9622 | K | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-232R | 1,80 | 14,20 | 16,00 | 0,30 | 11,90 | 16,70 | 64,00 | 1,65 | 3,248 | 11,50 | 28,30 | 35,70 | 0,00 | 115,940 | 7,09 | 30,30 | 19,15 | 109,452 | 6,99 | 12,1140 | H |
| D-232S | | | | | | | 80,00 | 2,02 | 2,576 | 14,50 | 34,75 | 45,25 | 40,34 | 116,567 | 6,94 | 37,28 | 24,06 | 110,041 | 6,84 | 14,8060 | H |
| D-232T | | | | | | | 93,00 | 2,26 | 2,264 | 16,50 | 39,04 | 53,96 | 63,42 | 122,141 | 6,95 | 41,91 | 26,44 | 115,650 | 6,85 | 16,6007 | J |
| D-233T-10 | 13,20 | 15,00 | 0,30 | 10,80 | 15,70 | 130,00 | 3,30 | 1,661 | 28,00 | 63,11 | 66,89 | 114,05 | 111,088 | 7,17 | 67,66 | 42,69 | 103,525 | 7,06 | 25,0242 | H | |
| D-233T-12 | | | | | | 12,00 | 0,40 | 30,448 | 2,50 | 8,81 | 3,19 | 0,00 | 97,130 | 13,40 | 9,20 | 2,80 | 85,255 | 13,20 | 3,1849 | F | |
| D-233T-14 | | | | | | 19,00 | 0,50 | 16,916 | 4,50 | 12,98 | 6,02 | 0,00 | 101,833 | 11,30 | 13,70 | 5,25 | 89,653 | 11,10 | 4,6004 | F | |
| D-233 | 11,20 | 13,00 | 0,30 | 8,90 | 13,60 | 28,00 | 0,86 | 10,149 | 7,50 | 19,23 | 8,77 | 0,00 | 88,970 | 10,02 | 20,30 | 7,70 | 78,151 | 9,85 | 6,7237 | F | |
| D-233A-01 | | | | | | 60,00 | 2,17 | 3,460 | 22,00 | 49,46 | 10,54 | 23,80 | 36,470 | 8,12 | 52,59 | 7,41 | 25,639 | 7,95 | 16,9861 | G | |
| D-233A-05 | | | | | | 12,00 | 0,40 | 44,789 | 2,25 | 8,25 | 3,75 | 0,00 | 167,960 | 17,50 | 8,60 | 1,70 | 152,284 | 17,30 | 2,7394 | F | |
| D-233A | 10,20 | 12,00 | 0,30 | 7,90 | 12,60 | 16,90 | 0,44 | 28,793 | 3,50 | 10,83 | 6,07 | 0,00 | 174,675 | 15,42 | 11,30 | 2,58 | 161,242 | 15,22 | 3,5451 | F | |
| D-233B | | | | | | 24,60 | 0,61 | 18,323 | 5,50 | 14,97 | 9,63 | 0,00 | 176,507 | 13,89 | 15,71 | 4,01 | 162,891 | 13,69 | 4,8342 | F | |
| D-234 | | | | | | 32,00 | 0,86 | 11,856 | 8,50 | 21,17 | 10,83 | 0,00 | 128,437 | 12,17 | 22,31 | 7,73 | 114,885 | 11,97 | 6,7679 | F | |
| D-234A | 9,20 | 11,00 | 0,25 | 6,90 | 11,50 | 39,80 | 0,95 | 10,608 | 9,50 | 23,23 | 16,57 | 0,00 | 175,736 | 12,60 | 24,50 | 6,95 | 162,302 | 12,48 | 7,4125 | G | |
| D-234B | | | | | | 62,70 | 1,44 | 6,502 | 15,50 | 35,63 | 27,07 | 39,00 | 175,975 | 12,03 | 37,70 | 11,33 | 162,542 | 11,83 | 11,2799 | G | |
| D-234BA-10 | | | | | | 12,50 | 0,30 | 54,936 | 2,50 | 8,73 | 3,77 | 0,00 | 207,107 | 21,00 | 9,04 | 1,30 | 190,077 | 20,80 | 2,6162 | F | |
| D-234BA-12 | 7,70 | 9,50 | 0,25 | 5,30 | 10,20 | 17,50 | 0,50 | 30,520 | 4,50 | 12,83 | 4,67 | 0,00 | 142,527 | 16,80 | 13,39 | 3,20 | 125,436 | 16,60 | 3,7789 | F | |
| D-234BA | | | | | | 24,00 | 0,64 | 21,129 | 6,50 | 16,93 | 7,07 | 0,00 | 149,415 | 15,68 | 17,75 | 4,55 | 132,057 | 15,42 | 4,9416 | F | |
| D-234BB | | | | | | 32,00 | 0,86 | 14,457 | 9,50 | 23,08 | 8,92 | 0,00 | 128,953 | 14,42 | 24,27 | 7,18 | 111,751 | 14,17 | 6,6858 | F | |
| D-234BC | 7,40 | 9,20 | 0,25 | 5,10 | 9,70 | 42,00 | 1,02 | 11,943 | 11,50 | 27,18 | 14,82 | 0,00 | 176,975 | 14,60 | 28,62 | 7,17 | 159,791 | 14,34 | 7,8485 | G | |
| D-234BD | | | | | | 55,00 | 1,32 | 8,861 | 15,50 | 35,38 | 19,62 | 32,46 | 173,816 | 14,28 | 37,32 | 9,80 | 156,655 | 14,03 | 10,1740 | G | |
| D-234BE | | | | | | 67,00 | 1,62 | 7,043 | 19,50 | 43,59 | 23,41 | 50,67 | 164,910 | 13,88 | 46,04 | 12,81 | 147,622 | 13,62 | 12,4995 | H | |
| D-234B-01 | 7,70 | 9,50 | 0,25 | 5,30 | 10,20 | 32,00 | 0,68 | 27,559 | 8,50 | 21,05 | 10,95 | 0,00 | 301,773 | 23,34 | 24,20 | 3,07 | 214,962 | 21,60 | 5,1091 | H | |
| D-234B-02 | | | | | | 25,00 | 0,59 | 35,189 | 7,50 | 18,79 | 6,21 | 0,00 | 218,442 | 24,19 | 19,64 | 2,81 | 188,611 | 23,74 | 4,4424 | F | |
| D-234B-03 | | | | | | 32,00 | 0,75 | 26,391 | 10,00 | 23,86 | 8,14 | 0,00 | 214,923 | 23,44 | 24,98 | 3,80 | 185,268 | 23,40 | 5,6115 | F | |
| D-234B-04 | 7,20 | 9,00 | 0,20 | 5,00 | 9,50 | 38,00 | 0,88 | 21,993 | 12,00 | 27,91 | 10,09 | 0,00 | 221,960 | 22,96 | 29,26 | 4,44 | 192,217 | 22,51 | 6,5467 | G | |
| D-234B-05 | | | | | | 44,00 | 1,04 | 18,201 | 14,50 | 32,97 | 11,03 | 25,75 | 200,726 | 21,88 | 34,61 | 5,80 | 170,907 | 21,44 | 7,7158 | G | |
| D-234B-06 | | | | | | 51,00 | 1,23 | 15,081 | 17,50 | 39,05 | 11,95 | 36,77 | 180,237 | 21,19 | 41,03 | 7,52 | 150,356 | 20,75 | 9,1187 | G | |
| D-234B-07 | 7,20 | 9,00 | 0,20 | 5,00 | 9,50 | 64,00 | 1,45 | 12,567 | 21,00 | 46,14 | 17,86 | 53,54 | 224,474 | 21,72 | 49,50 | 6,76 | 182,226 | 21,27 | 10,7554 | G | |
| D-234B-08 | | | | | | 76,00 | 1,70 | 10,557 | 25,00 | 54,24 | 21,76 | 67,48 | 229,702 | 21,52 | 57,06 | 8,97 | 199,941 | 21,08 | 12,6259 | H | |
| D-234C | | | | | | 13,40 | 0,33 | 81,864 | 3,50 | 10,68 | 2,72 | 0,00 | 222,571 | 30,43 | 11,07 | 1,24 | 190,743 | 29,95 | 2,5024 | F | |
| D-234D | 7,20 | 9,00 | 0,20 | 5,00 | 9,50 | 19,00 | 0,46 | 52,095 | 5,50 | 14,73 | 4,27 | 0,00 | 222,571 | 27,13 | 15,35 | 1,95 | 190,147 | 26,64 | 3,4124 | F | |
| D-234D-10 | | | | | | 26,00 | 0,58 | 38,203 | 7,50 | 18,77 | 7,23 | 0,00 | 276,056 | 26,34 | 20,00 | 2,27 | 229,219 | 25,86 | 4,3224 | G | |
| D-234E | | | | | | 30,30 | 0,70 | 30,160 | 9,50 | 22,82 | 7,48 | 0,00 | 225,587 | 24,65 | 23,88 | 3,32 | 193,630 | 24,17 | 5,2323 | G | |
| D-234F | 7,20 | 9,00 | 0,20 | 5,00 | 9,50 | 47,10 | 1,08 | 18,485 | 15,50 | 34,96 | 12,14 | 32,07 | 224,420 | 23,25 | 36,69 | 5,44 | 192,433 | 22,77 | 7,9622 | G | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-234G | 2,00 | 32,00 | 34,00 | 0,70 | 29,10 | 36,30 | 78,10 | 3,79 | 1,421 | 3,50 | 14,39 | 63,71 | 0,00 | 90,551 | 6,74 | 16,09 | 23,96 | 88,132 | 6,71 | 13,7307 | G |
| D-234H | | | | | | | 120,00 | 5,23 | 0,904 | 5,50 | 20,32 | 99,68 | 0,00 | 90,150 | 6,08 | 22,98 | 37,83 | 87,748 | 6,05 | 18,7237 | H |
| D-234J | | | | | | | 205,00 | 8,07 | 0,524 | 9,50 | 32,20 | 172,80 | 135,80 | 90,483 | 5,58 | 36,80 | 65,02 | 88,072 | 5,55 | 28,7097 | K |
| D-234K | | | | | | | 332,00 | 12,32 | 0,321 | 15,50 | 50,00 | 282,00 | 295,60 | 90,500 | 5,31 | 57,50 | 106,12 | 88,094 | 5,27 | 43,6886 | L |
| D-234K-01 | | 28,00 | 30,00 | 0,50 | 25,30 | 31,30 | 34,50 | 1,80 | 3,300 | 2,25 | 10,27 | 24,23 | 0,00 | 79,962 | 7,70 | 11,20 | 14,20 | 76,893 | 7,70 | 9,2838 | G |
| D-234L | | | | | | | 50,00 | 2,62 | 2,122 | 3,50 | 13,76 | 36,24 | 0,00 | 76,888 | 6,72 | 15,14 | 22,85 | 73,956 | 6,68 | 12,0144 | G |
| D-234M | | | | | | | 76,00 | 3,62 | 1,350 | 5,50 | 19,33 | 56,67 | 0,00 | 76,502 | 6,04 | 21,50 | 36,02 | 73,578 | 5,99 | 16,3832 | G |
| D-234N | | | | | | | 115,00 | 5,10 | 0,874 | 8,50 | 27,70 | 87,30 | 0,00 | 76,264 | 5,60 | 31,05 | 55,76 | 73,336 | 5,56 | 22,9365 | H |
| D-234N-10 | | | | | | | 170,00 | 7,55 | 0,550 | 13,50 | 41,64 | 128,36 | 103,40 | 70,602 | 5,21 | 46,96 | 92,61 | 67,675 | 5,17 | 33,8587 | J |
| D-234O | | | | | | | 182,00 | 7,55 | 0,550 | 13,50 | 41,64 | 140,36 | 122,90 | 77,202 | 5,31 | 46,96 | 87,93 | 74,275 | 5,27 | 33,8587 | J |
| D-235 | | 25,00 | 27,00 | 0,45 | 22,30 | 28,60 | 58,00 | 1,93 | 2,981 | 3,50 | 16,00 | 42,00 | 0,00 | 125,184 | 7,73 | 20,70 | 14,19 | 111,175 | 7,68 | 10,7271 | G |
| D-236 | | | | | | | 88,50 | 2,66 | 1,897 | 5,50 | 22,50 | 66,00 | 0,00 | 125,184 | 7,03 | 29,50 | 22,14 | 111,907 | 6,97 | 14,6279 | G |
| D-236D | | | | | | | 125,00 | 5,90 | 0,719 | 14,50 | 42,70 | 82,30 | 0,00 | 59,213 | 5,13 | 47,55 | 77,45 | 55,721 | 5,08 | 32,1813 | H |
| D-237 | | | | | | | 135,00 | 3,74 | 1,227 | 8,50 | 32,95 | 102,05 | 56,15 | 125,245 | 6,59 | 44,00 | 34,30 | 111,684 | 6,53 | 20,4790 | H |
| D-237A | | | | | | | 135,00 | 5,18 | 0,835 | 12,50 | 37,36 | 97,64 | 56,15 | 81,487 | 5,54 | 41,54 | 66,18 | 77,998 | 5,49 | 28,2806 | J |
| D-238 | | | | | | | 195,00 | 5,18 | 0,835 | 12,50 | 45,00 | 150,00 | 154,60 | 125,184 | 6,30 | 61,50 | 50,53 | 111,414 | 6,24 | 28,2806 | J |
| D-238A | | | | | | | 195,00 | 7,33 | 0,564 | 18,50 | 53,37 | 141,63 | 154,60 | 79,863 | 5,33 | 59,56 | 99,09 | 76,374 | 5,28 | 39,9829 | K |
| D-239 | | | | | | | 290,00 | 7,33 | 0,564 | 18,50 | 67,95 | 222,05 | 264,90 | 125,212 | 6,14 | 91,50 | 74,45 | 111,933 | 6,08 | 39,9829 | K |
| D-239A | | | | | | | 290,00 | 8,77 | 0,464 | 22,50 | 64,05 | 225,95 | 264,90 | 104,762 | 5,64 | 71,58 | 99,49 | 101,269 | 5,58 | 47,7844 | L |
| D-239A-08 | | 23,00 | 25,00 | 0,45 | 20,20 | 26,50 | 25,00 | 1,10 | 5,954 | 2,25 | 9,81 | 15,19 | 0,00 | 90,444 | 8,30 | 10,60 | 9,80 | 85,740 | 8,20 | 7,6260 | G |
| D-239A-01 | | | | | | | 40,50 | 1,55 | 3,828 | 3,50 | 13,09 | 27,41 | 0,00 | 104,922 | 7,49 | 14,14 | 13,83 | 100,898 | 7,43 | 9,8689 | G |
| D-239A-02 | | | | | | | 62,50 | 2,13 | 2,436 | 5,50 | 18,28 | 44,22 | 0,00 | 107,706 | 6,82 | 19,92 | 21,28 | 103,716 | 6,76 | 13,4577 | G |
| D-239A-03 | | | | | | | 63,00 | 1,84 | 2,977 | 4,50 | 17,30 | 45,70 | 0,00 | 136,053 | 7,60 | 22,50 | 15,20 | 120,572 | 7,54 | 11,6633 | M |
| D-239A-04 | | | | | | | 95,50 | 3,01 | 1,576 | 8,50 | 26,07 | 69,43 | 0,00 | 109,425 | 6,38 | 28,61 | 32,46 | 105,426 | 6,32 | 18,8407 | H |
| D-239A-05 | | | | | | | 139,50 | 4,16 | 1,072 | 12,50 | 36,46 | 103,04 | 84,70 | 110,434 | 6,12 | 40,19 | 47,36 | 106,436 | 6,06 | 26,0181 | H |
| D-239A-06 | | | | | | | 205,50 | 5,89 | 0,724 | 18,50 | 52,04 | 153,46 | 174,26 | 111,129 | 5,93 | 57,56 | 69,74 | 107,132 | 5,87 | 36,7842 | J |
| D-239A-12 | | 21,50 | 23,50 | 0,45 | 18,70 | 24,80 | 25,00 | 0,90 | 7,289 | 2,25 | 9,73 | 15,27 | 0,00 | 111,309 | 8,80 | 10,40 | 7,60 | 106,425 | 8,80 | 7,1287 | M |
| D-239A-10 | | | | | | | 43,00 | 1,31 | 4,686 | 3,50 | 12,91 | 30,09 | 0,00 | 140,986 | 8,25 | 15,80 | 10,29 | 127,460 | 8,18 | 9,2253 | M |
| D-239A-14 | | | | | | | 58,00 | 1,70 | 2,982 | 5,50 | 18,01 | 39,99 | 0,00 | 119,251 | 7,10 | 19,60 | 17,80 | 114,509 | 7,10 | 12,5800 | M |
| D-239A-20 | | 21,00 | 23,00 | 0,45 | 18,20 | 24,30 | 94,00 | 2,40 | 2,071 | 8,50 | 25,51 | 68,49 | 0,00 | 141,817 | 7,11 | 31,00 | 23,71 | 130,452 | 7,03 | 17,2024 | M |
| D-239A-30 | | 20,00 | 22,00 | 0,45 | 17,30 | 23,10 | 22,50 | 0,80 | 9,056 | 2,25 | 9,63 | 12,87 | 0,00 | 116,545 | 9,30 | 10,30 | 6,70 | 110,478 | 9,20 | 6,6313 | G |
| D-239B | | | | | | | 36,70 | 1,11 | 5,821 | 3,50 | 12,75 | 23,95 | 0,00 | 139,423 | 8,53 | 13,63 | 8,93 | 134,300 | 8,46 | 8,5817 | G |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|---------------------------|-------------|-----------------------------|----------------------------|---------|--------|---------|---------|---|
| | | | | | | | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | | | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | |
| VD-234G | 2,00 | 32,00 | 34,00 | 0,70 | 29,10 | 36,30 | 78,10 | 4,41 | 1,221 | 3,50 | 14,39 | 63,71 | 0,00 | 77,773 | 6,55 | 16,09 | 18,86 | 75,696 | 6,52 | 13,7307 | K | | | | | |
| VD-234H | | | | | | | 120,00 | 6,09 | 0,777 | 5,50 | 20,32 | 99,68 | 0,00 | 77,429 | 5,89 | 22,98 | 29,88 | 75,366 | 5,86 | 18,7237 | L | | | | | |
| VD-234J | | | | | | | 205,00 | 9,40 | 0,450 | 9,50 | 32,20 | 172,80 | 133,27 | 77,716 | 5,39 | 36,80 | 51,23 | 75,645 | 5,36 | 28,7097 | N | | | | | |
| VD-234K | | | | | | | 332,00 | 14,34 | 0,276 | 15,50 | 50,00 | 282,00 | 294,75 | 77,730 | 5,12 | 57,50 | 83,44 | 75,664 | 5,09 | 43,6886 | K | | | | | |
| VD-234K-01 | | | | | | | 28,00 | 30,00 | 0,50 | 25,30 | 31,30 | 34,50 | 2,20 | 2,834 | 2,25 | 10,30 | 24,20 | 0,00 | 68,594 | 7,50 | 11,20 | 13,50 | 66,043 | 7,60 | 9,2838 | J |
| VD-234L | | | | | | | | | | | | 50,00 | 3,06 | 1,822 | 3,50 | 13,76 | 36,24 | 0,00 | 66,039 | 6,56 | 15,14 | 17,80 | 63,520 | 6,52 | 12,0144 | K |
| VD-234M | | | | | | | | | | | | 76,00 | 3,62 | 1,160 | 5,50 | 19,33 | 56,67 | 0,00 | 65,707 | 6,04 | 21,50 | 32,48 | 63,196 | 5,99 | 16,3832 | G |
| VD-234N | | | | | | | | | | | | 115,00 | 5,94 | 0,750 | 8,50 | 27,70 | 87,30 | 0,00 | 65,503 | 5,44 | 31,05 | 43,24 | 62,988 | 5,40 | 22,9365 | L |
| VD-234N-10 | | | | | | | | | | | | 170,00 | 8,79 | 0,472 | 13,50 | 41,64 | 128,36 | 100,54 | 60,640 | 5,06 | 46,96 | 68,69 | 58,125 | 5,03 | 33,8587 | M |
| VD-2340 | | | | | | | | | | | | 182,00 | 8,79 | 0,472 | 13,50 | 41,64 | 140,36 | 120,81 | 66,309 | 5,15 | 46,96 | 68,69 | 63,794 | 5,11 | 33,8587 | M |
| VD-235 | 25,00 | 27,00 | 0,45 | 22,30 | 28,60 | 58,00 | | | | | | 2,24 | 2,560 | 3,50 | 15,90 | 42,10 | 0,00 | 107,776 | 7,30 | 20,25 | 9,68 | 96,640 | 7,15 | 10,7271 | K | |
| VD-236 | | | | | | 88,50 | | | | | | 3,09 | 1,629 | 5,50 | 22,25 | 66,25 | 0,00 | 107,927 | 6,60 | 29,20 | 15,18 | 96,605 | 6,46 | 14,6279 | K | |
| VD-236D | | | | | | 125,00 | | | | | | 6,87 | 0,618 | 14,50 | 42,70 | 82,30 | 0,00 | 50,858 | 5,01 | 47,55 | 69,00 | 47,859 | 4,96 | 32,1813 | L | |
| VD-237 | | | | | | 135,00 | | | | | | 4,36 | 1,054 | 8,50 | 32,60 | 102,40 | 48,64 | 107,942 | 6,15 | 43,35 | 23,45 | 96,610 | 6,00 | 20,4790 | L | |
| VD-237A | | | | | | 135,00 | 6,03 | 0,717 | 12,50 | 37,36 | 97,64 | 48,64 | 69,989 | 5,37 | 41,54 | 50,09 | 66,992 | 5,33 | 28,2806 | M | | | | | | |
| VD-238 | | | | | | 195,00 | 6,03 | 0,717 | 12,50 | 44,50 | 150,50 | 153,49 | 107,878 | 5,89 | 60,25 | 34,48 | 96,589 | 5,73 | 28,2806 | M | | | | | | |
| VD-238A | | | | | | 195,00 | 8,54 | 0,484 | 18,50 | 53,37 | 141,63 | 153,49 | 68,594 | 5,16 | 59,56 | 74,14 | 65,597 | 5,12 | 39,9829 | N | | | | | | |
| VD-239 | | | | | | 290,00 | 8,54 | 0,484 | 18,50 | 67,50 | 222,50 | 264,38 | 107,762 | 5,70 | 90,50 | 51,09 | 96,623 | 5,55 | 39,9829 | N | | | | | | |
| VD-239A | | | | | | 290,00 | 10,21 | 0,398 | 22,50 | 64,05 | 225,95 | 264,38 | 89,980 | 5,41 | 71,58 | 83,21 | 86,980 | 5,37 | 47,7844 | O | | | | | | |
| VD-239A-08 | | | | | | 23,00 | 25,00 | 0,45 | 20,20 | 26,50 | 25,00 | 1,30 | 5,114 | 2,25 | 9,85 | 15,15 | 0,00 | 77,477 | 8,10 | 10,60 | 9,70 | 73,642 | 8,10 | 7,6260 | J | |
| VD-239A-01 | 40,50 | 1,80 | 3,288 | 3,50 | 13,09 | | | | | | 27,41 | 0,00 | 90,117 | 7,27 | 14,14 | 11,84 | 86,661 | 7,22 | 9,8689 | K | | | | | | |
| VD-239A-02 | 62,50 | 2,49 | 2,092 | 5,50 | 18,28 | | | | | | 44,22 | 0,00 | 92,508 | 6,59 | 19,92 | 18,60 | 89,081 | 6,54 | 13,4577 | K | | | | | | |
| VD-239A-03 | 63,00 | 2,14 | 2,557 | 4,50 | 17,25 | | | | | | 45,75 | 0,00 | 116,983 | 7,30 | 22,30 | 10,43 | 104,070 | 7,25 | 11,6633 | P | | | | | | |
| VD-239A-04 | 95,50 | 3,50 | 1,354 | 8,50 | 26,07 | | | | | | 69,43 | 0,00 | 93,985 | 6,15 | 28,61 | 27,62 | 90,550 | 6,10 | 18,8407 | L | | | | | | |
| VD-239A-05 | 139,50 | 4,85 | 0,921 | 12,50 | 36,46 | | | | | | 103,04 | 82,32 | 94,851 | 5,88 | 40,19 | 40,09 | 91,417 | 5,83 | 26,0181 | L | | | | | | |
| VD-239A-06 | 205,50 | 6,86 | 0,622 | 18,50 | 52,04 | | | | | | 153,46 | 173,47 | 95,448 | 5,70 | 57,56 | 58,84 | 92,015 | 5,65 | 36,7842 | M | | | | | | |
| VD-239A-12 | 21,50 | 23,50 | 0,45 | 18,70 | 24,80 | | | | | | 25,00 | 1,10 | 6,261 | 2,25 | 9,75 | 15,25 | 0,00 | 95,477 | 8,60 | 10,40 | 7,00 | 91,408 | 8,60 | 7,1287 | J | |
| VD-239A-10 | | | | | | | | | | | 43,00 | 1,52 | 4,025 | 3,50 | 12,91 | 30,09 | 0,00 | 121,093 | 7,95 | 15,55 | 7,04 | 110,481 | 7,80 | 9,2253 | P | |
| VD-239A-14 | | | | | | | | | | | 58,00 | 2,00 | 2,561 | 5,50 | 18,05 | 39,95 | 0,00 | 102,321 | 6,90 | 19,60 | 15,00 | 98,352 | 6,86 | 12,5800 | M | |
| VD-239A-20 | 21,00 | 23,00 | 0,45 | 18,20 | 24,30 | 94,00 | 2,80 | 1,778 | 8,50 | 25,51 | 68,49 | 0,00 | 121,806 | 6,80 | 30,60 | 16,72 | 112,756 | 6,70 | 17,2024 | P | | | | | | |
| VD-239A-30 | 20,00 | 22,00 | 0,45 | 17,30 | 23,10 | 22,50 | 1,00 | 7,778 | 2,25 | 9,65 | 12,85 | 0,00 | 99,944 | 9,10 | 10,25 | 6,20 | 95,278 | 9,00 | 6,6313 | J | | | | | | |
| VD-239B | | | | | | 36,70 | 1,29 | 5,000 | 3,50 | 12,75 | 23,95 | 0,00 | 119,750 | 8,24 | 13,63 | 7,04 | 115,350 | 8,17 | 8,5817 | K | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn |
| VD-240 | 2,00 | 20,00 | 22,00 | 0,45 | 17,30 | 23,10 | 41,00 | 1,29 | 5,000 | 3,50 | 14,20 | 26,80 | 0,00 | 134,000 | 8,39 | 17,50 | 6,03 | 117,500 | 8,16 | 8,5817 | K |
| VD-240A | | | | | | | 55,40 | 1,78 | 3,182 | 5,50 | 17,75 | 37,65 | 0,00 | 119,795 | 7,45 | 19,13 | 11,05 | 115,405 | 7,39 | 11,7023 | K |
| VD-241 | | | | | | | 62,00 | 1,78 | 3,182 | 5,50 | 19,70 | 42,30 | 0,00 | 134,591 | 7,70 | 25,00 | 9,49 | 117,727 | 7,38 | 11,7023 | K |
| VD-241A | | | | | | | 79,00 | 2,50 | 2,059 | 8,50 | 25,25 | 53,75 | 0,00 | 110,662 | 6,81 | 27,38 | 19,51 | 106,276 | 6,75 | 16,3832 | K |
| VD-242 | | | | | | | 94,00 | 2,50 | 2,059 | 8,50 | 28,50 | 65,50 | 0,00 | 134,853 | 7,20 | 36,85 | 14,65 | 117,662 | 6,88 | 16,3832 | K |
| VD-242A | | | | | | | 102,00 | 3,23 | 1,522 | 11,50 | 32,75 | 69,25 | 0,00 | 105,380 | 6,49 | 35,63 | 28,30 | 100,998 | 6,42 | 21,0642 | L |
| VD-243 | | | | | | | 135,00 | 3,47 | 1,400 | 12,50 | 38,80 | 96,20 | 93,95 | 134,680 | 6,95 | 50,95 | 21,53 | 117,670 | 6,57 | 22,6245 | L |
| VD-243A | | | | | | | 135,00 | 4,91 | 0,946 | 18,50 | 50,25 | 84,75 | 93,95 | 80,169 | 5,84 | 54,88 | 47,33 | 75,789 | 5,78 | 31,9863 | M |
| VD-243B | | | | | | | 149,00 | 4,19 | 1,129 | 15,50 | 42,75 | 106,25 | 113,61 | 119,960 | 6,53 | 46,63 | 31,05 | 115,579 | 6,46 | 27,3054 | L |
| VD-244 | | | | | | | 200,00 | 4,91 | 0,946 | 18,50 | 57,90 | 142,10 | 175,69 | 134,419 | 6,77 | 75,55 | 31,82 | 117,723 | 6,36 | 31,9863 | M |
| VD-244A | | | | | | | 200,00 | 5,87 | 0,778 | 22,50 | 60,25 | 139,75 | 175,69 | 108,694 | 6,19 | 65,88 | 53,01 | 104,316 | 6,13 | 38,2275 | N |
| VD-245 | 19,00 | 21,00 | 0,45 | 16,30 | 21,90 | 45,00 | 1,59 | 3,711 | 5,50 | 17,59 | 27,41 | 0,00 | 101,725 | 7,43 | 18,89 | 12,62 | 96,897 | 7,36 | 11,1172 | K | |
| VD-246 | | | | | | 85,00 | 2,67 | 1,944 | 10,50 | 29,94 | 55,06 | 0,00 | 107,027 | 6,80 | 32,41 | 24,10 | 102,231 | 6,73 | 18,5287 | K | |
| VD-247 | | | | | | 115,00 | 3,32 | 1,512 | 13,50 | 37,36 | 77,64 | 67,57 | 117,394 | 6,78 | 40,54 | 27,24 | 112,579 | 6,71 | 22,9755 | L | |
| VD-247A | 18,50 | 20,50 | 0,45 | 15,80 | 21,40 | 27,00 | 1,09 | 6,317 | 3,50 | 12,60 | 14,40 | 0,00 | 90,982 | 8,27 | 13,40 | 7,57 | 85,918 | 8,19 | 7,9381 | K | |
| VD-247B | | | | | | 41,00 | 1,51 | 4,020 | 5,50 | 17,51 | 23,49 | 0,00 | 94,428 | 7,48 | 18,77 | 11,90 | 89,370 | 7,40 | 10,8246 | K | |
| VD-247C | | | | | | 62,00 | 2,12 | 2,601 | 8,50 | 24,88 | 37,12 | 0,00 | 96,556 | 6,97 | 26,82 | 18,39 | 91,514 | 6,90 | 15,1545 | K | |
| VD-247D | | | | | | 97,00 | 3,14 | 1,638 | 13,50 | 37,17 | 59,83 | 0,00 | 98,001 | 6,62 | 40,26 | 29,21 | 92,933 | 6,54 | 22,3709 | K | |
| VD-247D-05 | 18,00 | 20,00 | 0,45 | 15,20 | 21,00 | 43,50 | 1,53 | 4,001 | 6,00 | 18,66 | 24,84 | 0,00 | 99,391 | 7,66 | 19,99 | 12,33 | 94,061 | 7,58 | 11,2342 | K | |
| VD-247D-06 | | | | | | 50,00 | 2,50 | 2,182 | 11,00 | 30,87 | 19,13 | 0,00 | 41,741 | 6,11 | 33,31 | 16,69 | 36,423 | 6,03 | 18,2556 | K | |
| VD-247D-07 | | | | | | 65,00 | 3,85 | 1,334 | 18,00 | 47,97 | 17,03 | 0,00 | 22,707 | 5,49 | 51,96 | 13,04 | 17,391 | 5,41 | 28,0855 | L | |
| VD-247D-08 | | | | | | 77,50 | 2,50 | 2,182 | 11,00 | 30,87 | 46,63 | 0,00 | 101,755 | 7,01 | 33,31 | 22,60 | 96,437 | 6,93 | 18,2556 | L | |
| VD-247D-09 | | | | | | 200,00 | 5,58 | 0,889 | 27,00 | 69,96 | 130,04 | 180,63 | 115,617 | 6,71 | 75,94 | 53,27 | 110,301 | 6,63 | 40,7240 | M | |
| VD-247D-20 | 16,50 | 18,50 | 0,45 | 13,70 | 19,60 | 66,00 | 1,72 | 3,667 | 8,50 | 24,44 | 41,56 | 0,00 | 152,398 | 8,60 | 28,20 | 9,81 | 138,595 | 8,51 | 13,5162 | M | |
| VD-247D-30 | 16,00 | 18,00 | 0,30 | 13,50 | 18,60 | 21,50 | 0,60 | 13,672 | 2,50 | 10,00 | 11,50 | 0,00 | 157,227 | 11,60 | 11,15 | 3,00 | 141,504 | 11,45 | 5,6171 | J | |
| VD-248 | | | | | | 30,00 | 0,84 | 9,766 | 3,50 | 12,75 | 17,25 | 0,00 | 168,457 | 10,82 | 15,45 | 3,75 | 142,090 | 10,32 | 6,8654 | J | |
| VD-249 | | | | | | 45,00 | 1,16 | 6,214 | 5,50 | 18,00 | 27,00 | 0,00 | 167,791 | 9,83 | 22,10 | 5,89 | 142,312 | 9,31 | 9,3618 | K | |
| VD-249A | | | | | | 56,00 | 1,64 | 4,021 | 8,50 | 24,33 | 31,67 | 0,00 | 127,341 | 8,50 | 26,00 | 13,18 | 120,634 | 8,39 | 13,1066 | K | |
| VD-250 | | | | | | 68,00 | 1,64 | 4,021 | 8,50 | 26,35 | 41,65 | 0,00 | 167,480 | 9,22 | 32,60 | 9,09 | 142,348 | 8,68 | 13,1066 | K | |
| VD-251 | | | | | | 98,00 | 2,27 | 2,734 | 12,50 | 36,50 | 61,50 | 59,00 | 168,164 | 8,83 | 45,90 | 13,35 | 142,461 | 8,29 | 18,0996 | L | |
| VD-251A | | | | | | 98,00 | 3,21 | 1,848 | 18,50 | 48,25 | 49,75 | 59,00 | 91,912 | 7,31 | 51,88 | 29,88 | 85,209 | 7,21 | 25,5890 | M | |
| VD-252 | | | | | | 145,00 | 3,21 | 1,848 | 18,50 | 54,00 | 91,00 | 123,11 | 168,127 | 8,60 | 67,90 | 19,70 | 142,446 | 8,01 | 25,5890 | M | |
| VD-252A | | | | | | 145,00 | 3,84 | 1,519 | 22,50 | 57,82 | 87,18 | 123,11 | 132,435 | 7,82 | 62,23 | 33,05 | 125,736 | 7,72 | 30,5820 | M | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-240 | 2,00 | 20,00 | 22,00 | 0,45 | 17,30 | 23,10 | 41,00 | 1,11 | 5,821 | 3,50 | 14,20 | 26,80 | 0,00 | 156,014 | 8,91 | 17,50 | 8,76 | 136,804 | 8,83 | 8,5817 | G |
| D-240A | | | | | | | 55,40 | 1,53 | 3,705 | 5,50 | 17,75 | 37,65 | 0,00 | 139,476 | 7,75 | 19,13 | 14,02 | 134,364 | 7,67 | 11,7023 | G |
| D-241 | | | | | | | 62,00 | 1,53 | 3,705 | 5,50 | 19,85 | 42,15 | 0,00 | 156,147 | 8,12 | 25,40 | 13,89 | 135,586 | 8,04 | 11,7023 | G |
| D-241A | | | | | | | 79,00 | 2,15 | 2,397 | 8,50 | 25,25 | 53,75 | 0,00 | 128,842 | 7,09 | 27,38 | 23,40 | 123,736 | 7,01 | 16,3832 | G |
| D-242 | | | | | | | 94,00 | 2,15 | 2,397 | 8,50 | 28,80 | 65,20 | 0,00 | 156,288 | 7,63 | 37,00 | 21,30 | 136,632 | 7,55 | 16,3832 | G |
| D-242A | | | | | | | 102,00 | 2,77 | 1,772 | 11,50 | 32,75 | 69,25 | 0,00 | 122,693 | 6,75 | 35,63 | 33,01 | 117,590 | 6,67 | 21,0642 | G |
| D-243 | | | | | | | 135,00 | 2,98 | 1,630 | 12,50 | 39,00 | 96,00 | 95,29 | 156,480 | 7,29 | 51,00 | 31,25 | 136,920 | 7,21 | 22,6245 | H |
| D-243A | | | | | | | 135,00 | 4,21 | 1,101 | 18,50 | 50,25 | 84,75 | 95,29 | 93,340 | 6,04 | 54,88 | 63,53 | 88,240 | 5,97 | 31,9863 | J |
| D-243B | | | | | | | 149,00 | 3,60 | 1,315 | 15,50 | 42,75 | 106,25 | 114,60 | 139,667 | 6,82 | 46,63 | 39,44 | 134,567 | 6,75 | 27,3054 | J |
| D-244 | | | | | | | 200,00 | 4,21 | 1,101 | 18,50 | 57,85 | 142,15 | 176,20 | 156,557 | 7,12 | 88,00 | 51,08 | 123,351 | 7,04 | 31,9863 | J |
| D-244A | | | | | | | 200,00 | 5,04 | 0,906 | 22,50 | 60,25 | 139,75 | 176,20 | 126,551 | 6,46 | 65,88 | 62,90 | 121,453 | 6,38 | 38,2275 | K |
| D-245 | 19,00 | 21,00 | 0,45 | 16,30 | 21,90 | 45,00 | 1,37 | 4,321 | 5,50 | 17,59 | 27,41 | 0,00 | 118,437 | 7,69 | 18,89 | 14,07 | 112,816 | 7,60 | 11,1172 | G | |
| D-246 | | | | | | 85,00 | 2,30 | 2,263 | 10,50 | 29,94 | 55,06 | 0,00 | 124,609 | 7,07 | 32,41 | 17,70 | 119,026 | 6,98 | 18,5287 | G | |
| D-247 | | | | | | 115,00 | 2,85 | 1,760 | 13,50 | 37,36 | 77,64 | 69,55 | 136,680 | 7,07 | 40,54 | 32,94 | 131,074 | 6,98 | 22,9755 | H | |
| D-247A | 18,50 | 20,50 | 0,45 | 15,80 | 21,40 | 27,00 | 0,94 | 7,355 | 3,50 | 12,60 | 14,40 | 0,00 | 105,929 | 8,49 | 13,40 | 9,88 | 100,033 | 8,39 | 7,9381 | G | |
| D-247B | | | | | | 41,00 | 1,30 | 4,681 | 5,50 | 17,51 | 23,49 | 0,00 | 109,941 | 7,71 | 18,77 | 15,18 | 104,052 | 7,62 | 10,8246 | G | |
| D-247C | | | | | | 62,00 | 1,82 | 3,029 | 8,50 | 24,88 | 37,12 | 0,00 | 112,419 | 7,21 | 26,82 | 23,14 | 106,549 | 7,12 | 15,1545 | G | |
| D-247D | | | | | | 97,00 | 2,70 | 1,907 | 13,50 | 37,17 | 59,83 | 31,23 | 114,102 | 6,86 | 40,26 | 36,42 | 108,200 | 6,77 | 22,3709 | H | |
| D-247D-05 | 18,00 | 20,00 | 0,45 | 15,20 | 21,00 | 43,50 | 1,31 | 4,658 | 6,00 | 18,66 | 24,84 | 0,00 | 115,719 | 7,91 | 19,99 | 15,37 | 109,514 | 7,82 | 11,2342 | G | |
| D-247D-06 | | | | | | 50,00 | 2,14 | 2,541 | 11,00 | 30,87 | 19,13 | 0,00 | 48,599 | 6,21 | 33,31 | 16,69 | 42,407 | 6,12 | 18,2556 | G | |
| D-247D-07 | | | | | | 65,00 | 3,31 | 1,553 | 18,00 | 47,97 | 17,03 | 0,00 | 26,437 | 5,55 | 51,96 | 13,04 | 20,248 | 5,46 | 28,0855 | H | |
| D-247D-08 | | | | | | 77,50 | 2,14 | 2,541 | 11,00 | 30,87 | 46,63 | 0,00 | 118,472 | 7,26 | 33,31 | 27,75 | 112,280 | 7,17 | 18,2556 | H | |
| D-247D-09 | | | | | | 200,00 | 4,80 | 1,035 | 27,00 | 69,96 | 130,04 | 181,06 | 134,611 | 7,00 | 75,94 | 62,04 | 128,422 | 6,91 | 40,7240 | K | |
| D-247D-20 | 16,50 | 18,50 | 0,45 | 13,70 | 19,60 | 66,00 | 1,48 | 4,269 | 8,50 | 24,44 | 41,56 | 0,00 | 177,435 | 8,99 | 30,00 | 14,79 | 153,681 | 8,80 | 13,5162 | K | |
| D-247D-30 | 16,00 | 18,00 | 0,30 | 13,50 | 18,60 | 21,50 | 0,60 | 15,918 | 2,50 | 9,98 | 11,52 | 0,00 | 183,375 | 12,00 | 10,50 | 3,60 | 175,098 | 11,90 | 5,6171 | F | |
| D-248 | | | | | | 30,00 | 0,72 | 11,370 | 3,50 | 12,80 | 17,20 | 0,00 | 195,564 | 9,53 | 15,70 | 5,53 | 162,591 | 11,12 | 6,8654 | F | |
| D-249 | | | | | | 45,00 | 1,00 | 7,235 | 5,50 | 18,00 | 27,00 | 0,00 | 195,357 | 10,25 | 22,50 | 8,68 | 162,797 | 10,14 | 9,3618 | G | |
| D-249A | | | | | | 56,00 | 1,41 | 4,682 | 8,50 | 24,33 | 31,67 | 0,00 | 148,262 | 8,81 | 26,00 | 15,28 | 140,453 | 8,70 | 13,1066 | G | |
| D-250 | | | | | | 68,00 | 1,41 | 4,682 | 8,50 | 26,35 | 41,65 | 0,00 | 194,995 | 9,66 | 33,10 | 13,36 | 163,393 | 9,54 | 13,1066 | G | |
| D-251 | | | | | | 98,00 | 1,95 | 3,184 | 12,50 | 36,65 | 61,35 | 60,58 | 195,313 | 9,26 | 46,20 | 19,46 | 164,910 | 9,14 | 18,0996 | H | |
| D-251A | | | | | | 98,00 | 2,76 | 2,151 | 18,50 | 48,25 | 49,75 | 60,58 | 107,012 | 7,54 | 51,88 | 40,47 | 99,208 | 7,42 | 25,5890 | J | |
| D-252 | | | | | | 145,00 | 2,76 | 2,151 | 18,50 | 54,25 | 90,75 | 123,60 | 195,210 | 9,05 | 68,20 | 28,76 | 165,203 | 8,90 | 25,5890 | H | |
| D-252A | | | | | | 145,00 | 3,30 | 1,769 | 22,50 | 57,82 | 87,18 | 123,60 | 154,192 | 8,15 | 62,23 | 39,12 | 146,392 | 8,03 | 30,5820 | J | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|---------|-------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-252A-01 | 2,00 | 16,00 | 18,00 | 0,30 | 13,50 | 18,60 | 170,00 | 3,50 | 1,624 | 24,50 | 62,60 | 107,40 | 152,29 | 174,441 | 8,41 | 70,20 | 38,83 | 162,103 | 8,29 | 33,0785 | K | | | | |
| D-252A-20 | | 13,50 | 15,50 | 0,30 | 10,90 | 16,30 | 167,00 | 3,26 | 2,325 | 28,50 | 70,60 | 96,40 | 154,40 | 224,098 | 10,93 | 85,20 | 30,56 | 190,149 | 10,76 | 32,1228 | L | | | | |
| D-252A-32 | | 13,00 | 15,00 | 0,30 | 10,50 | 15,70 | 17,00 | 0,50 | 26,979 | 2,75 | 10,40 | 6,60 | 0,00 | 178,061 | 15,30 | 10,90 | 3,10 | 164,572 | 15,10 | 4,8174 | H | | | | |
| D-252A-33 | | | | | | | 28,50 | 0,70 | 14,132 | 5,25 | 16,22 | 12,28 | 0,00 | 173,539 | 12,90 | 17,10 | 6,10 | 161,103 | 12,80 | 7,3529 | H | | | | |
| D-252AA | | | | | | | 40,00 | 0,97 | 9,892 | 7,50 | 21,45 | 18,55 | 0,00 | 183,496 | 12,31 | 22,68 | 8,38 | 171,334 | 12,12 | 9,6349 | H | | | | |
| D-252A-30 | | | | | | | 52,00 | 1,07 | 8,728 | 8,50 | 24,50 | 27,50 | 0,00 | 240,033 | 13,02 | 29,70 | 8,45 | 194,645 | 11,45 | 10,6491 | K | | | | |
| D-252AB | | | | | | | 55,60 | 1,27 | 7,066 | 10,50 | 28,43 | 27,17 | 0,00 | 191,975 | 11,88 | 30,15 | 11,26 | 179,827 | 11,70 | 12,6775 | H | | | | |
| D-252AC | | | | | | | 66,20 | 1,48 | 5,935 | 12,50 | 33,08 | 33,12 | 0,00 | 196,553 | 11,73 | 35,12 | 13,10 | 184,471 | 11,55 | 14,7059 | H | | | | |
| D-252A-35 | | | | | | | 75,00 | 1,48 | 5,916 | 12,54 | 34,30 | 40,70 | 40,67 | 240,799 | 12,51 | 42,50 | 12,59 | 192,284 | 12,10 | 14,7465 | K | | | | |
| D-252AD | | | | | | | 87,40 | 1,89 | 4,496 | 16,50 | 42,39 | 45,01 | 61,43 | 202,381 | 11,53 | 45,09 | 16,79 | 190,246 | 11,35 | 18,7627 | H | | | | |
| D-252A-40 | | | | | | | 92,00 | 1,79 | 4,787 | 15,50 | 41,80 | 50,20 | 67,96 | 240,287 | 12,28 | 51,30 | 15,40 | 194,814 | 12,00 | 17,7485 | K | | | | |
| D-252AE | | | | | | | 98,00 | 2,09 | 4,010 | 18,50 | 47,04 | 50,96 | 76,02 | 204,350 | 11,47 | 50,06 | 18,63 | 192,258 | 11,28 | 20,7911 | J | | | | |
| D-252AF | | | | | | | 120,00 | 2,50 | 3,297 | 22,50 | 56,35 | 63,65 | 103,00 | 209,875 | 11,44 | 63,20 | 23,25 | 187,294 | 11,22 | 24,8479 | K | | | | |
| D-252AG | | | | | | | 305,00 | 7,21 | 1,083 | 68,50 | 163,38 | 141,62 | 298,80 | 153,385 | 10,11 | 174,57 | 87,38 | 141,268 | 9,93 | 71,5011 | M | | | | |
| D-252A-02 | | 12,80 | 14,80 | 0,30 | 10,30 | 15,50 | 25,00 | 0,64 | 17,272 | 4,50 | 14,45 | 10,55 | 0,00 | 182,170 | 13,86 | 15,18 | 4,95 | 169,612 | 13,67 | 6,4909 | G | | | | |
| D-252A-03 | | | | | | | 32,00 | 0,75 | 14,132 | 5,50 | 16,78 | 15,22 | 0,00 | 215,144 | 13,77 | 18,20 | 5,34 | 195,018 | 13,58 | 7,4895 | G | | | | |
| D-252A-04 | | | | | | | 38,00 | 0,95 | 10,363 | 7,50 | 21,42 | 16,58 | 0,00 | 171,806 | 12,42 | 22,63 | 8,63 | 159,283 | 12,23 | 9,4867 | G | | | | |
| D-252A-05 | | | | | | | 44,00 | 1,10 | 8,636 | 9,00 | 24,91 | 19,09 | 0,00 | 164,897 | 12,11 | 26,36 | 10,67 | 152,340 | 11,92 | 10,9846 | H | | | | |
| D-252A-06 | 51,00 | | | | | | 1,30 | 7,066 | 11,00 | 29,55 | 21,45 | 0,00 | 151,551 | 11,59 | 31,33 | 13,78 | 138,985 | 11,40 | 12,9818 | H | | | | | |
| D-252A-07 | 64,00 | | | | | | 1,51 | 5,979 | 13,00 | 34,20 | 29,80 | 0,00 | 178,184 | 11,76 | 36,30 | 14,55 | 165,613 | 11,57 | 14,9790 | H | | | | | |
| D-252A-08 | 76,00 | | | | | | 1,86 | 4,711 | 16,50 | 42,33 | 33,67 | 44,20 | 158,617 | 11,13 | 45,00 | 20,09 | 146,028 | 10,94 | 18,4740 | H | | | | | |
| D-252A-09 | 89,00 | | | | | | 2,21 | 3,886 | 20,00 | 50,46 | 38,54 | 64,71 | 149,784 | 10,90 | 53,69 | 25,23 | 137,223 | 10,71 | 21,9691 | J | | | | | |
| D-252A-10 | 102,00 | | | | | | 2,56 | 3,307 | 23,50 | 58,59 | 43,41 | 81,91 | 143,583 | 10,63 | 62,39 | 30,39 | 131,007 | 10,44 | 25,4642 | J | | | | | |
| D-253 | 12,50 | | | | | | 14,50 | 0,30 | 10,00 | 15,20 | 22,50 | 0,53 | 23,845 | 3,50 | 12,11 | 10,39 | 0,00 | 247,741 | 16,29 | 14,20 | 3,24 | 197,910 | 16,09 | 5,3636 | F |
| D-254 | | 33,00 | 0,73 | 15,174 | 5,50 | 16,74 | | | | | 16,26 | 0,00 | 246,658 | 14,74 | 20,20 | 5,18 | 194,225 | 14,54 | 7,3139 | F | | | | | |
| D-254A | | 39,00 | 0,83 | 12,839 | 6,50 | 19,50 | | | | | 19,50 | 0,00 | 250,368 | 14,46 | 23,50 | 5,98 | 199,010 | 14,10 | 8,2891 | G | | | | | |
| D-255 | | 49,50 | 1,02 | 9,818 | 8,50 | 24,00 | | | | | 25,50 | 0,00 | 250,368 | 13,86 | 28,90 | 7,69 | 202,258 | 13,66 | 10,2395 | G | | | | | |
| D-256 | | 71,00 | 1,42 | 6,676 | 12,50 | 33,50 | | | | | 37,50 | 36,78 | 250,368 | 13,28 | 41,30 | 11,55 | 198,291 | 13,08 | 14,1403 | G | | | | | |
| D-256A | | 71,00 | 2,01 | 4,511 | 18,50 | 46,87 | | | | | 24,13 | 36,78 | 108,863 | 10,69 | 49,81 | 21,19 | 95,591 | 10,49 | 19,9914 | H | | | | | |
| D-257 | | 105,00 | 2,01 | 4,511 | 18,50 | 49,50 | | | | | 55,50 | 86,67 | 250,368 | 12,99 | 60,60 | 16,91 | 200,294 | 12,79 | 19,9914 | H | | | | | |
| D-257A | | 105,00 | 2,40 | 3,709 | 22,50 | 56,14 | | | | | 48,86 | 86,67 | 181,242 | 11,62 | 59,71 | 23,97 | 167,988 | 11,42 | 23,8922 | J | | | | | |
| D-257B | | 12,00 | 14,00 | 0,30 | 9,50 | 14,70 | | | | | 19,60 | 0,51 | 26,951 | 3,50 | 12,08 | 7,52 | 0,00 | 202,726 | 16,67 | 12,62 | 3,19 | 188,118 | 16,45 | 5,1490 | F |
| D-257C | | | | | | | | | | | 28,50 | 0,70 | 17,151 | 5,50 | 16,69 | 11,81 | 0,00 | 202,481 | 15,01 | 17,54 | 5,02 | 187,971 | 14,79 | 7,0214 | F |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-252A-01 | 2,00 | 16,00 | 18,00 | 0,30 | 13,50 | 18,60 | 170,00 | 4,15 | 1,395 | 24,50 | 62,60 | 107,40 | 151,88 | 149,827 | 8,04 | 67,90 | 29,13 | 142,439 | 7,94 | 33,0785 | P |
| VD-252A-20 | | 13,50 | 15,50 | 0,30 | 10,90 | 16,30 | 167,00 | 3,79 | 1,997 | 28,50 | 70,60 | 96,40 | 154,12 | 192,477 | 10,46 | 84,95 | 20,97 | 163,818 | 10,31 | 32,1228 | P |
| VD-252A-32 | | 13,00 | 15,00 | 0,30 | 10,50 | 15,70 | 17,00 | 0,50 | 23,172 | 2,75 | 10,40 | 6,60 | 0,00 | 152,936 | 14,97 | 10,90 | 2,90 | 141,350 | 14,80 | 4,8174 | J |
| VD-252A-33 | | | | | | | 28,50 | 0,80 | 12,138 | 5,25 | 16,25 | 12,25 | 0,00 | 148,688 | 12,59 | 17,15 | 5,60 | 137,764 | 12,50 | 7,3529 | K |
| VD-252AA | | | | | | | 40,00 | 1,12 | 8,496 | 7,50 | 21,45 | 18,55 | 0,00 | 157,604 | 11,92 | 22,68 | 7,13 | 147,158 | 11,76 | 9,6349 | L |
| VD-252A-30 | | | | | | | 52,00 | 1,24 | 7,497 | 8,50 | 24,35 | 27,65 | 0,00 | 207,288 | 12,50 | 29,50 | 5,78 | 168,679 | 12,35 | 10,6491 | M |
| VD-252AB | | | | | | | 55,60 | 1,48 | 6,069 | 10,50 | 28,43 | 27,17 | 0,00 | 164,886 | 11,48 | 30,15 | 9,31 | 154,453 | 11,32 | 12,6775 | L |
| VD-252AC | | | | | | | 66,20 | 1,72 | 5,098 | 12,50 | 33,08 | 33,12 | 0,00 | 168,819 | 11,32 | 35,12 | 10,66 | 158,442 | 11,16 | 14,7059 | L |
| VD-252A-35 | | | | | | | 75,00 | 1,72 | 5,082 | 12,54 | 34,20 | 40,80 | 38,85 | 207,329 | 11,99 | 41,80 | 8,54 | 168,709 | 11,80 | 14,7465 | M |
| VD-252AD | | | | | | | 87,40 | 2,20 | 3,862 | 16,50 | 42,39 | 45,01 | 60,54 | 173,824 | 11,11 | 45,09 | 13,36 | 163,402 | 10,95 | 18,7627 | L |
| VD-252A-40 | | | | | | | 92,00 | 2,08 | 4,111 | 15,50 | 41,55 | 50,45 | 67,21 | 207,409 | 11,76 | 50,95 | 10,52 | 168,764 | 11,60 | 17,7485 | N |
| VD-252AE | | | | | | | 98,00 | 2,44 | 3,445 | 18,50 | 47,04 | 50,96 | 75,38 | 175,515 | 11,03 | 50,06 | 14,70 | 165,129 | 10,88 | 20,7911 | M |
| VD-252AF | | | | | | | 120,00 | 2,92 | 2,832 | 22,50 | 56,35 | 63,65 | 102,61 | 180,261 | 10,96 | 60,40 | 16,97 | 168,796 | 10,81 | 24,8479 | N |
| VD-252AG | | | | | | | 305,00 | 8,40 | 0,930 | 68,50 | 163,38 | 141,62 | 298,69 | 131,742 | 9,79 | 174,57 | 71,71 | 121,335 | 9,63 | 71,5011 | Q |
| VD-252A-02 | | 12,80 | 14,80 | 0,30 | 10,30 | 15,50 | 25,00 | 0,75 | 14,835 | 4,50 | 14,45 | 10,55 | 0,00 | 156,465 | 13,47 | 15,18 | 4,35 | 145,679 | 13,31 | 6,4909 | K |
| VD-252A-03 | | | | | | | 32,00 | 0,87 | 12,138 | 5,50 | 16,78 | 15,22 | 0,00 | 184,786 | 13,32 | 17,95 | 3,92 | 170,534 | 13,15 | 7,4895 | K |
| VD-252A-04 | | | | | | | 38,00 | 1,11 | 8,901 | 7,50 | 21,42 | 16,58 | 0,00 | 147,564 | 12,05 | 22,63 | 7,61 | 136,808 | 11,89 | 9,4867 | K |
| VD-252A-05 | | | | | | | 44,00 | 1,28 | 7,417 | 9,00 | 24,91 | 19,09 | 0,00 | 141,630 | 11,75 | 26,36 | 9,13 | 130,844 | 11,58 | 10,9846 | L |
| VD-252A-06 | | | | | | | 51,00 | 1,52 | 6,069 | 11,00 | 29,55 | 21,45 | 0,00 | 130,166 | 11,25 | 31,33 | 11,16 | 119,374 | 11,09 | 12,9818 | L |
| VD-252A-07 | | | | | | | 64,00 | 1,75 | 5,135 | 13,00 | 34,20 | 29,80 | 0,00 | 153,041 | 11,37 | 36,30 | 12,66 | 142,244 | 11,21 | 14,9790 | L |
| VD-252A-08 | | | | | | | 76,00 | 2,16 | 4,046 | 16,50 | 42,33 | 33,67 | 42,72 | 136,235 | 10,80 | 45,00 | 16,74 | 125,423 | 10,63 | 18,4740 | L |
| VD-252A-09 | | | | | | | 89,00 | 2,57 | 3,338 | 20,00 | 50,46 | 38,54 | 63,92 | 128,649 | 10,57 | 53,69 | 20,29 | 117,860 | 10,41 | 21,9691 | M |
| VD-252A-10 | | | | | | | 102,00 | 2,98 | 2,841 | 23,50 | 58,59 | 43,41 | 81,35 | 123,323 | 10,33 | 62,39 | 23,85 | 112,521 | 10,16 | 25,4642 | M |
| VD-253 | | 12,50 | 14,50 | 0,30 | 10,00 | 15,20 | 22,50 | 0,61 | 20,480 | 3,50 | 12,11 | 10,39 | 0,00 | 212,784 | 15,76 | 14,00 | 2,20 | 174,080 | 15,50 | 5,3636 | J |
| VD-254 | | | | | | | 33,00 | 0,85 | 13,033 | 5,50 | 16,74 | 16,26 | 0,00 | 211,853 | 14,22 | 19,65 | 3,44 | 173,987 | 14,00 | 7,3139 | J |
| VD-254A | | | | | | | 39,00 | 0,96 | 11,028 | 6,50 | 19,45 | 19,55 | 0,00 | 215,591 | 13,91 | 23,25 | 4,08 | 173,686 | 13,70 | 8,2891 | L |
| VD-255 | | | | | | | 49,50 | 1,19 | 8,433 | 8,50 | 23,95 | 25,55 | 0,00 | 215,462 | 13,32 | 28,85 | 5,32 | 174,140 | 13,10 | 10,2395 | K |
| VD-256 | | | | | | | 71,00 | 1,65 | 5,734 | 12,50 | 33,45 | 37,55 | 34,80 | 215,327 | 12,74 | 40,65 | 7,70 | 174,039 | 12,02 | 14,1403 | K |
| VD-256A | | | | | | | 71,00 | 2,34 | 3,875 | 18,50 | 46,87 | 24,13 | 0,00 | 93,502 | 10,46 | 49,81 | 17,81 | 82,103 | 10,29 | 19,9914 | L |
| VD-257 | | | | | | | 105,00 | 2,34 | 3,875 | 18,50 | 49,35 | 55,65 | 86,18 | 215,621 | 12,44 | 60,10 | 11,51 | 173,969 | 11,60 | 19,9914 | L |
| VD-257A | | | | | | | 105,00 | 2,80 | 3,186 | 22,50 | 56,14 | 48,86 | 86,18 | 155,668 | 11,24 | 59,71 | 20,90 | 144,284 | 11,07 | 23,8922 | M |
| VD-257B | | 12,00 | 14,00 | 0,30 | 9,50 | 14,70 | 19,60 | 0,59 | 23,148 | 3,50 | 12,08 | 7,52 | 0,00 | 174,120 | 16,24 | 12,62 | 2,67 | 161,574 | 16,05 | 5,1490 | J |
| VD-257C | | | | | | | 28,50 | 0,81 | 14,731 | 5,50 | 16,69 | 11,81 | 0,00 | 173,910 | 14,58 | 17,54 | 4,20 | 161,448 | 14,39 | 7,0214 | J |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|-------|--------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-257C-01 | 2,00 | 12,00 | 14,00 | 0,30 | 9,50 | 14,70 | 39,00 | 1,14 | 9,532 | 8,50 | 23,62 | 15,38 | 0,00 | 146,615 | 13,10 | 24,93 | 8,07 | 134,109 | 12,92 | 9,8299 | J | | | | |
| VD-257D | | | | | | | 46,40 | 1,25 | 8,528 | 9,50 | 25,93 | 20,47 | 0,00 | 174,608 | 13,32 | 27,40 | 7,22 | 162,037 | 13,13 | 10,7661 | K | | | | |
| VD-257DA | | | | | | | 50,00 | 1,42 | 7,716 | 10,50 | 28,23 | 21,77 | 0,00 | 167,948 | 12,84 | 29,85 | 8,45 | 155,478 | 12,65 | 11,7023 | K | | | | |
| VD-257D-01 | | | | | | | 60,00 | 1,69 | 6,001 | 13,50 | 35,16 | 24,84 | 0,00 | 149,086 | 12,40 | 37,24 | 12,59 | 136,591 | 12,21 | 14,5109 | K | | | | |
| VD-257E | | | | | | | 73,10 | 1,91 | 5,227 | 15,50 | 39,77 | 33,33 | 43,53 | 174,195 | 12,61 | 42,16 | 11,81 | 161,723 | 12,43 | 16,3832 | L | | | | |
| VD-257E-10 | | 11,00 | 13,00 | 0,30 | 8,40 | 13,80 | 50,00 | 1,26 | 10,018 | 10,50 | 28,05 | 21,95 | 0,00 | 219,856 | 15,88 | 30,85 | 4,95 | 191,836 | 15,65 | 10,7271 | M | | | | |
| VD-257E-11 | | | | | | | 68,00 | 1,66 | 7,254 | 14,50 | 37,22 | 30,78 | 41,67 | 223,310 | 15,40 | 41,50 | 6,81 | 192,233 | 15,10 | 14,1598 | M | | | | |
| VD-257E-12 | | | | | | | 89,00 | 2,17 | 5,394 | 19,50 | 48,67 | 40,33 | 71,61 | 217,544 | 14,95 | 53,35 | 9,26 | 192,298 | 14,70 | 18,4506 | N | | | | |
| VD-257E-13 | | | | | | | 107,00 | 2,57 | 4,476 | 23,50 | 57,83 | 49,17 | 93,18 | 220,069 | 14,80 | 64,05 | 11,01 | 192,241 | 14,50 | 21,8833 | O | | | | |
| VD-257E-02 | | 10,30 | 12,30 | 0,30 | 7,80 | 12,90 | 25,00 | 0,71 | 23,295 | 5,50 | 16,54 | 8,46 | 0,00 | 197,127 | 19,40 | 17,31 | 3,04 | 179,135 | 19,13 | 6,0267 | K | | | | |
| VD-257E-03 | | | | | | | 32,00 | 0,90 | 17,083 | 7,50 | 21,10 | 10,90 | 0,00 | 186,256 | 18,14 | 22,15 | 4,49 | 168,264 | 17,87 | 7,6338 | L | | | | |
| VD-257E-04 | | | | | | | 38,00 | 1,09 | 13,486 | 9,50 | 25,66 | 12,34 | 0,00 | 166,476 | 17,19 | 26,99 | 6,15 | 148,484 | 16,93 | 9,2409 | L | | | | |
| VD-257E-05 | | | | | | | 44,00 | 1,28 | 11,647 | 11,00 | 29,08 | 14,92 | 0,00 | 173,832 | 16,57 | 30,61 | 7,17 | 155,957 | 16,30 | 10,4463 | L | | | | |
| VD-257E-06 | 51,00 | | | | | | 1,47 | 9,490 | 13,50 | 34,77 | 16,23 | 0,00 | 153,989 | 16,28 | 36,66 | 8,75 | 136,092 | 16,01 | 12,4552 | L | | | | | |
| VD-257E-07 | 64,00 | | | | | | 1,90 | 7,118 | 18,00 | 45,03 | 18,97 | 39,58 | 135,008 | 15,66 | 47,55 | 11,66 | 117,087 | 15,39 | 16,0712 | L | | | | | |
| VD-257E-08 | 76,00 | | | | | | 2,19 | 6,101 | 21,00 | 51,87 | 24,13 | 57,52 | 147,210 | 15,64 | 54,81 | 13,61 | 129,279 | 15,37 | 18,4818 | M | | | | | |
| VD-258 | 10,00 | | | | | | 12,00 | 0,25 | 7,50 | 12,60 | 18,00 | 0,50 | 40,000 | 3,50 | 11,96 | 6,04 | 0,00 | 241,500 | 23,58 | 12,85 | 1,36 | 206,000 | 22,98 | 4,2908 | J |
| VD-259 | | 26,50 | 0,69 | 25,455 | 5,50 | 16,51 | | | | | 9,99 | 0,00 | 254,227 | 21,34 | 18,40 | 2,12 | 206,182 | 20,53 | 5,8512 | J | | | | | |
| VD-260 | | 38,50 | 0,97 | 16,471 | 8,50 | 23,34 | | | | | 15,16 | 0,00 | 249,735 | 19,71 | 25,98 | 3,24 | 206,212 | 19,00 | 8,1916 | J | | | | | |
| VD-261 | | 55,00 | 1,34 | 11,200 | 12,50 | 32,44 | | | | | 22,56 | 22,80 | 252,700 | 18,82 | 36,60 | 4,75 | 206,080 | 18,05 | 11,3122 | K | | | | | |
| VD-261A | | 55,00 | 1,90 | 7,568 | 18,50 | 46,09 | | | | | 8,91 | 22,80 | 67,446 | 15,39 | 48,64 | 6,36 | 48,130 | 15,10 | 15,9932 | L | | | | | |
| VD-262 | | 79,50 | 1,90 | 7,568 | 18,50 | 46,09 | | | | | 33,41 | 63,32 | 252,851 | 18,17 | 52,25 | 7,00 | 206,216 | 17,40 | 15,9932 | L | | | | | |
| VD-262A | | 79,50 | 2,27 | 6,222 | 22,50 | 55,19 | | | | | 24,31 | 63,32 | 151,278 | 16,40 | 58,29 | 13,68 | 131,973 | 16,11 | 19,1138 | L | | | | | |
| VD-262A-10 | | 9,00 | 11,00 | 0,25 | 6,40 | 11,70 | | | | | 20,00 | 0,50 | 38,409 | 5,00 | 15,30 | 4,70 | 0,00 | 180,377 | 26,39 | 15,96 | 2,64 | 155,171 | 25,95 | 4,9150 | G |
| VD-262A-15 | | | | | | | | | | | 32,00 | 0,69 | 25,606 | 7,50 | 20,96 | 11,04 | 0,00 | 282,801 | 25,48 | 23,35 | 2,25 | 221,491 | 24,90 | 6,6703 | G |
| VD-262B | | 8,70 | 10,70 | 0,25 | 6,20 | 11,20 | | | | | 14,00 | 0,44 | 60,744 | 3,50 | 11,90 | 2,10 | 0,00 | 127,642 | 28,90 | 12,35 | 1,58 | 100,227 | 28,49 | 3,7330 | J |
| VD-262C | 20,00 | | | | | | 0,61 | 38,655 | 5,50 | 16,41 | 3,59 | 0,00 | 138,686 | 25,79 | 17,12 | 2,48 | 111,327 | 25,38 | 5,0905 | J | | | | | |
| VD-262D | 29,00 | | | | | | 0,86 | 25,012 | 8,50 | 23,18 | 5,82 | 0,00 | 145,508 | 23,78 | 24,27 | 3,84 | 118,308 | 23,37 | 7,1267 | J | | | | | |
| VD-263 | 36,00 | | | | | | 1,03 | 20,248 | 10,50 | 27,70 | 8,30 | 0,00 | 168,138 | 23,37 | 29,05 | 4,74 | 140,723 | 22,96 | 8,4842 | J | | | | | |
| VD-263AA | 45,00 | | | | | | 1,28 | 15,748 | 13,50 | 34,47 | 10,53 | 0,00 | 165,888 | 22,62 | 36,21 | 6,10 | 138,428 | 22,21 | 10,5204 | K | | | | | |
| VD-263A | 8,00 | 10,00 | 0,20 | 5,60 | 10,50 | 14,80 | 0,41 | 78,125 | 3,50 | 11,87 | 2,93 | 0,00 | 229,063 | 35,84 | 12,31 | 1,22 | 194,531 | 35,32 | 3,4327 | J | | | | | |
| VD-263B | | | | | | 21,00 | 0,57 | 49,716 | 5,50 | 16,36 | 4,64 | 0,00 | 230,483 | 31,92 | 17,04 | 1,89 | 196,875 | 31,41 | 4,6809 | J | | | | | |
| VD-263C | | | | | | 33,40 | 0,88 | 28,783 | 9,50 | 25,36 | 8,04 | 0,00 | 231,530 | 28,90 | 26,54 | 3,25 | 197,451 | 28,39 | 7,1774 | J | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-257C-01 | 2,00 | 12,00 | 14,00 | 0,30 | 9,50 | 14,70 | 39,00 | 0,98 | 11,097 | 8,50 | 23,62 | 15,38 | 0,00 | 170,702 | 13,47 | 24,93 | 8,88 | 156,142 | 13,25 | 9,8299 | G |
| D-257D | | | | | | | 46,40 | 1,08 | 9,929 | 9,50 | 25,93 | 20,47 | 0,00 | 203,293 | 13,75 | 27,40 | 8,65 | 188,657 | 13,53 | 10,7661 | G |
| D-257DA | | | | | | | 50,00 | 1,17 | 8,984 | 10,50 | 28,23 | 21,77 | 0,00 | 195,539 | 13,46 | 29,85 | 9,89 | 181,021 | 13,24 | 11,7023 | G |
| D-257D-01 | | | | | | | 60,00 | 1,45 | 6,987 | 13,50 | 35,16 | 24,84 | 0,00 | 173,579 | 12,77 | 37,24 | 13,95 | 159,031 | 12,55 | 14,5109 | G |
| D-257E | | | | | | | 73,10 | 1,64 | 6,086 | 15,50 | 39,77 | 33,33 | 44,74 | 202,813 | 13,04 | 42,16 | 14,13 | 188,292 | 12,83 | 16,3832 | H |
| D-257E-10 | | 11,00 | 13,00 | 0,30 | 8,40 | 13,80 | 50,00 | 1,08 | 11,663 | 10,50 | 28,05 | 21,95 | 0,00 | 255,975 | 16,43 | 31,00 | 7,21 | 221,602 | 16,16 | 10,7271 | H |
| D-257E-11 | | | | | | | 68,00 | 1,43 | 8,446 | 14,50 | 37,22 | 30,78 | 42,70 | 259,997 | 15,95 | 42,70 | 10,32 | 213,679 | 15,68 | 14,1598 | H |
| D-257E-12 | | | | | | | 89,00 | 1,86 | 6,280 | 19,50 | 48,67 | 40,33 | 72,07 | 253,284 | 15,48 | 53,50 | 13,30 | 222,948 | 15,22 | 18,4506 | K |
| D-257E-13 | | | | | | | 107,00 | 2,21 | 5,211 | 23,50 | 57,83 | 49,17 | 93,51 | 256,223 | 15,35 | 64,50 | 16,14 | 221,478 | 15,08 | 21,8833 | L |
| D-257E-02 | | 10,30 | 12,30 | 0,30 | 7,80 | 12,90 | 25,00 | 0,61 | 27,121 | 5,50 | 16,54 | 8,46 | 0,00 | 229,512 | 19,89 | 17,31 | 3,61 | 208,564 | 19,58 | 6,0267 | G |
| D-257E-03 | | | | | | | 32,00 | 0,77 | 19,889 | 7,50 | 21,10 | 10,90 | 0,00 | 216,855 | 18,60 | 22,15 | 5,17 | 195,907 | 18,29 | 7,6338 | H |
| D-257E-04 | | | | | | | 38,00 | 0,94 | 15,702 | 9,50 | 25,66 | 12,34 | 0,00 | 193,826 | 17,60 | 26,99 | 7,12 | 172,878 | 17,29 | 9,2409 | H |
| D-257E-05 | | | | | | | 44,00 | 1,06 | 13,561 | 11,00 | 29,08 | 14,92 | 0,00 | 202,391 | 17,60 | 30,61 | 7,99 | 181,578 | 17,29 | 10,4463 | H |
| D-257E-06 | | | | | | | 51,00 | 1,26 | 11,049 | 13,50 | 34,77 | 16,23 | 0,00 | 179,287 | 16,66 | 36,66 | 10,62 | 158,450 | 16,35 | 12,4552 | H |
| D-257E-07 | | | | | | | 64,00 | 1,63 | 8,287 | 18,00 | 45,03 | 18,97 | 40,53 | 157,188 | 16,01 | 47,55 | 15,20 | 136,323 | 15,70 | 16,0712 | H |
| D-257E-08 | | | | | | | 76,00 | 1,88 | 7,103 | 21,00 | 51,87 | 24,13 | 58,06 | 171,395 | 16,02 | 54,81 | 16,96 | 150,518 | 15,81 | 18,4818 | J |
| D-258 | | 10,00 | 12,00 | 0,25 | 7,50 | 12,60 | 18,00 | 0,43 | 46,571 | 3,50 | 11,96 | 6,04 | 0,00 | 281,175 | 24,17 | 12,90 | 1,94 | 237,514 | 23,84 | 4,2908 | F |
| D-259 | | | | | | | 26,50 | 0,59 | 29,636 | 5,50 | 16,51 | 9,99 | 0,00 | 295,993 | 21,96 | 18,50 | 3,06 | 237,091 | 21,63 | 5,8512 | F |
| D-260 | | | | | | | 38,50 | 0,83 | 19,176 | 8,50 | 23,34 | 15,16 | 0,00 | 290,763 | 20,33 | 26,00 | 4,67 | 239,706 | 19,99 | 8,1916 | F |
| D-261 | | | | | | | 55,00 | 1,15 | 13,040 | 12,50 | 32,44 | 22,56 | 0,00 | 294,215 | 19,44 | 36,70 | 6,90 | 238,632 | 19,11 | 11,3122 | G |
| D-261A | | | | | | | 55,00 | 1,63 | 8,811 | 18,50 | 46,09 | 8,91 | 0,00 | 78,526 | 15,56 | 48,64 | 6,36 | 56,037 | 15,22 | 15,9932 | H |
| D-262 | | | | | | | 79,50 | 1,63 | 8,811 | 18,50 | 46,09 | 33,41 | 63,75 | 294,391 | 18,79 | 52,30 | 10,17 | 239,654 | 18,46 | 15,9932 | G |
| D-262A | | | | | | | 79,50 | 1,95 | 7,244 | 22,50 | 55,19 | 24,31 | 63,75 | 176,131 | 16,78 | 58,29 | 17,00 | 153,655 | 16,44 | 19,1138 | H |
| D-262A-10 | | 9,00 | 11,00 | 0,25 | 6,40 | 11,70 | 20,00 | 0,50 | 44,719 | 5,00 | 15,30 | 4,70 | 0,00 | 210,011 | 26,39 | 15,96 | 2,84 | 180,664 | 25,95 | 4,9150 | G |
| D-262A-15 | | | | | | | 32,00 | 0,69 | 29,813 | 7,50 | 20,96 | 11,04 | 0,00 | 329,261 | 25,48 | 23,40 | 3,27 | 256,388 | 24,90 | 6,6703 | G |
| D-262B | | 8,70 | 10,70 | 0,25 | 6,20 | 11,20 | 14,00 | 0,38 | 70,723 | 3,50 | 11,90 | 2,10 | 0,00 | 148,612 | 29,22 | 12,35 | 1,65 | 116,693 | 28,82 | 3,7330 | F |
| D-262C | | | | | | | 20,00 | 0,53 | 45,006 | 5,50 | 16,41 | 3,59 | 0,00 | 161,470 | 26,13 | 17,12 | 2,88 | 129,616 | 25,65 | 5,0905 | F |
| D-262D | | | | | | | 29,00 | 0,74 | 29,121 | 8,50 | 23,18 | 5,82 | 0,00 | 169,413 | 24,14 | 24,27 | 4,73 | 137,744 | 23,66 | 7,1267 | F |
| D-263 | | | | | | | 36,00 | 0,88 | 23,574 | 10,50 | 27,70 | 8,30 | 0,00 | 195,760 | 23,78 | 29,05 | 5,87 | 163,842 | 23,31 | 8,4842 | F |
| D-263AA | | | | | | | 45,00 | 1,10 | 18,336 | 13,50 | 34,47 | 10,53 | 0,00 | 193,141 | 23,03 | 36,21 | 7,60 | 161,170 | 22,55 | 10,5204 | G |
| D-263A | | 8,00 | 10,00 | 0,20 | 5,60 | 10,50 | 14,80 | 0,36 | 90,960 | 3,50 | 11,87 | 2,93 | 0,00 | 266,694 | 36,40 | 12,31 | 1,38 | 226,490 | 35,80 | 3,4327 | F |
| D-263B | | | | | | | 21,00 | 0,49 | 57,884 | 5,50 | 16,36 | 4,64 | 0,00 | 268,348 | 32,49 | 17,04 | 2,15 | 229,219 | 31,90 | 4,6809 | F |
| D-263C | | | | | | | 33,40 | 0,76 | 33,512 | 9,50 | 25,36 | 8,04 | 0,00 | 269,567 | 29,47 | 26,54 | 3,71 | 229,889 | 28,88 | 7,1774 | F |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|--------------------------|-------------|---------|---------|---------|---------|-------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Ldyn minimum length dynamic | shdyn maximum stroke dynamic | Fdyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-263D | 2,00 | 8,00 | 10,00 | 0,20 | 5,60 | 10,50 | 52,00 | 1,16 | 20,539 | 15,50 | 38,84 | 13,16 | 35,13 | 270,215 | 27,83 | 40,76 | 6,03 | 230,862 | 27,24 | 10,9222 | F | | | | | |
| D-263D-02 | 2,20 | 39,80 | 42,00 | 0,70 | 36,70 | 431,00 | 16,50 | 4,20 | 1,682 | 2,25 | 12,28 | 4,22 | 0,00 | 7,100 | 7,10 | 13,80 | 2,70 | 4,542 | 7,20 | 15,9675 | H | | | | | |
| D-263D-10 | | | | | | | 21,00 | 5,58 | 1,082 | 3,50 | 16,65 | 4,35 | 0,00 | 4,705 | 1,50 | 18,93 | 2,07 | 2,239 | 6,07 | 20,6639 | H | | | | | |
| D-263D-11 | | | | | | | 33,00 | 7,70 | 0,688 | 5,50 | 23,65 | 9,35 | 0,00 | 6,435 | 2,00 | 27,23 | 5,77 | 3,971 | 5,36 | 28,1780 | H | | | | | |
| D-263D-12 | | | | | | | 45,00 | 9,80 | 0,505 | 7,50 | 30,65 | 14,35 | 0,00 | 7,243 | 2,50 | 35,53 | 9,47 | 4,780 | 5,02 | 35,6921 | H | | | | | |
| D-263D-13 | | | | | | | 75,00 | 15,01 | 0,303 | 12,50 | 48,15 | 26,85 | 0,00 | 8,131 | 2,68 | 56,28 | 18,72 | 5,669 | 4,63 | 54,4774 | J | | | | | |
| D-263E | | | | | | | 35,80 | 38,00 | 0,70 | 32,70 | 40,30 | 86,60 | 4,24 | 1,486 | 3,50 | 15,93 | 70,67 | 0,00 | 105,023 | 7,88 | 17,85 | 24,97 | 102,168 | 7,83 | 18,5871 | H |
| D-263F | | | | | | | | | | | | 134,00 | 5,85 | 0,946 | 5,50 | 22,52 | 111,48 | 0,00 | 105,429 | 7,11 | 25,53 | 39,01 | 102,578 | 7,07 | 25,3460 | J |
| D-263G | | | | | | | | | | | | 228,00 | 9,03 | 0,548 | 9,50 | 35,69 | 192,31 | 149,80 | 105,289 | 6,52 | 40,89 | 67,45 | 102,443 | 6,48 | 38,8639 | K |
| D-263H | | | | | | | | | | | | 368,00 | 13,78 | 0,336 | 15,50 | 55,45 | 312,55 | 326,80 | 104,880 | 6,20 | 63,93 | 110,55 | 102,035 | 6,15 | 59,1407 | L |
| D-263H-10 | | | | | | | | | | | | 21,80 | 24,00 | 0,45 | 18,90 | 25,10 | 26,50 | 0,90 | 10,238 | 2,25 | 10,57 | 15,93 | 0,00 | 163,088 | 11,40 | 11,20 |
| D-263J | 39,20 | 1,16 | 6,581 | 3,50 | 14,00 | 25,20 | 0,00 | 165,825 | 10,12 | 14,95 | 8,80 | | | | | | 159,600 | 10,00 | 11,3184 | G | | | | | | |
| D-263K | 59,10 | 1,60 | 4,188 | 5,50 | 19,49 | 39,61 | 0,00 | 165,885 | 9,18 | 20,99 | 13,82 | | | | | | 159,612 | 9,09 | 15,4342 | G | | | | | | |
| D-263L | 98,90 | 2,47 | 2,425 | 9,50 | 30,47 | 68,43 | 0,00 | 165,929 | 8,47 | 33,06 | 23,86 | | | | | | 159,645 | 8,38 | 23,6657 | H | | | | | | |
| D-263M | 159,00 | 3,77 | 1,486 | 15,50 | 46,93 | 112,07 | 120,40 | 166,547 | 8,10 | 51,15 | 38,74 | | | | | | 160,279 | 8,00 | 36,0131 | H | | | | | | |
| D-263M-01 | 16,80 | 19,00 | 0,35 | 14,00 | 19,80 | 57,00 | 1,40 | 5,921 | 8,50 | 26,61 | 30,39 | | | | | | 0,00 | 179,971 | 11,00 | 28,37 | 14,51 | 169,525 | 10,84 | 16,6519 | G | |
| D-263M-02 | | | | | | 68,00 | 1,67 | 4,793 | 10,50 | 31,83 | 36,17 | 0,00 | 173,374 | 10,61 | 34,00 | 18,56 | 162,975 | 10,46 | 19,8237 | H | | | | | | |
| D-263M-03 | | | | | | 80,00 | 1,94 | 4,026 | 12,50 | 37,06 | 42,94 | 0,00 | 172,913 | 10,41 | 39,64 | 22,15 | 162,507 | 10,25 | 22,9955 | H | | | | | | |
| D-263M-04 | | | | | | 95,00 | 2,21 | 3,471 | 14,50 | 42,28 | 52,72 | 48,51 | 182,993 | 10,42 | 45,27 | 24,35 | 172,616 | 10,26 | 26,1673 | H | | | | | | |
| D-263M-05 | | | | | | 106,00 | 2,48 | 3,050 | 16,50 | 47,51 | 58,49 | 68,74 | 178,428 | 10,24 | 50,92 | 28,40 | 168,012 | 10,08 | 29,3391 | H | | | | | | |
| D-263M-10 | 13,20 | 15,40 | 0,30 | 10,40 | 16,40 | 240,00 | 3,32 | 3,347 | 31,00 | 147,50 | 92,50 | 231,83 | 309,611 | 20,73 | 168,00 | 26,35 | 240,995 | 16,76 | 41,1200 | M | | | | | | |
| D-263N | 12,80 | 15,00 | 0,30 | 10,10 | 15,70 | 20,80 | 0,52 | 32,513 | 3,50 | 13,26 | 7,54 | 0,00 | 245,118 | 20,73 | 13,84 | 3,07 | 226,292 | 20,45 | 6,6457 | G | | | | | | |
| D-2630 | | | | | | 30,20 | 0,72 | 20,690 | 5,50 | 18,32 | 11,88 | 0,00 | 245,709 | 18,67 | 19,23 | 4,81 | 226,972 | 18,38 | 9,0623 | G | | | | | | |
| D-2630-01 | | | | | | 42,00 | 1,02 | 13,388 | 8,50 | 25,92 | 16,08 | 0,00 | 215,282 | 16,88 | 27,33 | 8,48 | 196,399 | 16,59 | 12,6872 | G | | | | | | |
| D-263P | | | | | | 48,90 | 1,12 | 11,979 | 9,50 | 28,45 | 20,45 | 0,00 | 244,947 | 17,06 | 30,03 | 8,34 | 226,036 | 16,78 | 13,8955 | G | | | | | | |
| D-263P-01 | | | | | | 53,00 | 1,22 | 10,838 | 10,50 | 30,98 | 22,02 | 0,00 | 238,615 | 16,75 | 32,72 | 9,48 | 219,790 | 16,47 | 15,1038 | H | | | | | | |
| D-263P-02 | | | | | | 68,00 | 1,51 | 8,429 | 13,50 | 38,58 | 29,42 | 25,25 | 248,008 | 16,44 | 40,82 | 11,69 | 229,110 | 16,16 | 18,7287 | H | | | | | | |
| D-263Q | | | | | | 77,00 | 1,70 | 7,342 | 15,50 | 43,64 | 33,36 | 46,02 | 244,908 | 16,19 | 46,21 | 13,61 | 226,051 | 15,91 | 21,1453 | H | | | | | | |
| D-263Q-01 | | | | | | 77,00 | 2,00 | 6,151 | 18,50 | 51,24 | 25,76 | 46,02 | 158,475 | 14,67 | 54,31 | 22,69 | 139,570 | 14,38 | 24,7702 | H | | | | | | |
| D-263Q-02 | | | | | | 10,10 | 12,30 | 0,30 | 7,40 | 12,90 | 25,00 | 0,63 | 38,605 | 6,00 | 19,34 | 5,66 | 0,00 | 218,608 | 28,19 | 20,21 | 4,09 | 184,918 | 27,68 | 7,6274 | G | |
| D-263Q-03 | | | | | | | | | | | 32,00 | 0,71 | 33,090 | 7,00 | 21,83 | 10,17 | 0,00 | 336,629 | 29,05 | 23,00 | 3,20 | 297,810 | 28,54 | 8,5808 | G | |
| D-263Q-04 | 38,00 | 0,91 | 24,382 | 9,50 | 28,05 | | | | | | 9,95 | 0,00 | 242,583 | 25,79 | 29,43 | 6,03 | 208,954 | 25,29 | 10,9644 | G | | | | | | |
| D-263Q-05 | 44,00 | 1,03 | 21,057 | 11,00 | 31,79 | | | | | | 12,21 | 0,00 | 257,213 | 25,85 | 33,38 | 6,66 | 223,628 | 25,35 | 12,3945 | G | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-263D | 2,00 | 8,00 | 10,00 | 0,20 | 5,60 | 10,50 | 52,00 | 1,35 | 17,641 | 15,50 | 38,84 | 13,16 | 35,13 | 232,087 | 27,26 | 40,76 | 5,28 | 198,286 | 26,75 | 10,9222 | J |
| VD-263D-02 | 2,20 | 39,80 | 42,00 | 0,70 | 36,70 | 431,00 | 16,50 | 4,30 | 1,445 | 2,25 | 12,30 | 4,20 | 0,00 | 6,069 | 7,10 | 13,75 | 2,75 | 3,974 | 7,20 | 15,9675 | K |
| VD-263D-10 | | | | | | | 21,00 | 6,09 | 0,929 | 3,50 | 16,65 | 4,35 | 0,00 | 4,041 | 6,18 | 18,93 | 2,07 | 1,923 | 6,14 | 20,6639 | L |
| VD-263D-11 | | | | | | | 33,00 | 8,41 | 0,591 | 5,50 | 23,65 | 9,35 | 0,00 | 5,527 | 5,46 | 27,23 | 5,77 | 3,411 | 5,43 | 28,1780 | L |
| VD-263D-12 | | | | | | | 45,00 | 10,70 | 0,433 | 7,50 | 30,65 | 14,35 | 0,00 | 6,221 | 5,11 | 35,53 | 9,47 | 4,105 | 5,08 | 35,6921 | L |
| VD-263D-13 | | | | | | | 75,00 | 16,40 | 0,260 | 12,50 | 48,15 | 26,85 | 0,00 | 6,984 | 4,72 | 56,28 | 18,72 | 4,869 | 4,69 | 54,4774 | M |
| VD-263E | | 35,80 | 38,00 | 0,70 | 32,70 | 40,30 | 86,60 | 4,94 | 1,276 | 3,50 | 15,93 | 70,67 | 0,00 | 90,204 | 7,65 | 17,85 | 21,57 | 87,751 | 7,62 | 18,5871 | L |
| VD-263F | | | | | | | 134,00 | 6,81 | 0,812 | 5,50 | 22,52 | 111,48 | 0,00 | 90,552 | 6,89 | 25,53 | 33,66 | 88,104 | 6,86 | 25,3460 | M |
| VD-263G | | | | | | | 228,00 | 10,52 | 0,470 | 9,50 | 35,69 | 192,31 | 146,91 | 90,432 | 6,30 | 40,89 | 58,30 | 87,988 | 6,26 | 38,8639 | N |
| VD-263H | | | | | | | 368,00 | 16,04 | 0,288 | 15,50 | 55,45 | 312,55 | 325,87 | 90,081 | 5,97 | 63,93 | 95,81 | 87,638 | 5,94 | 59,1407 | O |
| VD-263H-10 | | 21,80 | 24,00 | 0,45 | 18,90 | 25,10 | 26,50 | 1,00 | 8,793 | 2,25 | 10,60 | 15,90 | 0,00 | 139,812 | 11,10 | 11,20 | 4,90 | 134,536 | 10,99 | 8,7460 | K |
| VD-263J | | | | | | | 39,20 | 1,35 | 5,653 | 3,50 | 14,00 | 25,20 | 0,00 | 142,427 | 9,77 | 14,95 | 7,59 | 137,080 | 9,68 | 11,3184 | K |
| VD-263K | | | | | | | 59,10 | 1,86 | 3,597 | 5,50 | 19,49 | 39,61 | 0,00 | 142,478 | 8,84 | 20,99 | 11,93 | 137,090 | 8,76 | 15,4342 | K |
| VD-263L | | | | | | | 98,90 | 2,88 | 2,083 | 9,50 | 30,47 | 68,43 | 0,00 | 142,516 | 8,13 | 33,06 | 20,60 | 137,118 | 8,04 | 23,6657 | L |
| VD-263M | | | | | | | 159,00 | 4,39 | 1,276 | 15,50 | 46,93 | 112,07 | 119,23 | 143,047 | 7,74 | 51,15 | 36,17 | 137,663 | 7,66 | 36,0131 | L |
| VD-263M-01 | | 16,80 | 19,00 | 0,35 | 14,00 | 19,80 | 57,00 | 1,63 | 5,086 | 8,50 | 26,61 | 30,39 | 0,00 | 154,577 | 10,62 | 28,37 | 13,44 | 145,604 | 10,49 | 16,6519 | J |
| VD-263M-02 | | | | | | | 68,00 | 1,95 | 4,117 | 10,50 | 31,83 | 36,17 | 0,00 | 148,910 | 10,25 | 34,00 | 16,60 | 139,978 | 10,11 | 19,8237 | K |
| VD-263M-03 | | | | | | | 80,00 | 2,26 | 3,458 | 12,50 | 37,06 | 42,94 | 0,00 | 148,515 | 10,04 | 39,64 | 19,76 | 139,576 | 9,91 | 22,9955 | L |
| VD-263M-04 | | | | | | | 95,00 | 2,57 | 2,981 | 14,50 | 42,28 | 52,72 | 45,74 | 157,172 | 10,03 | 45,27 | 22,09 | 148,259 | 9,90 | 26,1673 | L |
| VD-263M-05 | | | | | | | 106,00 | 2,89 | 2,620 | 16,50 | 47,51 | 58,49 | 67,30 | 153,251 | 9,89 | 50,92 | 25,95 | 144,305 | 9,72 | 29,3391 | M |
| VD-263M-10 | | 13,20 | 15,40 | 0,30 | 10,40 | 16,40 | 240,00 | 3,32 | 2,875 | 31,00 | 148,15 | 91,85 | 231,83 | 264,055 | 20,73 | 166,55 | 19,56 | 211,158 | 16,76 | 41,1200 | M |
| VD-263N | | 12,80 | 15,00 | 0,30 | 10,10 | 15,70 | 20,80 | 0,61 | 27,925 | 3,50 | 13,26 | 7,54 | 0,00 | 210,531 | 20,21 | 13,84 | 2,74 | 194,361 | 19,97 | 6,6457 | K |
| VD-263O | | | | | | | 30,20 | 0,84 | 17,771 | 5,50 | 18,32 | 11,88 | 0,00 | 211,039 | 18,15 | 19,23 | 4,29 | 194,945 | 17,90 | 9,0623 | K |
| VD-263O-01 | | | | | | | 42,00 | 1,19 | 11,499 | 8,50 | 25,92 | 16,08 | 0,00 | 184,905 | 16,42 | 27,33 | 7,06 | 168,686 | 16,18 | 12,6872 | K |
| VD-263P | | | | | | | 48,90 | 1,30 | 10,288 | 9,50 | 28,45 | 20,45 | 0,00 | 210,384 | 16,54 | 30,03 | 7,46 | 194,141 | 16,30 | 13,8955 | K |
| VD-263P-01 | | | | | | | 53,00 | 1,22 | 9,308 | 10,50 | 30,98 | 22,02 | 0,00 | 204,946 | 16,75 | 32,72 | 8,55 | 188,776 | 16,47 | 15,1038 | K |
| VD-263P-02 | | | | | | | 68,00 | 1,51 | 7,240 | 13,50 | 38,58 | 29,42 | 18,20 | 213,013 | 16,44 | 40,82 | 10,40 | 196,782 | 16,16 | 18,7287 | K |
| VD-263Q | | | | | | | 77,00 | 1,70 | 6,306 | 15,50 | 43,64 | 33,36 | 46,02 | 210,351 | 16,19 | 46,21 | 12,13 | 194,154 | 15,91 | 21,1453 | K |
| VD-263Q-01 | | | | | | | 77,00 | 2,00 | 5,283 | 18,50 | 51,24 | 25,76 | 46,02 | 136,113 | 14,67 | 54,31 | 19,16 | 119,876 | 14,38 | 24,7702 | K |
| VD-263Q-02 | | 10,10 | 12,30 | 0,30 | 7,40 | 12,90 | 25,00 | 0,63 | 33,158 | 6,00 | 19,34 | 5,66 | 0,00 | 187,761 | 28,19 | 20,21 | 3,80 | 158,825 | 27,68 | 7,6274 | J |
| VD-263Q-03 | | | | | | | 32,00 | 0,71 | 28,421 | 7,00 | 21,83 | 10,17 | 0,00 | 289,129 | 29,05 | 22,95 | 2,67 | 257,208 | 28,54 | 8,5808 | J |
| VD-263Q-04 | | | | | | | 38,00 | 0,91 | 20,942 | 9,50 | 28,05 | 9,95 | 0,00 | 208,354 | 25,79 | 29,43 | 5,70 | 179,470 | 25,29 | 10,9644 | J |
| VD-263Q-05 | | | | | | | 44,00 | 1,03 | 18,086 | 11,00 | 31,79 | 12,21 | 0,00 | 220,919 | 25,85 | 33,38 | 6,22 | 192,073 | 25,35 | 12,3945 | J |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-263Q-06 | 2,20 | 10,10 | 12,30 | 0,30 | 7,40 | 12,90 | 51,00 | 1,19 | 15,304 | 13,00 | 36,76 | 14,24 | 0,00 | 217,858 | 25,25 | 38,65 | 7,46 | 188,998 | 24,75 | 14,3014 | K |
| VD-263Q-07 | | | | | | | 64,00 | 1,47 | 12,057 | 16,50 | 45,48 | 18,52 | 41,77 | 223,330 | 24,47 | 47,87 | 5,68 | 194,485 | 23,97 | 17,6384 | K |
| VD-263Q-08 | | | | | | | 76,00 | 1,78 | 9,705 | 20,50 | 55,44 | 20,56 | 58,80 | 199,569 | 23,63 | 58,41 | 4,60 | 170,705 | 23,13 | 21,4521 | M |
| VD-263R | | 8,80 | 11,00 | 0,30 | 6,00 | 11,60 | 16,20 | 0,38 | 85,938 | 3,50 | 13,05 | 3,15 | 0,00 | 270,291 | 42,83 | 13,53 | 1,32 | 229,453 | 42,11 | 4,5689 | J |
| VD-263S | | | | | | | 23,00 | 0,53 | 54,688 | 5,50 | 18,00 | 5,00 | 0,00 | 273,416 | 38,24 | 18,75 | 2,05 | 232,422 | 37,52 | 6,2303 | K |
| VD-263T | | | | | | | 36,50 | 0,81 | 31,661 | 9,50 | 27,89 | 8,61 | 0,00 | 272,552 | 34,67 | 29,19 | 3,56 | 231,443 | 33,95 | 9,5531 | K |
| VD-263U | | | | | | | 56,80 | 1,24 | 19,405 | 15,50 | 42,73 | 14,07 | 37,30 | 273,063 | 32,73 | 44,85 | 5,80 | 231,893 | 32,01 | 14,5374 | K |
| VD-263U-09 | 2,25 | 14,75 | 17,00 | 0,30 | 12,00 | 17,70 | 85,00 | 1,62 | 5,591 | 12,50 | 39,85 | 45,15 | 45,95 | 252,412 | 15,22 | 48,20 | 9,74 | 205,731 | 14,99 | 21,1176 | K |
| VD-263V | | 12,35 | 14,60 | 0,30 | 9,60 | 15,30 | 35,00 | 0,89 | 15,874 | 7,50 | 23,83 | 11,17 | 0,00 | 177,288 | 19,30 | 25,07 | 7,12 | 157,625 | 18,96 | 11,6314 | K |
| VD-263VA | 2,30 | 17,70 | 20,00 | 0,35 | 14,70 | 20,90 | 27,80 | 0,75 | 12,616 | 3,50 | 14,17 | 13,63 | 0,00 | 171,958 | 14,06 | 14,93 | 5,50 | 162,372 | 138,90 | 10,0441 | K |
| VD-263VB | | | | | | | 41,10 | 1,04 | 8,029 | 5,50 | 19,64 | 21,46 | 0,00 | 172,303 | 12,72 | 20,84 | 8,63 | 162,658 | 12,55 | 13,6965 | K |
| VD-263VC | | | | | | | 60,90 | 1,46 | 5,195 | 8,50 | 27,84 | 33,06 | 0,00 | 171,736 | 11,85 | 29,69 | 13,38 | 162,134 | 11,68 | 19,1751 | M |
| VD-263VD | | | | | | | 87,60 | 2,03 | 3,533 | 12,50 | 38,78 | 48,82 | 0,00 | 172,463 | 11,34 | 41,50 | 19,57 | 162,851 | 11,17 | 26,4799 | M |
| VD-263VE | | | | | | | 127,00 | 2,87 | 2,387 | 18,50 | 55,18 | 71,82 | 94,92 | 171,413 | 10,96 | 59,20 | 29,20 | 161,829 | 10,79 | 37,4372 | N |
| VD-263V-02 | 2,35 | 10,00 | 12,35 | 0,30 | 7,20 | 13,00 | 25,00 | 0,58 | 49,255 | 5,50 | 19,27 | 5,73 | 0,00 | 282,300 | 37,14 | 20,11 | 2,62 | 240,855 | 36,44 | 8,0782 | L |
| VD-263V-03 | | | | | | | 32,00 | 0,70 | 38,700 | 7,00 | 23,24 | 8,76 | 0,00 | 338,943 | 37,13 | 24,29 | 2,55 | 298,378 | 36,45 | 9,6939 | M |
| VD-263V-04 | | | | | | | 38,00 | 0,82 | 31,871 | 8,50 | 27,22 | 10,78 | 0,00 | 343,724 | 35,31 | 28,51 | 3,03 | 302,453 | 34,61 | 11,3095 | M |
| VD-263V-05 | | | | | | | 44,00 | 0,94 | 27,090 | 10,00 | 31,19 | 12,81 | 0,00 | 347,070 | 35,10 | 32,68 | 3,48 | 306,660 | 34,41 | 12,9252 | N |
| VD-263V-06 | | | | | | | 51,00 | 1,05 | 23,557 | 11,50 | 35,16 | 15,84 | 0,00 | 373,100 | 34,40 | 37,65 | 3,56 | 314,480 | 33,72 | 14,5408 | N |
| VD-263V-07 | | | | | | | 64,00 | 1,17 | 20,839 | 13,00 | 43,35 | 20,65 | 42,07 | 430,315 | 35,88 | 48,90 | 4,03 | 314,662 | 36,12 | 16,1565 | N |
| VD-263V-08 | | | | | | | 76,00 | 1,49 | 15,935 | 17,00 | 49,73 | 26,27 | 59,08 | 418,620 | 34,18 | 56,25 | 5,28 | 314,723 | 33,20 | 20,4649 | P |
| VD-263V-10 | | | | | | | 2,40 | 12,80 | 15,20 | 0,30 | 9,70 | 15,60 | 25,00 | 0,71 | 25,169 | 5,50 | 19,88 | 5,12 | 0,00 | 128,783 | 23,07 |
| VD-263V-11 | 32,00 | 0,81 | 21,297 | 6,50 | 22,63 | 9,37 | | | | | | | 0,00 | 199,643 | 23,50 | 23,75 | 6,04 | 175,697 | 23,08 | 12,2228 | N |
| VD-263V-12 | 38,00 | 0,95 | 17,303 | 8,00 | 26,74 | 11,26 | | | | | | | 0,00 | 194,851 | 22,95 | 28,11 | 7,44 | 171,131 | 22,53 | 14,3798 | O |
| VD-263V-13 | 44,00 | 1,05 | 15,381 | 9,00 | 29,48 | 14,52 | | | | | | | 0,00 | 223,305 | 23,00 | 31,02 | 7,69 | 199,644 | 22,58 | 15,8178 | O |
| VD-263V-14 | 51,00 | 1,24 | 12,584 | 11,00 | 34,97 | 16,03 | | | | | | | 0,00 | 201,772 | 21,97 | 36,85 | 10,23 | 178,068 | 21,56 | 18,6937 | N |
| VD-263V-15 | 64,00 | 1,62 | 9,229 | 15,00 | 45,94 | 18,06 | | | | | | | 0,00 | 166,704 | 20,56 | 48,50 | 13,95 | 143,042 | 20,15 | 24,4456 | M |
| VD-263V-16 | 76,00 | 1,86 | 7,910 | 17,50 | 52,79 | 23,21 | | | | | | | 42,60 | 183,579 | 20,38 | 55,79 | 16,28 | 159,864 | 19,97 | 28,0406 | M |
| VD-263V-17 | 89,00 | 2,20 | 6,592 | 21,00 | 62,39 | 26,61 | | | | | | | 64,71 | 175,405 | 20,09 | 65,99 | 19,53 | 151,677 | 19,67 | 33,0735 | M |
| VD-263V-18 | 102,00 | 2,49 | 5,768 | 24,00 | 70,62 | 31,38 | | | | | | | 81,91 | 181,008 | 19,99 | 74,73 | 22,32 | 157,289 | 19,57 | 37,3875 | N |
| VD-263VG | 2,50 | 12,60 | 15,00 | 0,30 | 9,50 | 15,50 | | | | | | | 300,00 | 6,80 | 2,073 | 70,00 | 196,55 | 103,45 | 294,00 | 214,482 | 20,20 |
| VD-263VH | | 43,50 | 46,00 | 0,90 | 39,90 | 48,30 | 60,00 | 4,20 | 1,846 | 2,25 | 13,75 | 46,25 | 0,00 | 85,355 | 10,20 | 15,35 | 24,30 | 82,402 | 10,25 | 22,5361 | K |
| VD-263V-19 | | 87,00 | 5,53 | 1,186 | 3,50 | 18,60 | 68,40 | 0,00 | 81,151 | 9,06 | 21,03 | 38,65 | 78,267 | 9,00 | 29,1643 | K | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-263Q-06 | 2,20 | 10,10 | 12,30 | 0,30 | 7,40 | 12,90 | 51,00 | 1,19 | 17,818 | 13,00 | 36,76 | 14,24 | 0,00 | 253,649 | 25,25 | 38,65 | 7,96 | 220,048 | 24,75 | 14,3014 | H |
| D-263Q-07 | | | | | | | 64,00 | 1,47 | 14,038 | 16,50 | 45,48 | 18,52 | 41,77 | 260,020 | 24,47 | 47,87 | 9,90 | 226,436 | 23,97 | 17,6384 | H |
| D-263Q-08 | | | | | | | 76,00 | 1,78 | 11,299 | 20,50 | 55,44 | 20,56 | 58,80 | 232,355 | 23,63 | 58,41 | 13,42 | 198,750 | 23,13 | 21,4521 | J |
| D-263R | | 8,80 | 11,00 | 0,30 | 6,00 | 11,60 | 16,20 | 0,38 | 100,056 | 3,50 | 13,05 | 3,15 | 0,00 | 314,696 | 42,83 | 13,53 | 1,44 | 267,149 | 42,11 | 4,5689 | F |
| D-263S | | | | | | | 23,00 | 0,53 | 63,672 | 5,50 | 18,00 | 5,00 | 0,00 | 318,334 | 38,24 | 18,75 | 2,24 | 270,605 | 37,52 | 6,2303 | G |
| D-263T | | | | | | | 36,50 | 0,81 | 36,863 | 9,50 | 27,89 | 8,61 | 0,00 | 317,329 | 34,67 | 29,19 | 3,88 | 269,466 | 33,95 | 9,5531 | G |
| D-263U | | | | | | | 56,80 | 1,24 | 22,593 | 15,50 | 42,73 | 14,07 | 38,07 | 317,923 | 32,73 | 44,85 | 6,32 | 269,989 | 32,01 | 14,5374 | G |
| D-263U-09 | 2,25 | 14,75 | 17,00 | 0,30 | 12,00 | 17,70 | 85,00 | 1,62 | 6,509 | 12,50 | 39,50 | 45,50 | 45,95 | 296,158 | 15,22 | 48,50 | 13,67 | 237,577 | 14,99 | 21,1176 | H |
| D-263V | | 12,40 | 14,65 | 0,30 | 9,60 | 15,30 | 35,00 | 0,89 | 18,259 | 7,50 | 23,83 | 11,17 | 0,00 | 203,927 | 19,30 | 25,07 | 7,59 | 181,310 | 18,96 | 11,6314 | H |
| D-263VA | 2,30 | 17,70 | 20,00 | 0,35 | 14,70 | 20,90 | 27,80 | 0,75 | 14,689 | 3,50 | 14,17 | 13,63 | 0,00 | 200,209 | 14,06 | 14,93 | 6,34 | 189,047 | 138,90 | 10,0441 | H |
| D-263VB | | | | | | | 41,10 | 1,04 | 9,348 | 5,50 | 19,64 | 21,46 | 0,00 | 200,609 | 12,72 | 20,84 | 9,95 | 189,381 | 12,55 | 13,6965 | H |
| D-263VC | | | | | | | 60,90 | 1,46 | 6,048 | 8,50 | 27,84 | 33,06 | 0,00 | 199,950 | 11,85 | 29,69 | 15,43 | 188,770 | 11,68 | 19,1751 | J |
| D-263VD | | | | | | | 87,60 | 2,03 | 4,113 | 12,50 | 38,78 | 48,82 | 0,00 | 200,796 | 11,34 | 41,50 | 22,60 | 189,605 | 11,17 | 26,4799 | J |
| D-263VE | | | | | | | 127,00 | 2,87 | 2,779 | 18,50 | 55,18 | 71,82 | 94,92 | 199,574 | 10,96 | 59,20 | 33,62 | 188,416 | 10,79 | 37,4372 | K |
| D-263V-02 | 2,35 | 10,00 | 12,35 | 0,30 | 7,20 | 13,00 | 25,00 | 0,58 | 56,491 | 5,50 | 19,27 | 5,73 | 0,00 | 323,772 | 37,14 | 20,11 | 2,92 | 276,239 | 36,44 | 8,0782 | F |
| D-263V-03 | | | | | | | 32,00 | 0,70 | 44,385 | 7,00 | 23,24 | 8,76 | 0,00 | 388,737 | 37,13 | 24,29 | 3,10 | 342,212 | 36,45 | 9,6939 | G |
| D-263V-04 | | | | | | | 38,00 | 0,82 | 36,553 | 8,50 | 27,22 | 10,78 | 0,00 | 394,220 | 35,31 | 28,51 | 3,71 | 346,886 | 34,61 | 11,3095 | G |
| D-263V-05 | | | | | | | 44,00 | 0,94 | 31,070 | 10,00 | 31,19 | 12,81 | 0,00 | 398,058 | 35,10 | 32,68 | 4,30 | 351,711 | 34,41 | 12,9252 | H |
| D-263V-06 | | | | | | | 51,00 | 1,05 | 27,017 | 11,50 | 35,16 | 15,84 | 0,00 | 427,912 | 34,40 | 37,78 | 4,80 | 357,168 | 33,72 | 14,5408 | H |
| D-263V-07 | | | | | | | 64,00 | 1,17 | 23,900 | 13,00 | 43,40 | 20,60 | 42,07 | 492,338 | 35,88 | 49,15 | 5,43 | 354,913 | 36,12 | 16,1565 | H |
| D-263V-08 | | | | | | | 76,00 | 1,49 | 18,276 | 17,00 | 49,73 | 26,27 | 59,08 | 480,119 | 34,18 | 56,70 | 7,28 | 352,734 | 33,20 | 20,4649 | J |
| D-263V-10 | | | | | | | 2,40 | 12,80 | 15,20 | 0,30 | 9,70 | 15,60 | 25,00 | 0,71 | 29,304 | 5,50 | 19,88 | 5,12 | 0,00 | 149,940 | 23,07 |
| D-263V-11 | 32,00 | 0,81 | 24,795 | 6,50 | 22,63 | 9,37 | | | | | | | 0,00 | 232,441 | 23,50 | 23,75 | 6,52 | 204,561 | 23,08 | 12,2228 | G |
| D-263V-12 | 38,00 | 0,95 | 20,146 | 8,00 | 26,74 | 11,26 | | | | | | | 0,00 | 226,862 | 22,95 | 28,11 | 8,13 | 199,246 | 22,53 | 14,3798 | H |
| D-263V-13 | 44,00 | 1,05 | 17,908 | 9,00 | 29,48 | 14,52 | | | | | | | 0,00 | 259,991 | 23,00 | 31,02 | 8,37 | 232,442 | 22,58 | 15,8178 | H |
| D-263V-14 | 51,00 | 1,24 | 14,652 | 11,00 | 34,97 | 16,03 | | | | | | | 0,00 | 234,921 | 21,97 | 36,85 | 10,95 | 207,322 | 21,56 | 18,6937 | H |
| D-263V-15 | 64,00 | 1,62 | 10,745 | 15,00 | 45,94 | 18,06 | | | | | | | 0,00 | 194,091 | 20,56 | 48,50 | 15,50 | 166,542 | 20,15 | 24,4456 | J |
| D-263V-16 | 76,00 | 1,86 | 9,210 | 17,50 | 52,79 | 23,21 | | | | | | | 44,29 | 213,738 | 20,38 | 55,78 | 18,38 | 186,220 | 19,97 | 28,0406 | J |
| D-263V-17 | 89,00 | 2,20 | 7,675 | 21,00 | 62,39 | 26,61 | | | | | | | 64,71 | 204,222 | 20,09 | 65,99 | 22,59 | 176,596 | 19,67 | 33,0735 | J |
| D-263V-18 | 102,00 | 2,49 | 6,715 | 24,00 | 70,62 | 31,38 | | | | | | | 81,91 | 210,745 | 19,99 | 74,73 | 25,41 | 183,129 | 19,57 | 37,3875 | K |
| D-263VG | 2,50 | 12,60 | 15,00 | 0,30 | 9,50 | 15,50 | | | | | | | 300,00 | 6,80 | 2,414 | 70,00 | 196,55 | 103,45 | 294,00 | 249,719 | 20,20 |
| D-263VH | | 43,50 | 46,00 | 0,90 | 39,90 | 48,30 | 60,00 | 4,10 | 2,149 | 2,25 | 13,74 | 46,26 | 0,00 | 99,399 | 10,40 | 15,40 | 26,10 | 95,832 | 10,40 | 22,5361 | H |
| D-263V-19 | | 87,00 | 5,53 | 1,381 | 3,50 | 18,60 | 68,40 | 0,00 | 94,484 | 9,06 | 21,03 | 42,29 | 91,125 | 9,00 | 29,1643 | H | | | | | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|---------|-------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-263V-20 | 2,50 | 43,50 | 46,00 | 0,90 | 39,90 | 48,30 | 136,00 | 7,63 | 0,879 | 5,50 | 26,37 | 109,63 | 0,00 | 96,367 | 8,15 | 30,18 | 65,55 | 93,018 | 8,10 | 39,7696 | J | | | | |
| D-263V-21 | | | | | | | 208,00 | 10,75 | 0,569 | 8,50 | 38,03 | 169,97 | 0,00 | 96,677 | 7,56 | 43,92 | 101,05 | 93,325 | 7,51 | 55,6774 | L | | | | |
| D-263V-22 | | | | | | | 330,00 | 15,91 | 0,358 | 13,50 | 57,45 | 272,55 | 257,00 | 97,604 | 7,16 | 66,80 | 159,49 | 94,257 | 7,11 | 82,1904 | M | | | | |
| D-263W | 39,50 | 42,00 | 0,70 | 36,10 | 44,40 | 91,70 | 4,28 | 1,845 | 3,50 | 17,90 | 73,80 | 0,00 | 136,149 | 9,93 | 19,98 | 27,26 | 132,315 | 9,88 | 26,4826 | H | | | | | |
| D-263X | | | | | | 141,00 | 5,91 | 1,174 | 5,50 | 25,27 | 115,73 | 0,00 | 135,864 | 8,97 | 28,53 | 42,94 | 132,041 | 8,92 | 36,1126 | J | | | | | |
| D-263Y | | | | | | 240,00 | 9,12 | 0,680 | 9,50 | 40,02 | 199,98 | 146,20 | 135,926 | 8,24 | 45,66 | 74,11 | 132,092 | 8,18 | 55,3726 | L | | | | | |
| D-263Z | 32,00 | 34,50 | 0,60 | 28,70 | 35,30 | 389,00 | 13,91 | 0,417 | 15,50 | 62,14 | 326,86 | 136,10 | 136,167 | 7,84 | 71,34 | 120,60 | 132,333 | 7,78 | 84,2627 | M | | | | | |
| D-263Z-10 | | | | | | 44,00 | 1,70 | 5,398 | 2,25 | 12,57 | 31,43 | 0,00 | 169,644 | 12,30 | 13,85 | 10,80 | 162,736 | 12,20 | 16,5783 | H | | | | | |
| D-264 | | | | | | 71,50 | 2,40 | 3,470 | 3,50 | 18,90 | 52,60 | 0,00 | 182,514 | 11,17 | 24,60 | 17,26 | 162,736 | 11,09 | 21,4542 | H | | | | | |
| D-264B | | | | | | 71,50 | 3,31 | 2,208 | 5,50 | 23,50 | 48,00 | 0,00 | 105,979 | 8,89 | 25,88 | 38,76 | 100,733 | 8,82 | 29,2558 | H | | | | | |
| D-265 | | | | | | 110,00 | 3,31 | 2,208 | 5,50 | 27,00 | 83,00 | 0,00 | 183,271 | 10,18 | 36,00 | 27,01 | 163,398 | 10,10 | 29,2558 | H | | | | | |
| D-266 | | | | | | 170,00 | 4,66 | 1,429 | 8,50 | 42,00 | 128,00 | 62,66 | 182,881 | 9,59 | 56,50 | 42,09 | 162,164 | 9,51 | 40,9581 | J | | | | | |
| D-267 | | | | | | 245,00 | 6,46 | 0,972 | 12,50 | 57,00 | 188,00 | 192,00 | 182,652 | 9,16 | 77,50 | 61,63 | 162,736 | 9,08 | 56,5611 | K | | | | | |
| D-267A | | | | | | 245,00 | 9,14 | 0,656 | 18,50 | 67,24 | 177,76 | 192,00 | 116,691 | 7,75 | 75,24 | 123,66 | 111,440 | 7,67 | 79,9658 | L | | | | | |
| D-268 | | | | | | 360,00 | 9,14 | 0,656 | 18,50 | 80,80 | 279,20 | 326,80 | 183,283 | 8,88 | 112,00 | 91,29 | 162,801 | 8,80 | 79,9658 | L | | | | | |
| D-268A | | | | | | 360,00 | 10,93 | 0,540 | 22,50 | 80,70 | 279,30 | 326,80 | 150,754 | 8,16 | 90,43 | 124,15 | 145,501 | 8,08 | 95,5688 | M | | | | | |
| D-268A-05 | | | | | | 29,50 | 32,00 | 0,50 | 26,30 | 33,10 | 100,00 | 4,30 | 1,550 | 10,00 | 37,72 | 62,28 | 0,00 | 96,538 | 8,14 | 41,58 | 58,42 | 90,557 | 8,05 | 43,1523 | K |
| D-268B | | | | | | 28,50 | 31,00 | 0,50 | 25,20 | 32,30 | 45,00 | 1,77 | 4,912 | 3,50 | 16,33 | 28,67 | 0,00 | 140,813 | 10,80 | 17,62 | 17,40 | 134,480 | 10,70 | 19,1077 | H |
| D-268C | | | | | | | | | | | 69,00 | 2,44 | 3,126 | 5,50 | 22,81 | 46,19 | 0,00 | 144,385 | 9,79 | 24,84 | 26,88 | 138,026 | 9,70 | 26,0559 | H |
| D-268D | | | | | | | | | | | 103,00 | 3,44 | 2,022 | 8,50 | 32,52 | 70,48 | 0,00 | 142,546 | 9,09 | 35,66 | 41,93 | 136,191 | 8,99 | 36,4783 | H |
| D-268E | | | | | | | | | | | 163,00 | 5,09 | 1,273 | 13,50 | 48,70 | 114,30 | 86,24 | 145,542 | 8,66 | 53,68 | 65,61 | 139,206 | 8,57 | 53,8489 | J |
| D-268G | | | | | | | | | | | 28,50 | 0,90 | 11,319 | 2,25 | 12,03 | 16,47 | 0,00 | 186,431 | 13,80 | 12,80 | 7,40 | 177,715 | 13,70 | 12,9518 | H |
| D-269 | | | | | | 25,00 | 27,50 | 0,45 | 21,80 | 28,80 | 49,00 | 1,29 | 7,277 | 3,50 | 16,80 | 32,20 | 0,00 | 234,313 | 13,02 | 21,40 | 10,34 | 200,839 | 12,90 | 16,7611 | H |
| D-270 | 74,50 | 1,79 | 4,631 | 5,50 | 24,00 | | | | | | 50,50 | 0,00 | 233,849 | 11,90 | 30,80 | 16,12 | 202,361 | 11,78 | 22,8561 | H | | | | | |
| D-271 | 115,00 | 2,51 | 2,996 | 8,50 | 37,00 | | | | | | 78,00 | 0,00 | 233,713 | 11,28 | 47,50 | 24,63 | 202,252 | 11,16 | 31,9985 | H | | | | | |
| D-272 | 165,00 | 3,48 | 2,038 | 12,50 | 49,80 | | | | | | 115,20 | 113,57 | 234,720 | 10,79 | 66,00 | 36,77 | 201,713 | 10,67 | 44,1884 | J | | | | | |
| D-272A | 165,00 | 4,93 | 1,377 | 18,50 | 62,81 | | | | | | 102,19 | 113,57 | 140,680 | 8,89 | 68,59 | 75,14 | 132,727 | 8,77 | 62,4732 | K | | | | | |
| D-273 | 240,00 | 4,93 | 1,377 | 18,50 | 69,30 | | | | | | 170,70 | 208,86 | 235,001 | 10,44 | 93,00 | 54,19 | 202,373 | 10,32 | 62,4732 | L | | | | | |
| D-273A | 240,00 | 5,89 | 1,132 | 22,50 | 75,31 | | | | | | 164,69 | 208,86 | 186,417 | 9,46 | 82,34 | 74,67 | 178,462 | 9,34 | 74,6632 | M | | | | | |
| D-273A-02 | 21,50 | 24,00 | 0,45 | 18,20 | 25,20 | | | | | | 37,50 | 0,90 | 11,440 | 3,50 | 15,60 | 21,90 | 0,00 | 250,547 | 14,60 | 17,30 | 7,20 | 231,098 | 14,40 | 14,4146 | J |
| D-273A-04 | | | | | | | | | | | 52,00 | 1,30 | 7,280 | 5,50 | 21,65 | 30,35 | 0,00 | 220,957 | 12,90 | 23,20 | 12,80 | 209,673 | 12,70 | 19,6562 | J |
| D-273A-10 | | | | | | | | | | | 85,00 | 1,68 | 5,339 | 7,50 | 34,05 | 50,95 | 0,00 | 272,016 | 13,55 | 41,90 | 15,94 | 230,106 | 12,08 | 24,8979 | J |
| D-273B | 20,00 | 22,50 | 0,35 | 16,80 | 23,30 | 27,00 | 0,85 | 14,212 | 3,50 | 15,47 | 11,54 | 0,00 | 163,941 | 14,48 | 16,33 | 9,07 | 151,647 | 14,31 | 13,4089 | G | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|---------------------------|-------------|-----------------------------|----------------------------|---------|-------|---------|---|
| | | | | | | | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | | | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | |
| VD-263V-20 | 2,50 | 43,50 | 46,00 | 0,90 | 39,90 | 48,30 | 136,00 | 7,63 | 0,755 | 5,50 | 26,37 | 109,63 | 0,00 | 82,769 | 8,15 | 30,18 | 60,73 | 79,892 | 8,10 | 39,7696 | K | | | | |
| VD-263V-21 | | | | | | | 208,00 | 10,75 | 0,489 | 8,50 | 38,03 | 169,97 | 0,00 | 83,036 | 7,56 | 43,92 | 93,86 | 80,156 | 7,51 | 55,6774 | O | | | | |
| VD-263V-22 | | | | | | | 330,00 | 15,91 | 0,308 | 13,50 | 57,45 | 272,55 | 257,00 | 83,832 | 7,16 | 66,80 | 143,29 | 80,957 | 7,11 | 82,1904 | P | | | | |
| VD-263W | 39,50 | 42,00 | 0,70 | 36,10 | 44,40 | 91,70 | 4,28 | 1,585 | 3,50 | 17,90 | 73,80 | 0,00 | 116,938 | 9,93 | 19,98 | 20,02 | 113,645 | 9,88 | 26,4826 | K | | | | | |
| VD-263X | | | | | | 141,00 | 5,91 | 1,008 | 5,50 | 25,27 | 115,73 | 0,00 | 116,693 | 8,97 | 28,53 | 34,76 | 113,410 | 8,92 | 36,1126 | N | | | | | |
| VD-263Y | | | | | | 240,00 | 9,12 | 0,584 | 9,50 | 40,02 | 199,98 | 146,20 | 116,746 | 8,24 | 45,66 | 59,93 | 113,453 | 8,18 | 55,3726 | O | | | | | |
| VD-263Z | | | | | | 389,00 | 13,91 | 0,358 | 15,50 | 62,14 | 326,86 | 136,10 | 116,953 | 7,84 | 71,34 | 97,45 | 113,660 | 7,78 | 84,2627 | P | | | | | |
| VD-263Z-10 | | | | | | 32,00 | 34,50 | 0,60 | 28,70 | 35,30 | 44,00 | 2,10 | 4,636 | 2,25 | 12,60 | 31,40 | 0,00 | 145,568 | 11,90 | 13,60 | 8,30 | 140,932 | 11,90 | 16,5783 | J |
| VD-264 | | | | | | | | | | | 71,50 | 2,40 | 2,980 | 3,50 | 18,00 | 53,50 | 0,00 | 159,442 | 11,17 | 23,40 | 12,41 | 143,349 | 11,09 | 21,4542 | K |
| VD-264B | 71,50 | 3,31 | 1,897 | 5,50 | 23,50 | | | | | | 48,00 | 0,00 | 91,025 | 8,89 | 25,88 | 32,44 | 86,519 | 8,82 | 29,2558 | K | | | | | |
| VD-265 | 110,00 | 3,31 | 1,897 | 5,50 | 25,80 | | | | | | 84,20 | 0,00 | 159,686 | 10,18 | 34,40 | 19,49 | 143,376 | 10,10 | 29,2558 | K | | | | | |
| VD-266 | 170,00 | 4,66 | 1,227 | 8,50 | 39,90 | | | | | | 130,10 | 62,66 | 159,653 | 9,59 | 53,10 | 30,10 | 143,454 | 9,51 | 40,9581 | M | | | | | |
| VD-267 | 245,00 | 6,46 | 0,834 | 12,50 | 53,70 | | | | | | 191,30 | 192,00 | 159,633 | 9,16 | 73,10 | 44,29 | 143,445 | 9,08 | 56,5611 | N | | | | | |
| VD-267A | 245,00 | 9,14 | 0,564 | 18,50 | 67,24 | | | | | | 177,76 | 192,00 | 100,225 | 7,75 | 75,24 | 109,13 | 95,715 | 7,67 | 79,9658 | O | | | | | |
| VD-268 | 360,00 | 9,14 | 0,564 | 18,50 | 76,95 | | | | | | 283,05 | 326,80 | 159,591 | 8,88 | 105,60 | 65,45 | 143,438 | 8,80 | 79,9658 | O | | | | | |
| VD-268A | 360,00 | 10,93 | 0,464 | 22,50 | 80,70 | | | | | | 279,30 | 326,80 | 129,482 | 8,16 | 90,43 | 105,59 | 124,970 | 8,08 | 95,5688 | P | | | | | |
| VD-268A-05 | 29,50 | 32,00 | 0,50 | 26,30 | 33,10 | | | | | | 100,00 | 4,30 | 1,331 | 10,00 | 37,72 | 62,28 | 0,00 | 82,916 | 8,14 | 41,58 | 49,92 | 77,779 | 8,05 | 43,1523 | N |
| VD-268B | 28,50 | 31,00 | 0,50 | 25,20 | 32,30 | | | | | | 45,00 | 1,77 | 4,219 | 3,50 | 16,33 | 28,67 | 0,00 | 120,943 | 10,80 | 17,62 | 15,79 | 115,505 | 10,70 | 19,1077 | K |
| VD-268C | | | | | | | | | | | 69,00 | 2,44 | 2,685 | 5,50 | 22,81 | 46,19 | 0,00 | 124,011 | 9,79 | 24,84 | 24,21 | 118,550 | 9,70 | 26,0559 | L |
| VD-268D | | | | | | | | | | | 103,00 | 3,44 | 1,737 | 8,50 | 32,52 | 70,48 | 0,00 | 122,432 | 9,09 | 35,66 | 37,90 | 116,974 | 8,99 | 36,4783 | L |
| VD-268E | | | | | | | | | | | 163,00 | 5,09 | 1,094 | 13,50 | 48,70 | 114,30 | 86,24 | 125,006 | 8,66 | 53,68 | 58,92 | 119,564 | 8,57 | 53,8489 | M |
| VD-268G | | | | | | 25,00 | 27,50 | 0,45 | 21,80 | 28,80 | 28,50 | 1,10 | 9,722 | 2,25 | 12,05 | 16,45 | 0,00 | 159,931 | 13,45 | 12,80 | 6,50 | 152,639 | 13,40 | 12,9518 | K |
| VD-269 | 49,00 | 1,29 | 6,250 | 3,50 | 16,30 | | | | | | 32,70 | 0,00 | 204,375 | 13,02 | 20,45 | 7,37 | 178,438 | 12,90 | 16,7611 | L | | | | | |
| VD-270 | 74,50 | 1,79 | 3,977 | 5,50 | 23,30 | | | | | | 51,20 | 0,00 | 203,636 | 11,90 | 29,60 | 11,57 | 178,580 | 11,78 | 22,8561 | L | | | | | |
| VD-271 | 115,00 | 2,51 | 2,574 | 8,50 | 35,80 | | | | | | 79,20 | 0,00 | 203,824 | 11,28 | 45,65 | 17,85 | 178,474 | 11,16 | 31,9985 | L | | | | | |
| VD-272 | 165,00 | 3,48 | 1,750 | 12,50 | 48,50 | | | | | | 116,50 | 113,57 | 203,875 | 10,79 | 63,00 | 26,30 | 178,500 | 10,67 | 44,1884 | M | | | | | |
| VD-272A | 165,00 | 4,93 | 1,182 | 18,50 | 62,81 | | | | | | 102,19 | 113,57 | 120,830 | 8,89 | 68,59 | 65,94 | 113,998 | 8,77 | 62,4732 | N | | | | | |
| VD-273 | 240,00 | 4,93 | 1,182 | 18,50 | 67,00 | | | | | | 173,00 | 208,86 | 204,561 | 10,44 | 89,00 | 38,87 | 178,547 | 10,32 | 62,4732 | O | | | | | |
| VD-273A | 240,00 | 5,89 | 0,972 | 22,50 | 75,31 | | | | | | 164,69 | 208,86 | 160,113 | 9,46 | 82,34 | 63,99 | 153,281 | 9,34 | 74,6632 | P | | | | | |
| VD-273A-02 | 21,50 | 24,00 | 0,45 | 18,20 | 25,20 | | | | | | 37,50 | 1,10 | 9,826 | 3,50 | 15,60 | 21,90 | 0,00 | 215,193 | 14,10 | 16,85 | 5,40 | 202,911 | 14,00 | 14,4146 | K |
| VD-273A-04 | | | | | | | | | | | 52,00 | 1,50 | 6,253 | 5,50 | 21,65 | 30,35 | 0,00 | 189,779 | 12,40 | 23,15 | 10,80 | 180,400 | 12,35 | 19,6562 | L |
| VD-273A-10 | | | | | | | | | | | 85,00 | 1,68 | 4,586 | 7,50 | 33,20 | 51,80 | 0,00 | 237,531 | 13,55 | 40,70 | 11,44 | 203,140 | 12,08 | 24,8979 | M |
| VD-273B | 20,00 | 22,50 | 0,35 | 16,80 | 23,30 | 27,00 | 0,85 | 12,207 | 3,50 | 15,47 | 11,54 | 0,00 | 140,808 | 14,48 | 16,33 | 8,57 | 130,249 | 14,31 | 13,4089 | J | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-274 | 2,50 | 20,00 | 22,50 | 0,35 | 16,80 | 23,30 | 36,00 | 0,85 | 12,207 | 3,50 | 15,47 | 20,54 | 0,00 | 250,671 | 16,41 | 18,35 | 4,57 | 215,454 | 16,22 | 13,4089 | J |
| VD-274A | | | | | | | 40,00 | 1,17 | 7,768 | 5,50 | 21,45 | 18,56 | 0,00 | 144,137 | 13,08 | 22,80 | 13,23 | 133,612 | 12,90 | 18,2849 | J |
| VD-275 | | | | | | | 54,00 | 1,17 | 7,768 | 5,50 | 21,45 | 32,56 | 0,00 | 252,891 | 14,98 | 26,20 | 7,19 | 215,953 | 14,80 | 18,2849 | J |
| VD-275A | | | | | | | 60,00 | 1,65 | 5,026 | 8,50 | 30,42 | 29,59 | 0,00 | 148,707 | 12,22 | 32,51 | 19,97 | 138,176 | 120,40 | 25,5988 | L |
| VD-276 | | | | | | | 81,50 | 1,65 | 5,026 | 8,50 | 30,65 | 50,85 | 0,00 | 255,594 | 14,11 | 38,50 | 11,05 | 216,136 | 13,93 | 25,5988 | L |
| VD-276A | | | | | | | 93,00 | 2,44 | 3,165 | 13,50 | 45,37 | 47,64 | 0,00 | 150,755 | 11,61 | 48,68 | 30,24 | 140,263 | 11,42 | 37,7887 | M |
| VD-276B | | | | | | | 103,00 | 2,44 | 3,165 | 13,50 | 45,37 | 57,64 | 0,00 | 182,402 | 12,16 | 48,68 | 26,06 | 171,911 | 11,98 | 37,7887 | M |
| VD-277 | | | | | | | 120,00 | 2,28 | 3,418 | 12,50 | 45,30 | 74,70 | 71,34 | 255,322 | 13,70 | 56,80 | 16,28 | 216,016 | 13,51 | 35,3507 | M |
| VD-277A | | | | | | | 120,00 | 3,22 | 2,309 | 18,50 | 60,32 | 59,69 | 71,34 | 137,839 | 11,08 | 64,86 | 41,44 | 127,342 | 10,89 | 49,9786 | N |
| VD-278 | | | | | | | 175,00 | 3,22 | 2,309 | 18,50 | 64,50 | 110,50 | 147,10 | 255,193 | 13,30 | 81,45 | 24,09 | 216,048 | 13,11 | 49,9786 | N |
| VD-278A | 175,00 | 3,86 | 1,899 | 22,50 | 72,28 | 102,73 | 147,10 | 195,062 | 11,93 | 77,80 | 39,90 | 184,570 | 11,75 | 59,7305 | O | | | | | | |
| VD-278B | 18,00 | 20,50 | 0,35 | 14,80 | 21,40 | 95,00 | 1,96 | 4,689 | 12,50 | 41,81 | 53,20 | 0,00 | 249,409 | 15,04 | 44,75 | 13,68 | 235,601 | 14,81 | 31,8156 | M | |
| VD-278B-10 | 17,50 | 20,00 | 0,35 | 14,30 | 20,90 | 65,00 | 1,36 | 7,503 | 8,50 | 29,94 | 35,06 | 0,00 | 263,079 | 16,50 | 32,85 | 8,30 | 241,221 | 16,26 | 22,3989 | L | |
| VD-278C | 17,00 | 19,50 | 0,35 | 13,80 | 20,30 | 35,00 | 0,93 | 12,649 | 5,50 | 21,08 | 13,92 | 0,00 | 176,092 | 16,84 | 22,25 | 8,75 | 161,276 | 16,58 | 15,5421 | J | |
| VD-278D | | | | | | 125,00 | 2,58 | 3,761 | 18,50 | 59,08 | 65,92 | 95,24 | 247,884 | 15,62 | 63,00 | 19,90 | 233,153 | 15,37 | 42,4818 | N | |
| VD-278E | 16,00 | 18,50 | 0,30 | 12,90 | 19,30 | 16,50 | 0,50 | 37,087 | 2,25 | 11,50 | 5,00 | 0,00 | 185,437 | 23,40 | 12,00 | 2,95 | 166,893 | 26,50 | 7,7711 | J | |
| VD-279 | | | | | | 27,50 | 0,63 | 23,842 | 3,50 | 15,16 | 12,34 | 0,00 | 294,147 | 22,68 | 16,65 | 2,83 | 258,684 | 22,39 | 10,7271 | J | |
| VD-279A | | | | | | 32,00 | 0,75 | 18,544 | 4,50 | 18,07 | 13,93 | 0,00 | 258,384 | 20,76 | 18,97 | 4,33 | 241,624 | 20,47 | 12,6775 | J | |
| VD-280 | | | | | | 41,00 | 0,87 | 15,172 | 5,50 | 20,97 | 20,03 | 0,00 | 303,900 | 20,72 | 23,95 | 4,43 | 258,684 | 20,42 | 14,6279 | J | |
| VD-281 | | | | | | 61,00 | 1,23 | 9,817 | 8,50 | 29,68 | 31,32 | 0,00 | 307,470 | 19,41 | 34,60 | 6,83 | 259,175 | 19,12 | 20,4790 | L | |
| VD-282 | | | | | | 88,00 | 1,70 | 6,676 | 12,50 | 41,30 | 46,71 | 36,50 | 311,790 | 18,66 | 49,20 | 10,04 | 259,018 | 18,37 | 28,2806 | L | |
| VD-282A | | | | | | 88,00 | 2,41 | 4,511 | 18,50 | 58,72 | 29,28 | 36,50 | 132,086 | 14,95 | 62,46 | 25,54 | 115,201 | 14,66 | 39,9829 | M | |
| VD-282B | | | | | | 105,00 | 1,94 | 5,755 | 14,50 | 49,55 | 55,45 | 71,18 | 319,111 | 18,79 | 59,95 | 11,63 | 259,260 | 17,20 | 32,1813 | M | |
| VD-283 | | | | | | 130,00 | 2,41 | 4,511 | 18,50 | 59,20 | 70,80 | 105,50 | 319,352 | 18,26 | 72,55 | 14,83 | 259,135 | 17,96 | 39,9829 | M | |
| VD-283A | | | | | | 130,00 | 2,88 | 3,709 | 22,50 | 70,33 | 59,67 | 105,50 | 221,296 | 16,29 | 74,87 | 26,95 | 204,462 | 16,00 | 47,7844 | N | |
| VD-283A-05 | 15,50 | 18,00 | 0,30 | 12,40 | 18,70 | 45,00 | 1,42 | 8,741 | 10,50 | 35,39 | 9,61 | 0,00 | 84,018 | 15,88 | 37,46 | 7,54 | 65,911 | 15,56 | 23,6179 | L | |
| VD-283A-06 | | | | | | 91,00 | 1,76 | 6,799 | 13,50 | 44,07 | 46,93 | 51,59 | 319,066 | 19,49 | 51,90 | 10,08 | 265,837 | 19,10 | 29,2862 | L | |
| VD-283A-07 | | | | | | 181,00 | 3,35 | 3,338 | 27,50 | 84,59 | 96,41 | 165,58 | 321,785 | 18,65 | 101,35 | 20,58 | 265,844 | 18,20 | 55,7383 | L | |
| VD-283A-10 | 14,00 | 16,50 | 0,30 | 10,90 | 17,30 | 52,00 | 0,97 | 16,608 | 7,50 | 30,00 | 22,00 | 0,00 | 365,381 | 26,10 | 34,70 | 4,48 | 287,322 | 24,16 | 16,2126 | L | |
| VD-283A-12 | 13,00 | 15,50 | 0,30 | 9,40 | 16,30 | 17,00 | 0,50 | 62,230 | 2,50 | 12,13 | 4,87 | 0,00 | 303,059 | 34,70 | 12,65 | 1,70 | 270,699 | 34,30 | 7,1311 | J | |
| VD-283A-15 | | | | | | 28,00 | 0,62 | 34,572 | 4,50 | 17,83 | 10,17 | 0,00 | 351,553 | 30,97 | 19,99 | 2,83 | 276,922 | 30,50 | 10,3005 | K | |
| VD-283A-16 | | | | | | 49,00 | 1,01 | 18,303 | 8,50 | 29,24 | 19,76 | 0,00 | 361,721 | 27,77 | 32,40 | 4,32 | 303,828 | 27,29 | 16,6392 | K | |
| VD-283A-17 | | | | | | 59,00 | 1,20 | 14,817 | 10,50 | 34,94 | 24,06 | 0,00 | 356,492 | 26,93 | 38,50 | 5,32 | 303,740 | 26,45 | 19,8086 | K | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-274 | 2,50 | 20,00 | 22,50 | 0,35 | 16,80 | 23,30 | 36,00 | 0,85 | 14,212 | 3,50 | 15,47 | 20,54 | 0,00 | 291,853 | 16,41 | 18,80 | 6,37 | 244,455 | 16,22 | 13,4089 | G |
| D-274A | | | | | | | 40,00 | 1,17 | 9,044 | 5,50 | 21,45 | 18,56 | 0,00 | 167,817 | 13,08 | 22,80 | 14,08 | 155,562 | 12,90 | 18,2849 | G |
| D-275 | | | | | | | 54,00 | 1,17 | 9,044 | 5,50 | 21,70 | 32,30 | 0,00 | 292,131 | 14,98 | 26,90 | 9,97 | 245,101 | 14,80 | 18,2849 | G |
| D-275A | | | | | | | 60,00 | 1,65 | 5,852 | 8,50 | 30,42 | 29,59 | 0,00 | 173,137 | 12,22 | 32,51 | 21,38 | 160,877 | 120,40 | 25,5988 | H |
| D-276 | | | | | | | 81,50 | 1,65 | 5,852 | 8,50 | 31,50 | 50,00 | 0,00 | 292,610 | 14,11 | 40,00 | 15,58 | 242,866 | 13,93 | 25,5988 | H |
| D-276A | | | | | | | 93,00 | 2,44 | 3,685 | 13,50 | 45,37 | 47,64 | 0,00 | 175,521 | 11,61 | 48,68 | 33,68 | 163,307 | 11,42 | 37,7887 | J |
| D-276B | | | | | | | 103,00 | 2,44 | 3,685 | 13,50 | 45,37 | 57,64 | 0,00 | 212,369 | 12,16 | 48,68 | 29,54 | 200,154 | 11,98 | 37,7887 | J |
| D-277 | | | | | | | 120,00 | 2,28 | 3,979 | 12,50 | 46,30 | 73,70 | 71,34 | 293,289 | 13,70 | 58,20 | 22,59 | 245,933 | 13,51 | 35,3507 | J |
| D-277A | | | | | | | 120,00 | 3,22 | 2,689 | 18,50 | 60,32 | 59,69 | 71,34 | 160,484 | 11,08 | 64,86 | 48,47 | 148,263 | 10,89 | 49,9786 | K |
| D-278 | | | | | | | 175,00 | 3,22 | 2,689 | 18,50 | 66,20 | 108,80 | 147,10 | 292,546 | 13,30 | 84,00 | 33,62 | 244,685 | 13,11 | 49,9786 | K |
| D-278A | 175,00 | 3,86 | 2,211 | 22,50 | 72,28 | 102,73 | 147,10 | 227,107 | 11,93 | 77,80 | 46,47 | 214,893 | 11,75 | 59,7305 | L | | | | | | |
| D-278B | 18,00 | 20,50 | 0,35 | 14,80 | 21,40 | 95,00 | 1,96 | 5,459 | 12,50 | 41,81 | 53,20 | 33,11 | 290,383 | 15,04 | 46,00 | 18,04 | 267,483 | 14,81 | 31,8156 | J | |
| D-278B-10 | 17,50 | 20,00 | 0,35 | 14,30 | 20,90 | 65,00 | 1,36 | 8,736 | 8,50 | 29,94 | 35,06 | 0,00 | 306,299 | 16,50 | 33,90 | 11,63 | 271,678 | 16,26 | 22,3989 | H | |
| D-278C | 17,00 | 19,50 | 0,35 | 13,80 | 20,30 | 35,00 | 0,93 | 14,727 | 5,50 | 21,08 | 13,92 | 0,00 | 205,021 | 16,84 | 22,25 | 9,60 | 187,771 | 16,58 | 15,5421 | G | |
| D-278D | | | | | | 125,00 | 2,58 | 4,378 | 18,50 | 59,08 | 65,92 | 95,24 | 288,607 | 15,62 | 63,00 | 24,39 | 271,457 | 15,37 | 42,4818 | K | |
| D-278E | 16,00 | 18,50 | 0,30 | 12,90 | 19,30 | 16,50 | 0,40 | 43,180 | 2,25 | 11,55 | 4,90 | 0,00 | 213,742 | 23,80 | 12,00 | 2,70 | 194,311 | 26,90 | 7,7711 | G | |
| D-279 | | | | | | 27,50 | 0,63 | 27,759 | 3,50 | 15,16 | 12,34 | 0,00 | 342,471 | 22,68 | 16,90 | 3,90 | 294,243 | 22,39 | 10,7271 | G | |
| D-279A | | | | | | 32,00 | 0,75 | 21,590 | 4,50 | 18,07 | 13,93 | 0,00 | 300,833 | 20,76 | 18,98 | 5,27 | 281,103 | 20,47 | 12,6775 | G | |
| D-280 | | | | | | 41,00 | 0,87 | 17,665 | 5,50 | 20,97 | 20,03 | 0,00 | 353,826 | 20,72 | 24,40 | 6,15 | 293,233 | 20,42 | 14,6279 | G | |
| D-281 | | | | | | 61,00 | 1,23 | 11,430 | 8,50 | 29,68 | 31,32 | 0,00 | 357,983 | 19,41 | 35,50 | 9,57 | 291,467 | 19,12 | 20,4790 | H | |
| D-282 | | | | | | 88,00 | 1,70 | 7,772 | 12,50 | 41,30 | 46,71 | 40,35 | 363,012 | 18,66 | 50,50 | 14,08 | 291,467 | 18,37 | 28,2806 | H | |
| D-282A | | | | | | 88,00 | 2,41 | 5,252 | 18,50 | 58,72 | 29,28 | 40,35 | 153,786 | 14,95 | 62,46 | 25,54 | 134,127 | 14,66 | 39,9829 | J | |
| D-282B | | | | | | 105,00 | 1,94 | 6,700 | 14,50 | 50,35 | 54,65 | 71,18 | 366,176 | 18,79 | 61,00 | 16,12 | 294,817 | 17,20 | 32,1813 | J | |
| D-283 | | | | | | 130,00 | 2,41 | 5,252 | 18,50 | 60,30 | 69,70 | 105,50 | 366,040 | 18,26 | 74,00 | 20,62 | 294,093 | 17,96 | 39,9829 | J | |
| D-283A | | | | | | 130,00 | 2,88 | 4,318 | 22,50 | 70,33 | 59,67 | 105,50 | 257,652 | 16,29 | 74,87 | 30,46 | 238,053 | 16,00 | 47,7844 | K | |
| D-283A-05 | 15,50 | 18,00 | 0,30 | 12,40 | 18,70 | 45,00 | 1,42 | 10,178 | 10,50 | 35,39 | 9,61 | 0,00 | 97,821 | 15,88 | 37,46 | 7,54 | 76,739 | 15,56 | 23,6179 | H | |
| D-283A-06 | | | | | | 91,00 | 1,76 | 7,916 | 13,50 | 44,07 | 46,93 | 51,59 | 371,484 | 19,49 | 53,00 | 14,07 | 300,803 | 19,10 | 29,2862 | H | |
| D-283A-07 | | | | | | 181,00 | 3,35 | 3,886 | 27,50 | 84,59 | 96,41 | 165,58 | 374,650 | 18,65 | 103,50 | 28,62 | 301,163 | 18,20 | 55,7383 | H | |
| D-283A-10 | 14,00 | 16,50 | 0,30 | 10,90 | 17,30 | 52,00 | 0,97 | 19,337 | 7,50 | 30,42 | 21,58 | 0,00 | 417,286 | 26,10 | 35,20 | 6,25 | 324,857 | 24,16 | 16,2126 | H | |
| D-283A-12 | 13,00 | 15,50 | 0,30 | 9,40 | 16,30 | 17,00 | 0,40 | 72,453 | 2,50 | 12,13 | 4,87 | 0,00 | 352,847 | 35,50 | 12,60 | 1,85 | 318,794 | 35,00 | 7,1311 | G | |
| D-283A-15 | | | | | | 28,00 | 0,62 | 40,252 | 4,50 | 17,83 | 10,17 | 0,00 | 409,308 | 30,97 | 19,40 | 3,15 | 346,165 | 30,50 | 10,3005 | G | |
| D-283A-16 | | | | | | 49,00 | 1,01 | 21,310 | 8,50 | 29,24 | 19,76 | 0,00 | 421,147 | 27,77 | 32,90 | 6,00 | 343,087 | 27,29 | 16,6392 | G | |
| D-283A-17 | | | | | | 59,00 | 1,20 | 17,251 | 10,50 | 34,94 | 24,06 | 0,00 | 415,059 | 26,93 | 39,00 | 7,37 | 345,015 | 26,45 | 19,8086 | G | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|-------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-283A-18 | 2,50 | 13,00 | 15,50 | 0,30 | 9,90 | 16,30 | 90,00 | 1,78 | 10,978 | 16,50 | 52,05 | 37,95 | 65,17 | 416,627 | 25,79 | 58,50 | 11,55 | 345,799 | 25,31 | 29,3167 | H | | | | |
| D-283A-19 | | | | | | | 224,00 | 4,29 | 4,262 | 42,50 | 126,18 | 97,82 | 215,49 | 416,885 | 24,53 | 143,50 | 30,02 | 343,087 | 24,05 | 70,5186 | H | | | | |
| D-283B | 12,50 | 15,00 | 0,30 | 9,40 | 15,70 | 19,00 | 0,50 | 58,214 | 3,50 | 14,95 | 4,05 | 0,00 | 235,586 | 32,69 | 15,55 | 3,35 | 200,839 | 32,17 | 8,3806 | F | | | | | |
| D-284 | | | | | | 22,00 | 0,50 | 58,214 | 3,50 | 14,95 | 7,05 | 0,00 | 410,229 | 35,31 | 15,90 | 2,25 | 355,107 | 34,79 | 8,3806 | F | | | | | |
| D-284A | | | | | | 27,00 | 0,69 | 37,045 | 5,50 | 20,64 | 6,36 | 0,00 | 235,586 | 29,14 | 21,59 | 5,26 | 200,416 | 28,61 | 11,4280 | F | | | | | |
| D-285 | | | | | | 32,00 | 0,69 | 37,045 | 5,50 | 20,64 | 11,36 | 0,00 | 420,813 | 31,92 | 22,40 | 3,53 | 355,636 | 31,39 | 11,4280 | G | | | | | |
| D-285A | | | | | | 40,00 | 0,97 | 23,971 | 8,50 | 29,17 | 10,83 | 0,00 | 259,557 | 27,23 | 30,63 | 7,71 | 224,604 | 26,70 | 15,9992 | G | | | | | |
| D-286 | | | | | | 47,50 | 0,97 | 23,971 | 8,50 | 29,17 | 18,33 | 0,00 | 439,336 | 29,92 | 32,70 | 5,47 | 354,765 | 29,40 | 15,9992 | G | | | | | |
| D-286A | | | | | | 55,00 | 1,44 | 15,093 | 13,50 | 43,39 | 11,61 | 0,00 | 175,216 | 24,38 | 45,71 | 9,29 | 140,210 | 23,85 | 23,6179 | H | | | | | |
| D-287 | | | | | | 67,50 | 1,35 | 16,300 | 12,50 | 40,55 | 26,95 | 28,22 | 439,336 | 28,55 | 45,80 | 8,07 | 353,710 | 28,03 | 22,0942 | H | | | | | |
| D-287A | | | | | | 67,50 | 1,91 | 11,014 | 18,50 | 57,61 | 9,89 | 28,22 | 108,931 | 22,64 | 60,79 | 6,71 | 73,901 | 22,12 | 31,2366 | J | | | | | |
| D-288 | | | | | | 98,00 | 1,91 | 11,014 | 18,50 | 57,61 | 40,39 | 77,95 | 444,843 | 27,68 | 66,30 | 12,11 | 349,128 | 27,16 | 31,2366 | H | | | | | |
| D-288A | | | | | | 98,00 | 2,28 | 9,056 | 22,50 | 68,98 | 29,02 | 77,95 | 262,753 | 24,60 | 72,85 | 20,28 | 227,747 | 24,07 | 37,3316 | J | | | | | |
| D-288B | | | | | | 10,50 | 13,00 | 0,30 | 7,40 | 13,70 | 18,80 | 0,43 | 98,218 | 3,50 | 14,86 | 3,94 | 0,00 | 387,321 | 48,38 | 15,42 | 1,80 | 331,977 | 47,56 | 7,0397 | G |
| D-288C | | | | | | | | | | | 26,70 | 0,60 | 62,502 | 5,50 | 20,49 | 6,21 | 0,00 | 388,214 | 43,22 | 21,36 | 2,82 | 333,763 | 42,40 | 9,5995 | G |
| D-288D | | | | | | | | | | | 42,50 | 0,92 | 36,186 | 9,50 | 31,75 | 10,75 | 0,00 | 388,872 | 39,25 | 33,25 | 4,86 | 334,717 | 38,44 | 14,7193 | H |
| D-288E | 66,20 | 1,41 | 22,178 | 15,50 | 48,65 | | | | | | 17,55 | 42,94 | 389,222 | 37,08 | 51,10 | 7,92 | 334,892 | 36,27 | 22,3989 | J | | | | | |
| D-288E-10 | 2,70 | 20,00 | 22,70 | 0,35 | 16,60 | 23,50 | 25,00 | 0,87 | 16,919 | 4,00 | 18,17 | 6,83 | 0,00 | 115,575 | 16,86 | 19,15 | 5,85 | 98,976 | 16,61 | 17,0620 | J | | | | |
| D-288F | | | | | | | 34,00 | 1,10 | 12,305 | 5,50 | 22,96 | 11,04 | 0,00 | 135,878 | 15,58 | 24,32 | 9,68 | 119,109 | 15,33 | 21,3275 | J | | | | |
| D-288G | 2,80 | 45,20 | 48,00 | 0,90 | 41,20 | 50,90 | 104,00 | 4,91 | 1,937 | 3,50 | 20,21 | 83,79 | 0,00 | 162,332 | 11,95 | 22,62 | 32,52 | 157,665 | 11,88 | 38,0135 | J | | | | |
| D-288H | | | | | | | 161,00 | 6,78 | 1,233 | 5,50 | 28,56 | 132,44 | 0,00 | 163,283 | 10,81 | 32,34 | 50,81 | 158,623 | 10,74 | 51,8365 | N | | | | |
| D-288J | | | | | | | 273,00 | 10,46 | 0,714 | 9,50 | 45,26 | 227,74 | 164,40 | 162,557 | 9,91 | 51,79 | 88,12 | 157,894 | 5,84 | 79,4827 | P | | | | |
| D-288K | | | | | | | 443,00 | 15,96 | 0,437 | 15,50 | 70,30 | 372,70 | 388,00 | 163,045 | 9,43 | 80,95 | 143,54 | 158,388 | 9,35 | 120,9519 | R | | | | |
| D-288K-10 | 30,20 | 33,00 | 0,50 | 26,60 | 34,20 | 25,00 | 1,18 | 11,367 | 2,00 | 12,74 | 12,26 | 0,00 | 139,392 | 15,69 | 13,51 | 11,14 | 130,608 | 15,56 | 18,4715 | N | | | | | |
| D-288K-11 | | | | | | 50,00 | 1,83 | 5,684 | 4,00 | 19,87 | 30,13 | 0,00 | 171,220 | 13,08 | 21,41 | 20,18 | 162,492 | 12,95 | 27,7073 | O | | | | | |
| D-288K-12 | | | | | | 100,00 | 3,09 | 2,842 | 8,00 | 34,15 | 65,85 | 0,00 | 187,134 | 11,64 | 37,22 | 38,27 | 178,406 | 11,51 | 46,1789 | P | | | | | |
| D-288K-13 | | | | | | 150,00 | 4,33 | 1,895 | 12,00 | 48,42 | 101,58 | 0,00 | 192,439 | 11,14 | 53,03 | 56,36 | 183,711 | 11,01 | 64,6504 | Q | | | | | |
| D-288K-20 | 27,20 | 30,00 | 0,50 | 23,60 | 31,30 | 34,00 | 1,31 | 8,890 | 3,50 | 17,77 | 16,23 | 0,00 | 144,317 | 13,85 | 18,95 | 15,05 | 133,802 | 13,69 | 22,8754 | N | | | | | |
| D-288L | | | | | | 47,00 | 1,31 | 8,890 | 3,50 | 17,77 | 29,23 | 0,00 | 259,893 | 18,58 | 18,95 | 11,14 | 249,378 | 15,43 | 22,8754 | N | | | | | |
| D-288M | | | | | | 70,70 | 1,81 | 5,658 | 5,50 | 24,72 | 45,98 | 0,00 | 260,136 | 14,17 | 26,58 | 17,49 | 249,612 | 14,01 | 31,1937 | O | | | | | |
| D-288N | | | | | | 118,00 | 2,80 | 3,275 | 9,50 | 38,63 | 79,37 | 0,00 | 259,987 | 13,07 | 41,85 | 30,24 | 249,425 | 12,91 | 47,8303 | P | | | | | |
| D-288N-10 | | | | | | 135,00 | 4,52 | 1,886 | 16,50 | 62,96 | 72,04 | 0,00 | 135,858 | 10,56 | 68,54 | 66,46 | 125,334 | 10,40 | 76,9444 | Q | | | | | |
| D-288O | | | | | | 189,00 | 4,27 | 2,008 | 15,50 | 59,48 | 129,52 | 137,30 | 260,008 | 12,48 | 64,72 | 49,31 | 249,495 | 12,32 | 72,7852 | Q | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|---------|--------|---------|---------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-283A-18 | 2,50 | 13,00 | 15,50 | 0,30 | 9,90 | 16,30 | 90,00 | 1,78 | 9,429 | 16,50 | 52,05 | 37,95 | 65,17 | 357,839 | 25,79 | 57,75 | 8,31 | 304,077 | 25,31 | 29,3167 | L | | | | | |
| VD-283A-19 | | | | | | | 224,00 | 4,29 | 3,661 | 42,50 | 126,18 | 97,82 | 215,49 | 358,061 | 24,53 | 140,90 | 21,61 | 304,194 | 24,05 | 70,5186 | L | | | | | |
| VD-283B | | | | | | | 12,50 | 15,00 | 0,30 | 9,40 | 15,70 | 19,00 | 0,50 | 50,000 | 3,50 | 14,95 | 4,05 | 0,00 | 202,344 | 32,69 | 15,55 | 3,20 | 172,500 | 32,17 | 8,3806 | J |
| VD-284 | | | | | | | | | | | | 22,00 | 0,50 | 50,000 | 3,50 | 14,95 | 7,05 | 0,00 | 352,344 | 35,31 | 15,75 | 1,61 | 312,500 | 34,79 | 8,3806 | J |
| VD-284A | | | | | | | | | | | | 27,00 | 0,69 | 31,818 | 5,50 | 20,64 | 6,36 | 0,00 | 202,344 | 29,14 | 21,59 | 4,62 | 172,136 | 28,61 | 11,4280 | J |
| VD-285 | | | | | | | | | | | | 32,00 | 0,69 | 31,818 | 5,50 | 20,64 | 11,36 | 0,00 | 361,435 | 31,92 | 22,20 | 2,57 | 311,818 | 31,39 | 11,4280 | K |
| VD-285A | | | | | | | | | | | | 40,00 | 0,97 | 20,588 | 8,50 | 29,17 | 10,83 | 0,00 | 222,932 | 27,23 | 30,63 | 7,14 | 192,912 | 26,70 | 15,9992 | K |
| VD-286 | | | | | | | | | | | | 47,50 | 0,97 | 20,588 | 8,50 | 29,17 | 18,33 | 0,00 | 377,344 | 29,92 | 32,30 | 3,96 | 312,941 | 29,40 | 15,9992 | K |
| VD-286A | | | | | | | | | | | | 55,00 | 1,44 | 12,963 | 13,50 | 43,39 | 11,61 | 0,00 | 150,492 | 24,38 | 45,71 | 9,29 | 120,426 | 23,85 | 23,6179 | L |
| VD-287 | | | | | | | | | | | | 67,50 | 1,35 | 14,000 | 12,50 | 40,55 | 26,95 | 24,10 | 377,344 | 28,55 | 45,15 | 5,79 | 312,900 | 28,03 | 22,0942 | L |
| VD-287A | | 67,50 | 1,91 | 9,459 | 18,50 | 57,61 | | | | | | 9,89 | 24,10 | 93,560 | 22,64 | 60,79 | 6,71 | 63,473 | 22,12 | 31,2366 | M | | | | | |
| VD-288 | | 98,00 | 1,91 | 9,459 | 18,50 | 57,61 | | | | | | 40,39 | 77,95 | 382,073 | 27,68 | 64,90 | 8,55 | 313,108 | 27,16 | 31,2366 | L | | | | | |
| VD-288A | | 98,00 | 2,28 | 7,778 | 22,50 | 68,98 | 29,02 | 77,95 | 225,677 | 24,60 | 72,85 | 19,02 | 195,611 | 24,07 | 37,3316 | M | | | | | | | | | | |
| VD-288B | | 10,50 | 13,00 | 0,30 | 7,40 | 13,70 | 18,80 | 0,43 | 84,359 | 3,50 | 14,86 | 3,94 | 0,00 | 332,668 | 48,38 | 15,42 | 1,58 | 285,134 | 47,56 | 7,0397 | K | | | | | |
| VD-288C | | | | | | | 26,70 | 0,60 | 53,683 | 5,50 | 20,49 | 6,21 | 0,00 | 333,435 | 43,22 | 21,36 | 2,47 | 286,668 | 42,40 | 9,5995 | K | | | | | |
| VD-288D | | | | | | | 42,50 | 0,92 | 31,080 | 9,50 | 31,75 | 10,75 | 0,00 | 334,000 | 39,25 | 33,25 | 4,25 | 287,487 | 38,44 | 14,7193 | L | | | | | |
| VD-288E | | | | | | | 66,20 | 1,41 | 19,049 | 15,50 | 48,65 | 17,55 | 41,90 | 334,301 | 37,08 | 51,10 | 6,94 | 287,637 | 36,27 | 22,3989 | M | | | | | |
| VD-288E-10 | | | | | | | 2,70 | 20,00 | 22,70 | 0,35 | 16,60 | 23,50 | 25,00 | 0,87 | 14,532 | 4,00 | 16,82 | 8,18 | 0,00 | 118,868 | 16,86 | 19,15 | 5,85 | 85,010 | 16,61 | 17,0620 |
| VD-288F | | 34,00 | 1,10 | 10,568 | 5,50 | 22,96 | | | | | | | 11,04 | 0,00 | 116,705 | 15,58 | 24,32 | 9,68 | 102,302 | 15,33 | 21,3275 | M | | | | |
| VD-288G | | 2,80 | 45,20 | 48,00 | 0,90 | 41,20 | 50,90 | 104,00 | 4,91 | 1,664 | 3,50 | 20,21 | 83,79 | 0,00 | 139,427 | 11,95 | 22,62 | 24,33 | 135,417 | 11,88 | 38,0135 | M | | | | |
| VD-288H | 161,00 | | | | | | | 6,78 | 1,059 | 5,50 | 28,56 | 132,44 | 0,00 | 140,243 | 10,81 | 32,34 | 37,81 | 136,240 | 10,74 | 51,8365 | Q | | | | | |
| VD-288J | 273,00 | | | | | | | 10,46 | 0,613 | 9,50 | 45,26 | 227,74 | 164,40 | 139,619 | 9,91 | 51,79 | 65,87 | 135,614 | 9,00 | 79,4827 | S | | | | | |
| VD-288K | 443,00 | | | | | | | 15,96 | 0,376 | 15,50 | 70,30 | 372,70 | 388,00 | 140,038 | 9,43 | 80,95 | 106,72 | 136,038 | 9,35 | 120,9519 | U | | | | | |
| VD-288K-10 | 30,20 | | | | | | | 33,00 | 0,50 | 26,60 | 34,20 | 25,00 | 1,18 | 9,763 | 2,00 | 12,74 | 12,26 | 0,00 | 119,724 | 15,69 | 13,51 | 9,12 | 112,178 | 15,56 | 18,4715 | Q |
| VD-288K-11 | | | 50,00 | 1,83 | 4,882 | 4,00 | 19,87 | | | | | 30,13 | 0,00 | 147,060 | 13,08 | 21,41 | 18,25 | 139,564 | 12,95 | 27,7073 | R | | | | | |
| VD-288K-12 | | | 100,00 | 3,09 | 2,441 | 8,00 | 34,15 | | | | | 65,85 | 0,00 | 160,729 | 11,64 | 37,22 | 33,03 | 153,232 | 11,51 | 46,1789 | S | | | | | |
| VD-288K-13 | | | 150,00 | 4,33 | 1,627 | 12,00 | 48,42 | | | | | 101,58 | 0,00 | 165,285 | 11,14 | 53,03 | 48,05 | 157,789 | 11,01 | 64,6504 | T | | | | | |
| VD-288K-20 | | | 27,20 | 30,00 | 0,50 | 23,60 | 31,30 | | | | | 34,00 | 1,31 | 7,636 | 3,50 | 17,77 | 16,23 | 0,00 | 123,954 | 13,85 | 18,95 | 12,82 | 114,922 | 13,69 | 22,8754 | R |
| VD-288L | 47,00 | | | | | | | 1,31 | 7,636 | 3,50 | 17,77 | 29,23 | 0,00 | 223,221 | 18,58 | 18,95 | 8,31 | 214,190 | 15,43 | 22,8754 | Q | | | | | |
| VD-288M | 70,70 | 1,81 | | | | | | 4,859 | 5,50 | 24,72 | 45,98 | 0,00 | 223,430 | 14,17 | 26,58 | 13,04 | 214,391 | 14,01 | 31,1937 | R | | | | | | |
| VD-288N | 118,00 | 2,80 | | | | | | 2,813 | 9,50 | 38,63 | 79,37 | 0,00 | 223,302 | 13,07 | 41,85 | 22,56 | 214,230 | 12,91 | 47,8303 | S | | | | | | |
| VD-288N-10 | 135,00 | 4,52 | | | | | | 1,620 | 16,50 | 62,96 | 72,04 | 0,00 | 116,688 | 10,56 | 68,54 | 60,44 | 107,649 | 10,40 | 76,9444 | T | | | | | | |
| VD-288O | 189,00 | 4,27 | | | | | | 1,724 | 15,50 | 59,48 | 129,52 | 137,30 | 223,320 | 12,48 | 64,72 | 36,79 | 214,291 | 12,32 | 72,7852 | T | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-2880-10 | 2,80 | 17,20 | 20,00 | 0,35 | 13,70 | 20,90 | 18,50 | 0,60 | 46,976 | 2,25 | 12,90 | 5,60 | 0,00 | 263,063 | 31,00 | 13,40 | 3,00 | 239,576 | 30,70 | 11,1777 | O |
| VD-288P | | | | | | | 27,20 | 0,66 | 30,199 | 3,50 | 16,93 | 10,27 | 0,00 | 309,998 | 28,46 | 17,70 | 3,55 | 286,887 | 28,05 | 14,4653 | O |
| VD-288Q | | | | | | | 39,50 | 0,90 | 19,217 | 5,50 | 23,41 | 16,09 | 0,00 | 309,174 | 25,64 | 24,62 | 5,60 | 285,953 | 25,23 | 19,7254 | O |
| VD-288R | | | | | | | 64,20 | 1,40 | 11,126 | 9,50 | 36,37 | 27,83 | 0,00 | 309,680 | 23,49 | 38,46 | 9,65 | 286,378 | 23,09 | 30,2456 | P |
| VD-288S | | | | | | | 101,00 | 2,13 | 6,819 | 15,50 | 55,80 | 45,20 | 57,29 | 308,244 | 22,29 | 59,20 | 15,85 | 285,036 | 21,89 | 46,0259 | Q |
| VD-288S-04 | | 16,10 | 18,90 | 0,35 | 12,60 | 20,00 | 27,50 | 0,70 | 36,821 | 3,50 | 16,87 | 10,63 | 0,00 | 391,406 | 32,20 | 18,20 | 4,00 | 342,434 | 31,50 | 13,5402 | P |
| VD-288S-10 | | | | | | | 65,00 | 0,96 | 19,827 | 6,50 | 43,20 | 21,80 | 0,00 | 432,221 | 32,40 | 47,85 | 4,37 | 340,027 | 31,00 | 20,9258 | Q |
| VD-288T | | 14,20 | 17,00 | 0,30 | 10,80 | 18,00 | 33,00 | 0,76 | 34,152 | 5,50 | 23,13 | 9,87 | 0,00 | 336,937 | 36,00 | 24,20 | 4,12 | 300,535 | 35,37 | 16,2849 | N |
| VD-288T-02 | | 12,20 | 15,00 | 0,30 | 8,80 | 15,70 | 25,00 | 0,58 | 65,819 | 4,50 | 19,82 | 5,18 | 0,00 | 341,018 | 50,09 | 20,63 | 2,77 | 287,627 | 49,16 | 12,1258 | P |
| VD-288T-03 | | | | | | | 32,00 | 0,71 | 49,364 | 6,00 | 24,56 | 7,44 | 0,00 | 367,346 | 48,60 | 25,64 | 3,41 | 313,954 | 47,67 | 14,9240 | P |
| VD-288T-04 | | | | | | | 38,00 | 0,80 | 42,312 | 7,00 | 27,72 | 10,28 | 0,00 | 435,045 | 48,24 | 28,98 | 3,12 | 381,653 | 47,30 | 16,7895 | P |
| VD-288T-05 | | | | | | | 44,00 | 0,94 | 34,845 | 8,50 | 32,46 | 11,54 | 0,00 | 402,191 | 45,15 | 33,99 | 4,29 | 348,799 | 44,22 | 19,5878 | P |
| VD-288T-06 | | | | | | | 51,00 | 1,03 | 31,177 | 9,50 | 35,62 | 15,38 | 0,00 | 479,584 | 45,77 | 37,60 | 3,46 | 417,774 | 44,84 | 21,4533 | Q |
| VD-288T-07 | | | | | | | 64,00 | 1,30 | 23,695 | 12,50 | 45,10 | 18,90 | 0,00 | 447,908 | 43,72 | 47,35 | 5,27 | 394,516 | 42,79 | 27,0498 | Q |
| VD-288T-08 | | | | | | | 76,00 | 1,53 | 19,746 | 15,00 | 53,00 | 23,00 | 48,33 | 454,226 | 43,51 | 55,69 | 6,15 | 401,032 | 42,58 | 31,7136 | Q |
| VD-288T-09 | | | | | | | 89,00 | 1,75 | 16,925 | 17,50 | 60,90 | 28,10 | 67,40 | 475,664 | 42,83 | 64,30 | 6,50 | 418,042 | 41,90 | 36,3773 | Q |
| VD-288T-10 | 102,00 | | | | | | 1,98 | 14,809 | 20,00 | 68,79 | 33,21 | 84,00 | 491,743 | 43,05 | 79,95 | 10,90 | 326,542 | 42,11 | 41,0411 | R | |
| VD-288U | 11,20 | | | | | | 14,00 | 0,25 | 7,70 | 14,70 | 20,50 | 0,45 | 109,375 | 3,50 | 16,62 | 3,88 | 0,00 | 424,900 | 64,82 | 17,23 | 1,51 |
| VD-288V | | 29,00 | 0,62 | 69,602 | 5,50 | 22,91 | | | | | 6,09 | 0,00 | 423,906 | 57,83 | 23,87 | 2,37 | 357,060 | 56,66 | 12,8445 | O | |
| VD-288W | | 45,90 | 0,96 | 40,296 | 9,50 | 35,50 | | | | | 10,40 | 0,00 | 419,143 | 52,38 | 37,15 | 4,16 | 352,590 | 51,22 | 19,6948 | O | |
| VD-288X | | 71,40 | 1,47 | 24,698 | 15,50 | 54,38 | | | | | 17,02 | 46,00 | 420,313 | 49,47 | 57,07 | 6,75 | 353,916 | 48,31 | 29,9704 | P | |
| VD-288X-02 | 2,90 | 16,50 | 19,40 | 0,35 | 12,90 | 20,40 | 25,00 | 0,53 | 50,097 | 2,75 | 15,65 | 9,35 | 0,00 | 468,411 | 40,08 | 17,65 | 1,84 | 368,216 | 38,27 | 12,8556 | O |
| VD-288X-03 | | | | | | | 32,00 | 0,65 | 36,738 | 3,75 | 19,25 | 12,75 | 0,00 | 468,411 | 37,65 | 21,95 | 1,49 | 369,218 | 35,13 | 15,5621 | O |
| VD-288X-04 | | | | | | | 38,00 | 0,74 | 30,615 | 4,50 | 22,70 | 15,30 | 0,00 | 468,411 | 35,66 | 25,90 | 3,02 | 370,443 | 33,69 | 17,5919 | O |
| VD-288X-05 | | | | | | | 44,00 | 0,92 | 22,961 | 6,00 | 25,78 | 18,22 | 0,00 | 418,243 | 32,45 | 27,85 | 3,96 | 370,825 | 31,93 | 21,6516 | O |
| VD-288X-06 | | | | | | | 51,00 | 0,98 | 21,195 | 6,50 | 28,95 | 22,05 | 0,00 | 467,351 | 32,84 | 33,50 | 4,33 | 370,914 | 31,60 | 23,0048 | Q |
| VD-288X-07 | | | | | | | 64,00 | 1,18 | 16,699 | 8,25 | 35,95 | 28,05 | 0,00 | 468,411 | 32,36 | 41,80 | 5,49 | 370,721 | 30,18 | 27,7411 | Q |
| VD-288X-08 | | | | | | | 76,00 | 1,33 | 14,502 | 9,50 | 43,65 | 32,35 | 0,00 | 469,136 | 32,18 | 50,60 | 6,29 | 368,348 | 29,64 | 31,1242 | Q |
| VD-288X-09 | | | | | | | 89,00 | 1,56 | 11,980 | 11,50 | 49,95 | 39,05 | 31,30 | 467,812 | 31,16 | 58,20 | 7,61 | 368,979 | 28,98 | 36,5371 | R |
| VD-288X-10 | | | | | | | 102,00 | 1,91 | 9,501 | 14,50 | 54,10 | 47,90 | 64,00 | 455,139 | 29,07 | 63,00 | 9,58 | 370,548 | 28,55 | 44,6564 | R |
| VD-288X-11 | | | | | | | 115,00 | 2,05 | 8,747 | 15,75 | 61,45 | 53,55 | 83,79 | 468,411 | 29,70 | 72,90 | 10,41 | 368,256 | 29,29 | 48,0395 | S |
| VD-288X-12 | | | | | | | 127,00 | 2,29 | 7,762 | 17,75 | 66,55 | 60,45 | 99,88 | 469,187 | 29,27 | 79,30 | 11,73 | 370,227 | 27,89 | 53,4524 | S |
| VD-288X-13 | | | | | | | 153,00 | 2,63 | 6,639 | 20,75 | 82,50 | 70,50 | 131,50 | 468,079 | 29,59 | 97,30 | 13,73 | 369,816 | 27,56 | 61,5718 | S |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|------|---------|-------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-2880-10 | 2,80 | 17,20 | 20,00 | 0,35 | 13,70 | 20,90 | 18,50 | 0,45 | 54,693 | 2,25 | 12,89 | 5,61 | 0,00 | 306,828 | 31,60 | 13,40 | 3,15 | 278,934 | 31,20 | 11,1777 | L | | | | | |
| D-288P | | | | | | | 27,20 | 0,66 | 35,160 | 3,50 | 16,93 | 10,27 | 0,00 | 360,926 | 28,46 | 17,70 | 4,45 | 334,018 | 28,05 | 14,4653 | L | | | | | |
| D-288Q | | | | | | | 39,50 | 0,90 | 22,374 | 5,50 | 23,41 | 16,09 | 0,00 | 359,967 | 25,64 | 24,62 | 7,01 | 332,931 | 25,23 | 19,7254 | L | | | | | |
| D-288R | | | | | | | 64,20 | 1,40 | 12,954 | 9,50 | 36,37 | 27,83 | 0,00 | 360,556 | 23,49 | 38,46 | 12,09 | 333,426 | 23,09 | 30,2456 | M | | | | | |
| D-288S | | | | | | | 101,00 | 2,13 | 7,939 | 15,50 | 55,80 | 45,20 | 57,29 | 358,884 | 22,29 | 59,20 | 19,80 | 331,863 | 21,89 | 46,0259 | N | | | | | |
| D-288S-04 | | 16,10 | 18,90 | 0,35 | 12,60 | 20,00 | 27,50 | 0,60 | 42,870 | 3,50 | 16,87 | 10,63 | 0,00 | 455,709 | 33,10 | 18,25 | 3,30 | 396,548 | 32,20 | 13,5402 | N | | | | | |
| D-288S-10 | | | | | | | 65,00 | 0,96 | 23,084 | 6,50 | 43,40 | 21,60 | 0,00 | 498,612 | 32,40 | 47,80 | 6,40 | 397,043 | 31,00 | 20,9258 | N | | | | | |
| D-288T | | 14,20 | 17,00 | 0,30 | 10,80 | 18,00 | 33,00 | 0,76 | 39,762 | 5,50 | 23,13 | 9,87 | 0,00 | 392,291 | 36,00 | 24,20 | 4,90 | 349,909 | 35,37 | 16,2849 | J | | | | | |
| D-288T-02 | | | | | | | 12,20 | 15,00 | 0,30 | 8,80 | 15,70 | 25,00 | 0,58 | 76,632 | 4,50 | 19,82 | 5,18 | 0,00 | 397,043 | 50,09 | 20,63 | 3,10 | 334,880 | 49,16 | 12,1258 | M |
| D-288T-03 | | | | | | | | | | | | 32,00 | 0,71 | 57,474 | 6,00 | 24,56 | 7,44 | 0,00 | 427,695 | 48,60 | 25,65 | 3,94 | 364,958 | 47,67 | 14,9240 | M |
| D-288T-04 | 38,00 | | | | | | 0,80 | 49,263 | 7,00 | 27,72 | 10,28 | 0,00 | 506,516 | 48,24 | 28,98 | 3,99 | 444,354 | 47,30 | 16,7895 | M | | | | | | |
| D-288T-05 | 44,00 | | | | | | 0,94 | 40,570 | 8,50 | 32,46 | 11,54 | 0,00 | 468,265 | 45,15 | 33,99 | 5,20 | 406,102 | 44,22 | 19,5878 | M | | | | | | |
| D-288T-06 | 51,00 | | | | | | 1,03 | 36,299 | 9,50 | 35,62 | 15,38 | 0,00 | 558,372 | 45,77 | 37,70 | 5,02 | 482,779 | 44,84 | 21,4533 | N | | | | | | |
| D-288T-07 | 64,00 | | | | | | 1,30 | 27,587 | 12,50 | 45,10 | 18,90 | 20,75 | 521,492 | 43,72 | 47,35 | 6,93 | 459,330 | 42,79 | 27,0498 | N | | | | | | |
| D-288T-08 | 76,00 | | | | | | 1,53 | 22,989 | 15,00 | 53,00 | 23,00 | 48,33 | 528,849 | 43,51 | 55,69 | 8,19 | 466,916 | 42,58 | 31,7136 | N | | | | | | |
| D-288T-09 | 89,00 | | | | | | 1,75 | 19,705 | 17,50 | 60,90 | 28,10 | 67,40 | 553,809 | 42,83 | 64,30 | 9,18 | 486,720 | 41,90 | 36,3773 | N | | | | | | |
| D-288T-10 | 102,00 | | | | | | 1,98 | 17,242 | 20,00 | 68,79 | 33,21 | 84,00 | 572,529 | 43,05 | 73,90 | 10,53 | 484,503 | 42,11 | 41,0411 | O | | | | | | |
| D-288U | 11,20 | 14,00 | 0,25 | 7,70 | 14,70 | 20,50 | 0,45 | 127,344 | 3,50 | 16,62 | 3,88 | 0,00 | 494,705 | 64,82 | 17,23 | 1,80 | 416,414 | 63,66 | 9,4193 | L | | | | | | |
| D-288V | | | | | | 29,00 | 0,62 | 81,037 | 5,50 | 22,91 | 6,09 | 0,00 | 493,547 | 57,83 | 23,87 | 2,82 | 415,719 | 56,66 | 12,8445 | L | | | | | | |
| D-288W | | | | | | 45,90 | 0,96 | 46,916 | 9,50 | 35,50 | 10,40 | 0,00 | 488,003 | 52,38 | 37,15 | 4,92 | 410,516 | 51,22 | 19,6948 | L | | | | | | |
| D-288X | | | | | | 71,40 | 1,47 | 28,755 | 15,50 | 54,38 | 17,02 | 47,06 | 489,365 | 49,47 | 57,07 | 8,01 | 412,060 | 48,31 | 29,9704 | M | | | | | | |
| D-288X-02 | | | | | | 2,90 | 16,50 | 19,40 | 0,35 | 12,90 | 20,40 | 25,00 | 0,53 | 58,328 | 2,75 | 15,75 | 9,25 | 0,00 | 539,532 | 40,08 | 17,70 | 2,73 | 425,792 | 38,27 | 12,8556 | L |
| D-288X-03 | 32,00 | 0,65 | 42,774 | 3,75 | 19,40 | | | | | | | 12,60 | 0,00 | 538,948 | 37,65 | 22,15 | 3,76 | 421,321 | 35,13 | 15,5621 | L | | | | | |
| D-288X-04 | 38,00 | 0,74 | 35,645 | 4,50 | 22,80 | | | | | | | 15,20 | 0,00 | 541,800 | 35,66 | 26,20 | 4,52 | 420,608 | 33,69 | 17,5919 | L | | | | | |
| D-288X-05 | 44,00 | 0,92 | 26,734 | 6,00 | 25,78 | | | | | | | 18,22 | 0,00 | 486,954 | 32,45 | 28,20 | 6,01 | 422,390 | 31,93 | 21,6516 | L | | | | | |
| D-288X-06 | 51,00 | 0,98 | 24,677 | 6,50 | 29,00 | | | | | | | 22,00 | 0,00 | 542,897 | 32,84 | 33,80 | 6,48 | 424,446 | 31,60 | 23,0048 | M | | | | | |
| D-288X-07 | 64,00 | 1,18 | 19,443 | 8,25 | 36,20 | | | | | | | 27,80 | 0,00 | 540,504 | 32,36 | 42,20 | 8,23 | 423,848 | 30,18 | 27,7411 | M | | | | | |
| D-288X-08 | 76,00 | 1,33 | 16,884 | 9,50 | 44,00 | | | | | | | 32,00 | 0,00 | 540,299 | 32,18 | 50,90 | 9,48 | 423,797 | 29,64 | 31,1242 | N | | | | | |
| D-288X-09 | 89,00 | 1,56 | 13,948 | 11,50 | 50,20 | | | | | | | 38,80 | 0,00 | 541,180 | 31,16 | 58,50 | 11,43 | 425,412 | 28,98 | 36,5371 | O | | | | | |
| D-288X-10 | 102,00 | 1,91 | 11,062 | 14,50 | 54,10 | | | | | | | 47,90 | 64,00 | 529,912 | 29,07 | 63,80 | 14,51 | 422,574 | 28,55 | 44,6564 | O | | | | | |
| D-288X-11 | 115,00 | 2,05 | 10,184 | 15,75 | 61,90 | | | | | | | 53,10 | 83,79 | 540,781 | 29,70 | 75,40 | 16,49 | 403,295 | 29,29 | 48,0395 | P | | | | | |
| D-288X-12 | 127,00 | 2,29 | 9,037 | 17,75 | 67,00 | | | | | | | 60,00 | 99,88 | 542,201 | 29,27 | 79,90 | 17,63 | 425,628 | 27,89 | 53,4524 | P | | | | | |
| D-288X-13 | 153,00 | 2,63 | 7,730 | 20,75 | 83,10 | | | | | | | 69,90 | 131,50 | 540,340 | 29,59 | 98,00 | 20,64 | 425,160 | 27,56 | 61,5718 | P | | | | | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-288X-20 | 3,00 | 45,00 | 48,00 | 0,90 | 40,80 | 50,40 | 88,00 | 4,22 | 2,587 | 3,50 | 21,09 | 66,91 | 0,00 | 173,107 | 13,51 | 23,39 | 33,52 | 167,166 | 13,42 | 43,4448 | M |
| D-288X-21 | | | | | | | 103,00 | 5,82 | 1,646 | 5,50 | 29,72 | 73,28 | 0,00 | 120,655 | 11,40 | 33,33 | 64,88 | 114,709 | 11,31 | 59,2429 | N |
| D-288X-22 | | | | | | | 203,00 | 8,20 | 1,065 | 8,50 | 42,66 | 160,34 | 0,00 | 170,824 | 11,30 | 48,24 | 82,24 | 164,875 | 11,21 | 82,9401 | N |
| D-288X-23 | | | | | | | 295,00 | 11,35 | 0,724 | 12,50 | 59,91 | 235,09 | 201,41 | 170,312 | 10,78 | 68,12 | 121,24 | 164,362 | 10,69 | 114,5363 | O |
| D-289X-24 | | | | | | | 434,00 | 16,07 | 0,489 | 18,50 | 85,78 | 348,22 | 378,26 | 170,449 | 10,42 | 97,92 | 179,36 | 164,508 | 10,33 | 161,9307 | P |
| D-288Y | | 38,00 | 41,00 | 0,60 | 34,10 | 42,10 | 92,00 | 5,40 | 1,671 | 9,00 | 42,20 | 49,80 | 0,00 | 83,216 | 10,30 | 46,80 | 45,20 | 75,526 | 10,19 | 73,3735 | J |
| D-288Z | | 37,00 | 40,00 | 0,60 | 33,20 | 41,10 | 100,00 | 5,25 | 1,715 | 9,50 | 43,85 | 56,15 | 0,00 | 96,284 | 10,46 | 48,53 | 51,47 | 88,263 | 10,34 | 74,6900 | J |
| D-288Z-11 | | 34,00 | 37,00 | 0,60 | 30,10 | 38,50 | 57,40 | 1,98 | 5,999 | 3,50 | 19,57 | 37,83 | 0,00 | 226,908 | 15,28 | 21,11 | 18,46 | 217,688 | 15,14 | 32,8250 | L |
| D-288Z-12 | | | | | | | 87,10 | 2,73 | 3,817 | 5,50 | 27,33 | 59,77 | 0,00 | 228,162 | 13,85 | 29,75 | 28,88 | 218,921 | 13,71 | 44,7613 | M |
| D-288Z-13 | | | | | | | 131,00 | 3,85 | 2,470 | 8,50 | 38,96 | 92,04 | 0,00 | 227,331 | 12,91 | 42,69 | 44,75 | 218,126 | 12,77 | 62,6658 | N |
| D-288Z-14 | | | | | | | 190,00 | 5,33 | 1,680 | 12,50 | 54,48 | 135,53 | 93,06 | 227,628 | 12,36 | 59,97 | 65,74 | 218,398 | 12,22 | 86,5386 | O |
| D-288Z-15 | | | | | | | 279,00 | 7,54 | 1,135 | 18,50 | 77,74 | 201,26 | 227,62 | 228,400 | 11,98 | 85,86 | 97,04 | 219,188 | 11,85 | 122,3476 | Q |
| D-288Z-20 | | 30,00 | 33,00 | 0,50 | 26,20 | 34,20 | 48,30 | 1,47 | 8,732 | 3,50 | 19,13 | 29,18 | 0,00 | 254,760 | 16,65 | 20,45 | 14,15 | 243,190 | 16,48 | 28,9632 | L |
| D-288Z-21 | | | | | | | 72,50 | 2,03 | 5,557 | 5,50 | 26,63 | 45,88 | 0,00 | 254,919 | 15,09 | 28,70 | 22,22 | 243,389 | 14,92 | 39,4953 | L |
| D-288Z-22 | | | | | | | 108,00 | 2,86 | 3,596 | 8,50 | 37,88 | 70,13 | 0,00 | 252,141 | 14,05 | 41,07 | 34,62 | 240,653 | 13,88 | 55,2934 | M |
| D-288Z-23 | | | | | | | 157,00 | 3,95 | 2,445 | 12,50 | 52,88 | 104,13 | 48,57 | 254,586 | 13,49 | 57,57 | 50,53 | 243,106 | 13,31 | 76,3575 | N |
| D-288Z-24 | | | | | | | 229,00 | 5,60 | 1,652 | 18,50 | 75,38 | 153,63 | 179,13 | 253,793 | 13,05 | 82,32 | 74,97 | 242,319 | 12,88 | 107,9538 | O |
| D-288Z-31 | | 25,00 | 28,00 | 0,45 | 21,20 | 29,10 | 40,00 | 1,03 | 15,089 | 3,50 | 18,64 | 21,36 | 0,00 | 322,248 | 20,35 | 19,71 | 9,02 | 306,159 | 20,11 | 24,1360 | L |
| D-288Z-32 | | | | | | | 63,00 | 1,42 | 9,602 | 5,50 | 25,87 | 37,13 | 0,00 | 356,541 | 18,97 | 28,20 | 13,06 | 334,156 | 18,73 | 32,9127 | M |
| D-288Z-33 | | | | | | | 97,00 | 2,00 | 6,213 | 8,50 | 36,71 | 60,29 | 0,00 | 374,616 | 18,03 | 43,50 | 20,29 | 332,405 | 17,79 | 46,0778 | M |
| D-288Z-34 | | | | | | | 142,00 | 2,77 | 4,225 | 12,50 | 51,16 | 90,84 | 73,56 | 383,811 | 17,44 | 63,00 | 29,71 | 333,772 | 17,20 | 63,6313 | N |
| D-288Z-41 | | 24,00 | 27,00 | 0,35 | 20,30 | 28,00 | 37,20 | 0,96 | 17,055 | 3,50 | 18,56 | 18,64 | 0,00 | 317,939 | 21,17 | 19,59 | 8,63 | 300,338 | 20,91 | 23,1706 | L |
| D-288Z-42 | | | | | | | 55,10 | 1,33 | 10,853 | 5,50 | 25,73 | 29,37 | 0,00 | 318,714 | 19,19 | 27,35 | 13,53 | 301,175 | 18,92 | 31,5962 | L |
| D-288Z-43 | | | | | | | 81,80 | 1,87 | 7,023 | 8,50 | 36,50 | 45,30 | 0,00 | 318,139 | 17,90 | 39,00 | 20,95 | 300,569 | 17,63 | 44,2347 | M |
| D-288Z-44 | | | | | | | 117,00 | 2,59 | 4,775 | 12,50 | 50,85 | 66,15 | 0,00 | 315,892 | 17,10 | 54,53 | 30,99 | 298,319 | 16,83 | 61,0860 | M |
| D-288Z-45 | | | | | | | 170,00 | 3,66 | 3,227 | 18,50 | 72,38 | 97,62 | 125,68 | 314,989 | 16,55 | 77,82 | 45,96 | 297,429 | 16,28 | 86,3630 | N |
| D-288Z-30 | | 18,50 | 21,50 | 0,35 | 14,70 | 22,50 | 30,00 | 0,69 | 37,237 | 3,50 | 18,15 | 11,85 | 0,00 | 441,293 | 32,33 | 18,98 | 4,48 | 410,347 | 37,87 | 17,8606 | L |
| D-288ZA | | | | | | | 45,00 | 0,95 | 23,696 | 5,50 | 25,09 | 19,91 | 0,00 | 471,759 | 29,66 | 27,00 | 6,78 | 426,528 | 29,20 | 24,3554 | J |
| D-288Z-50 | | 18,00 | 21,00 | 0,35 | 14,30 | 21,90 | 28,50 | 0,67 | 40,427 | 3,50 | 18,12 | 10,38 | 0,00 | 419,749 | 33,45 | 18,93 | 4,52 | 386,882 | 32,95 | 17,3779 | L |
| D-288Z-51 | | | | | | | 41,40 | 0,93 | 25,726 | 5,50 | 25,04 | 16,36 | 0,00 | 420,852 | 30,16 | 26,31 | 7,09 | 388,205 | 29,67 | 23,6972 | L |
| D-288Z-52 | | | | | | | 60,50 | 1,31 | 16,646 | 8,50 | 35,43 | 25,07 | 0,00 | 417,371 | 27,99 | 37,40 | 11,04 | 384,528 | 27,49 | 33,1760 | M |
| D-288Z-53 | | | | | | | 86,30 | 1,81 | 11,319 | 12,50 | 49,28 | 37,03 | 0,00 | 419,102 | 26,74 | 52,17 | 16,18 | 386,333 | 26,25 | 45,8145 | M |
| D-288Z-54 | | | | | | | 124,00 | 2,56 | 7,648 | 18,50 | 70,05 | 53,95 | 89,36 | 412,647 | 25,76 | 74,33 | 24,27 | 379,890 | 25,26 | 64,7723 | M |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn |
| VD-288X-20 | 3,00 | 45,00 | 48,00 | 0,90 | 40,80 | 50,40 | 88,00 | 4,22 | 2,222 | 3,50 | 21,09 | 66,91 | 0,00 | 148,681 | 13,51 | 23,39 | 25,95 | 143,578 | 13,42 | 43,4448 | P |
| VD-288X-21 | | | | | | | 103,00 | 5,82 | 1,414 | 5,50 | 29,72 | 73,28 | 0,00 | 103,630 | 11,40 | 33,33 | 51,86 | 98,523 | 11,31 | 59,2429 | Q |
| VD-288X-22 | | | | | | | 203,00 | 8,20 | 0,915 | 8,50 | 42,66 | 160,34 | 0,00 | 146,720 | 11,30 | 48,24 | 64,21 | 141,610 | 11,21 | 82,9401 | Q |
| VD-288X-23 | | | | | | | 295,00 | 11,35 | 0,622 | 12,50 | 59,91 | 235,09 | 201,41 | 146,281 | 10,78 | 68,12 | 94,85 | 141,170 | 10,69 | 114,5363 | R |
| VD-289X-24 | | | | | | | 434,00 | 16,07 | 0,420 | 18,50 | 85,78 | 348,22 | 378,26 | 146,398 | 10,42 | 97,92 | 140,34 | 141,295 | 10,33 | 161,9307 | S |
| VD-288Y | | 38,00 | 41,00 | 0,60 | 34,10 | 42,10 | 92,00 | 5,40 | 1,435 | 9,00 | 42,20 | 49,80 | 0,00 | 71,474 | 10,30 | 46,80 | 45,20 | 64,869 | 10,19 | 73,3735 | M |
| VD-288Z | | 37,00 | 40,00 | 0,60 | 33,20 | 41,10 | 100,00 | 5,25 | 1,473 | 9,50 | 43,85 | 56,15 | 0,00 | 82,698 | 10,46 | 48,53 | 51,47 | 75,809 | 10,34 | 74,6900 | M |
| VD-288Z-11 | | 34,00 | 37,00 | 0,60 | 30,10 | 38,50 | 57,40 | 1,98 | 5,152 | 3,50 | 19,57 | 37,83 | 0,00 | 194,890 | 15,28 | 21,11 | 14,19 | 186,971 | 15,14 | 32,8250 | O |
| VD-288Z-12 | | | | | | | 87,10 | 2,73 | 3,279 | 5,50 | 27,33 | 59,77 | 0,00 | 195,968 | 13,85 | 29,75 | 22,11 | 188,030 | 13,71 | 44,7613 | P |
| VD-288Z-13 | | | | | | | 131,00 | 3,85 | 2,121 | 8,50 | 38,96 | 92,04 | 0,00 | 195,254 | 12,91 | 42,69 | 34,37 | 187,347 | 12,77 | 62,6658 | Q |
| VD-288Z-14 | | | | | | | 190,00 | 5,33 | 1,443 | 12,50 | 54,48 | 135,53 | 93,06 | 195,509 | 12,36 | 59,97 | 50,41 | 187,581 | 12,22 | 86,5386 | R |
| VD-288Z-15 | | | | | | | 279,00 | 7,54 | 0,975 | 18,50 | 77,74 | 201,26 | 227,62 | 196,171 | 11,98 | 85,86 | 74,23 | 188,259 | 11,85 | 122,3476 | T |
| VD-288Z-20 | 30,00 | 33,00 | 0,50 | 26,20 | 34,20 | 48,30 | 1,47 | 7,500 | 3,50 | 19,13 | 29,18 | 0,00 | 218,813 | 16,65 | 20,45 | 10,87 | 208,875 | 16,48 | 28,9632 | O | |
| VD-288Z-21 | | | | | | 72,50 | 2,03 | 4,773 | 5,50 | 26,63 | 45,88 | 0,00 | 218,949 | 15,09 | 28,70 | 17,06 | 209,045 | 14,92 | 39,4953 | O | |
| VD-288Z-22 | | | | | | 108,00 | 2,86 | 3,088 | 8,50 | 37,88 | 70,13 | 0,00 | 216,563 | 14,05 | 41,07 | 26,79 | 206,696 | 13,88 | 55,2934 | P | |
| VD-288Z-23 | | | | | | 157,00 | 3,95 | 2,100 | 12,50 | 52,88 | 104,13 | 0,00 | 218,663 | 13,49 | 57,57 | 38,83 | 208,803 | 13,31 | 76,3575 | Q | |
| VD-288Z-24 | | | | | | 229,00 | 5,60 | 1,419 | 18,50 | 75,38 | 153,63 | 179,13 | 217,981 | 13,05 | 82,32 | 57,73 | 208,127 | 12,88 | 107,9538 | R | |
| VD-288Z-31 | 25,00 | 28,00 | 0,45 | 21,20 | 29,10 | 40,00 | 1,03 | 12,960 | 3,50 | 18,64 | 21,36 | 0,00 | 276,777 | 20,35 | 19,71 | 6,56 | 262,958 | 20,11 | 24,1360 | O | |
| VD-288Z-32 | | | | | | 63,00 | 1,42 | 8,247 | 5,50 | 25,87 | 37,13 | 0,00 | 306,232 | 18,97 | 27,65 | 8,35 | 291,541 | 18,73 | 32,9127 | P | |
| VD-288Z-33 | | | | | | 97,00 | 2,00 | 5,336 | 8,50 | 36,71 | 60,29 | 0,00 | 321,756 | 18,03 | 42,40 | 13,01 | 291,371 | 17,79 | 46,0778 | P | |
| VD-288Z-34 | | | | | | 142,00 | 2,77 | 3,629 | 12,50 | 51,16 | 90,84 | 69,40 | 329,654 | 17,44 | 61,70 | 19,12 | 291,393 | 17,20 | 63,6313 | Q | |
| VD-288Z-41 | 24,00 | 27,00 | 0,35 | 20,30 | 28,00 | 37,20 | 0,96 | 14,648 | 3,50 | 18,56 | 18,64 | 0,00 | 273,076 | 21,17 | 19,59 | 6,54 | 257,959 | 20,91 | 23,1706 | O | |
| VD-288Z-42 | | | | | | 55,10 | 1,33 | 9,322 | 5,50 | 25,73 | 29,37 | 0,00 | 273,742 | 19,19 | 27,35 | 10,24 | 258,678 | 18,92 | 31,5962 | O | |
| VD-288Z-43 | | | | | | 81,80 | 1,87 | 6,032 | 8,50 | 36,50 | 45,30 | 0,00 | 273,249 | 17,90 | 39,00 | 15,87 | 258,157 | 17,63 | 44,2347 | P | |
| VD-288Z-44 | | | | | | 117,00 | 2,59 | 4,102 | 12,50 | 50,85 | 66,15 | 0,00 | 271,318 | 17,10 | 54,53 | 23,59 | 256,225 | 16,83 | 61,0860 | P | |
| VD-288Z-45 | | | | | | 170,00 | 3,66 | 2,771 | 18,50 | 72,38 | 97,62 | 125,68 | 270,542 | 16,55 | 77,82 | 35,07 | 255,461 | 16,28 | 86,3630 | Q | |
| VD-288Z-30 | 18,50 | 21,50 | 0,35 | 14,70 | 22,50 | 30,00 | 0,69 | 31,982 | 3,50 | 18,15 | 11,85 | 0,00 | 379,024 | 32,33 | 18,98 | 3,12 | 352,445 | 37,87 | 17,8606 | O | |
| VD-288ZA | | | | | | 45,00 | 0,95 | 20,352 | 5,50 | 25,09 | 19,91 | 0,00 | 405,192 | 29,66 | 26,85 | 4,20 | 369,396 | 29,20 | 24,3554 | M | |
| VD-288Z-50 | 18,00 | 21,00 | 0,35 | 14,30 | 21,90 | 28,50 | 0,67 | 34,722 | 3,50 | 18,12 | 10,38 | 0,00 | 360,521 | 33,45 | 18,93 | 3,38 | 332,292 | 32,95 | 17,3779 | O | |
| VD-288Z-51 | | | | | | 41,40 | 0,93 | 22,096 | 5,50 | 25,04 | 16,36 | 0,00 | 361,468 | 30,16 | 26,31 | 5,28 | 333,428 | 29,67 | 23,6972 | O | |
| VD-288Z-52 | | | | | | 60,50 | 1,31 | 14,297 | 8,50 | 35,43 | 25,07 | 0,00 | 358,478 | 27,99 | 37,40 | 8,29 | 330,270 | 27,49 | 33,1760 | P | |
| VD-288Z-53 | | | | | | 86,30 | 1,81 | 9,722 | 12,50 | 49,28 | 37,03 | 0,00 | 359,965 | 26,74 | 52,17 | 12,10 | 331,819 | 26,25 | 45,8145 | P | |
| VD-288Z-54 | | | | | | 124,00 | 2,56 | 6,569 | 18,50 | 70,05 | 53,95 | 89,36 | 354,421 | 25,76 | 74,33 | 18,37 | 326,286 | 25,26 | 64,7723 | P | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|---------|---------|---------|---------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-288Z-56 | 3,00 | 17,00 | 20,00 | 0,35 | 13,30 | 20,80 | 39,50 | 0,94 | 24,043 | 6,00 | 26,67 | 12,83 | 0,00 | 308,548 | 32,25 | 28,00 | 6,72 | 276,499 | 31,69 | 23,8727 | O | | | | | |
| VD-288Z-57 | | | | | | | 150,00 | 3,19 | 5,770 | 25,00 | 92,11 | 57,89 | 126,55 | 334,034 | 27,42 | 97,67 | 25,58 | 301,965 | 26,86 | 80,5704 | Q | | | | | |
| VD-288ZB | | 16,50 | 19,50 | 0,35 | 12,70 | 20,40 | 40,00 | 0,91 | 26,296 | 6,00 | 26,62 | 13,38 | 0,00 | 351,926 | 34,75 | 27,93 | 5,56 | 317,393 | 34,15 | 23,1706 | M | | | | | |
| VD-288Z-40 | | | | | | | 85,00 | 1,89 | 10,881 | 14,50 | 55,82 | 29,18 | 0,00 | 317,469 | 29,55 | 58,99 | 15,18 | 283,018 | 28,95 | 47,7893 | Q | | | | | |
| VD-288ZC | | 14,50 | 17,50 | 0,30 | 10,80 | 18,30 | 45,00 | 1,02 | 29,060 | 8,00 | 33,24 | 11,76 | 0,00 | 341,719 | 41,34 | 34,86 | 6,57 | 294,671 | 40,52 | 25,4525 | M | | | | | |
| VD-288ZD | | | | | | | 50,00 | 1,13 | 25,831 | 9,00 | 36,65 | 13,35 | 0,00 | 344,948 | 40,58 | 38,47 | 7,33 | 297,835 | 39,75 | 27,9978 | M | | | | | |
| VD-288Z-60 | | 14,00 | 17,00 | 0,30 | 10,40 | 17,80 | 24,00 | 0,54 | 73,797 | 3,50 | 17,89 | 6,11 | 0,00 | 450,681 | 54,02 | 18,59 | 1,93 | 399,244 | 53,12 | 13,5162 | O | | | | | |
| VD-288Z-61 | | | | | | | 34,30 | 0,74 | 46,962 | 5,50 | 24,69 | 9,61 | 0,00 | 451,351 | 48,41 | 25,79 | 3,03 | 399,646 | 47,51 | 18,4311 | O | | | | | |
| VD-288Z-62 | | | | | | | 49,80 | 1,04 | 30,387 | 8,50 | 34,88 | 14,92 | 0,00 | 453,285 | 44,84 | 36,57 | 4,64 | 402,022 | 43,95 | 25,8036 | O | | | | | |
| VD-288Z-63 | | | | | | | 70,40 | 1,45 | 20,663 | 12,50 | 48,48 | 21,93 | 0,00 | 453,042 | 42,68 | 50,97 | 6,84 | 401,487 | 41,78 | 35,6335 | P | | | | | |
| VD-288Z-64 | 101,00 | | | | | | 2,05 | 13,962 | 18,50 | 68,86 | 32,14 | 75,82 | 448,686 | 41,09 | 72,54 | 10,28 | 397,349 | 40,19 | 50,3784 | P | | | | | | |
| VD-288Z-02 | 3,10 | | | | | | 12,40 | 15,50 | 0,40 | 8,50 | 16,50 | 25,00 | 0,48 | 121,094 | 3,50 | 18,90 | 6,10 | 0,00 | 738,672 | 82,21 | 20,75 | 1,15 | 514,648 | 78,80 | 12,7829 | P |
| VD-288Z-03 | | | | | | | | | | | | 32,00 | 0,65 | 80,729 | 5,25 | 24,49 | 7,51 | 0,00 | 606,026 | 70,14 | 25,50 | 1,69 | 524,740 | 68,72 | 16,8501 | P |
| VD-288Z-04 | | | | | | | | | | | | 38,00 | 0,78 | 62,789 | 6,75 | 29,72 | 8,28 | 0,00 | 519,915 | 67,11 | 31,02 | 3,23 | 438,270 | 65,68 | 20,3364 | P |
| VD-288Z-05 | | | | | | | | | | | | 44,00 | 0,90 | 52,979 | 8,00 | 34,08 | 9,92 | 0,00 | 525,801 | 65,85 | 35,61 | 3,29 | 444,490 | 64,42 | 23,2416 | P |
| VD-288Z-06 | | | | | | | | | | | | 51,00 | 1,05 | 43,470 | 9,75 | 40,17 | 10,83 | 0,00 | 470,649 | 62,15 | 42,05 | 4,74 | 389,052 | 60,72 | 27,3088 | Q |
| VD-288Z-07 | | 64,00 | 1,26 | 35,319 | 12,00 | 48,01 | | | | | | 15,99 | 0,00 | 564,652 | 62,53 | 50,32 | 4,33 | 483,164 | 61,10 | 32,5382 | Q | | | | | |
| VD-288Z-08 | | 76,00 | 1,48 | 29,230 | 14,50 | 56,72 | | | | | | 19,28 | 45,70 | 563,434 | 60,32 | 59,51 | 5,42 | 481,995 | 58,27 | 38,3486 | Q | | | | | |
| VD-288Z-09 | | 89,00 | 1,64 | 26,082 | 16,25 | 62,82 | | | | | | 26,18 | 66,53 | 682,781 | 61,40 | 68,90 | 4,72 | 524,243 | 59,98 | 42,4158 | R | | | | | |
| VD-288Z-10 | | 102,00 | 1,93 | 21,735 | 19,50 | 74,15 | | | | | | 27,85 | 83,32 | 605,405 | 58,52 | 77,90 | 6,01 | 523,808 | 58,10 | 49,9694 | R | | | | | |
| VD-289 | | 3,20 | 51,80 | 55,00 | 1,10 | 47,10 | | | | | | 58,40 | 117,00 | 5,43 | 1,886 | 3,50 | 23,12 | 93,88 | 0,00 | 177,057 | 15,02 | 25,88 | 24,55 | 171,856 | 14,93 | 56,9000 |
| VD-289A | 180,00 | | | | | | 7,50 | 1,200 | 5,50 | 32,68 | 147,32 | | 0,00 | 176,817 | 13,57 | 37,02 | 38,69 | 171,606 | 13,48 | 77,5910 | R | | | | | |
| VD-289B | 307,00 | | | | | | 11,58 | 0,695 | 9,50 | 51,79 | 255,21 | | 171,50 | 177,335 | 12,46 | 59,29 | 66,40 | 172,123 | 12,37 | 118,9728 | S | | | | | |
| VD-289C | 497,00 | | | | | | 17,66 | 0,426 | 15,50 | 80,46 | 416,54 | | 432,40 | 177,398 | 11,85 | 92,69 | 108,25 | 172,187 | 11,76 | 181,0456 | T | | | | | |
| VD-289C-06 | 44,80 | | 48,00 | 0,80 | 40,40 | 50,00 | 48,00 | 3,20 | 4,535 | 2,25 | 16,44 | 31,56 | 0,00 | 143,129 | 16,60 | 17,95 | 19,80 | 136,281 | 16,60 | 38,0266 | O | | | | | |
| VD-289C-01 | | | | | | | 76,00 | 3,65 | 2,915 | 3,50 | 22,01 | 53,99 | 0,00 | 157,397 | 15,13 | 24,22 | 26,09 | 150,962 | 15,02 | 49,2108 | P | | | | | |
| VD-289C-02 | | | | | | | 115,00 | 5,03 | 1,855 | 5,50 | 30,93 | 84,07 | 0,00 | 155,966 | 13,60 | 34,40 | 41,39 | 149,536 | 13,49 | 67,1057 | Q | | | | | |
| VD-289C-03 | | | | | | | 176,00 | 7,09 | 1,200 | 8,50 | 44,32 | 131,68 | 0,00 | 158,083 | 12,67 | 49,68 | 63,08 | 151,645 | 12,56 | 93,9480 | Q | | | | | |
| VD-289C-04 | 275,00 | | 10,49 | 0,756 | 13,50 | 66,62 | 208,38 | 170,60 | 157,505 | 11,99 | 75,13 | 100,51 | 151,073 | 11,87 | 138,6851 | S | | | | | | | | | | |
| VD-289D | 40,00 | | 43,20 | 0,60 | 35,80 | 45,30 | 82,00 | 2,67 | 4,096 | 3,50 | 21,35 | 60,66 | 0,00 | 248,443 | 17,10 | 27,50 | 12,76 | 223,232 | 16,96 | 43,9383 | P | | | | | |
| VD-290 | | 125,00 | | | | | 3,69 | 2,607 | 5,50 | 29,89 | 95,12 | 0,00 | 247,922 | 15,53 | 38,50 | 20,05 | 225,466 | 15,40 | 59,9158 | Q | | | | | | |
| VD-291 | | 190,00 | | | | | 5,20 | 1,687 | 8,50 | 42,70 | 147,31 | 0,00 | 248,443 | 14,55 | 57,50 | 30,94 | 223,473 | 14,41 | 83,8821 | R | | | | | | |
| VD-292 | | 275,00 | | | | | 7,20 | 1,147 | 12,50 | 59,78 | 215,23 | 197,70 | 246,837 | 13,92 | 78,50 | 45,51 | 225,362 | 13,79 | 115,8372 | T | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|---------|---------|---------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | |
| D-288Z-56 | 3,00 | 17,00 | 20,00 | 0,35 | 13,30 | 20,80 | 39,50 | 0,94 | 27,993 | 6,00 | 26,67 | 12,83 | 0,00 | 359,238 | 32,25 | 28,00 | 7,96 | 321,923 | 31,69 | 23,8727 | L | | | | | | |
| D-288Z-57 | | | | | | | 150,00 | 3,19 | 6,718 | 25,00 | 92,11 | 57,89 | 126,55 | 388,911 | 27,42 | 97,67 | 31,47 | 351,574 | 26,86 | 80,5704 | M | | | | | | |
| D-288ZB | | 16,50 | 19,50 | 0,35 | 12,70 | 20,40 | 40,00 | 0,91 | 30,616 | 6,00 | 26,62 | 13,38 | 0,00 | 409,743 | 34,75 | 27,93 | 6,94 | 369,536 | 34,15 | 23,1706 | J | | | | | | |
| D-288Z-40 | | | | | | | 85,00 | 1,89 | 12,669 | 14,50 | 55,82 | 29,18 | 0,00 | 369,625 | 29,55 | 58,98 | 17,98 | 329,640 | 28,95 | 47,7893 | M | | | | | | |
| D-288ZC | | 14,50 | 17,50 | 0,30 | 10,80 | 18,30 | 45,00 | 1,02 | 33,834 | 8,00 | 33,24 | 11,76 | 0,00 | 397,859 | 41,34 | 36,86 | 8,14 | 275,412 | 40,52 | 25,4525 | J | | | | | | |
| D-288ZD | | | | | | | 50,00 | 1,13 | 30,075 | 9,00 | 36,65 | 13,35 | 0,00 | 401,618 | 40,58 | 38,47 | 8,54 | 346,765 | 39,75 | 27,9978 | J | | | | | | |
| D-288Z-60 | | 14,00 | 17,00 | 0,30 | 10,40 | 17,80 | 24,00 | 0,54 | 85,921 | 3,50 | 17,89 | 6,11 | 0,00 | 524,721 | 54,02 | 21,06 | 2,94 | 252,608 | 53,12 | 13,5162 | L | | | | | | |
| D-288Z-61 | | | | | | | 34,30 | 0,74 | 54,677 | 5,50 | 24,69 | 9,61 | 0,00 | 525,502 | 48,41 | 25,79 | 4,05 | 465,303 | 47,51 | 18,4311 | L | | | | | | |
| D-288Z-62 | | | | | | | 49,80 | 1,04 | 35,379 | 8,50 | 34,88 | 14,92 | 0,00 | 527,753 | 44,84 | 36,57 | 6,23 | 468,069 | 43,95 | 25,8036 | L | | | | | | |
| D-288Z-63 | | | | | | | 70,40 | 1,45 | 24,058 | 12,50 | 48,48 | 21,93 | 0,00 | 527,470 | 42,68 | 50,97 | 9,16 | 467,446 | 41,78 | 35,6335 | M | | | | | | |
| D-288Z-64 | | | | | | | 101,00 | 2,05 | 16,255 | 18,50 | 68,86 | 32,14 | 75,82 | 522,399 | 41,09 | 72,54 | 13,68 | 462,628 | 40,19 | 50,3784 | M | | | | | | |
| D-288Z-02 | | | | | | | 3,10 | 12,40 | 15,50 | 0,40 | 8,50 | 16,50 | 25,00 | 0,48 | 140,988 | 3,50 | 18,85 | 6,15 | 0,00 | 867,074 | 82,21 | 20,60 | 1,63 | 620,346 | 78,80 | 12,7829 | M |
| D-288Z-03 | | | | | | | | | | | | | 32,00 | 0,65 | 93,992 | 5,25 | 24,49 | 7,51 | 0,00 | 705,587 | 70,14 | 26,28 | 2,78 | 537,633 | 68,72 | 16,8501 | M |
| D-288Z-04 | | | | | | | | | | | | | 38,00 | 0,78 | 73,105 | 6,75 | 29,72 | 8,28 | 0,00 | 605,329 | 67,11 | 31,02 | 3,72 | 510,271 | 65,68 | 20,3364 | M |
| D-288Z-05 | 44,00 | | | | | | | | | | | | 0,90 | 61,682 | 8,00 | 34,08 | 9,92 | 0,00 | 612,183 | 65,85 | 35,61 | 4,36 | 517,513 | 64,42 | 23,2416 | M | |
| D-288Z-06 | 51,00 | | | | | | | | | | | | 1,05 | 50,611 | 9,75 | 40,17 | 10,83 | 0,00 | 547,970 | 62,15 | 42,05 | 5,80 | 452,968 | 60,72 | 27,3088 | N | |
| D-288Z-07 | 64,00 | 1,26 | 41,121 | 12,00 | 48,01 | 15,99 | | | | | | | 13,10 | 657,416 | 62,53 | 50,32 | 6,12 | 562,541 | 61,10 | 32,5382 | N | | | | | | |
| D-288Z-08 | 76,00 | 1,48 | 34,032 | 14,50 | 56,72 | 19,28 | | | | | | | 47,10 | 655,998 | 60,32 | 59,81 | 7,53 | 550,970 | 58,27 | 38,3486 | N | | | | | | |
| D-288Z-09 | 89,00 | 1,64 | 30,367 | 16,25 | 62,82 | 26,18 | | | | | | | 66,53 | 794,952 | 61,40 | 68,70 | 7,61 | 616,442 | 59,98 | 42,4158 | O | | | | | | |
| D-288Z-10 | 102,00 | 1,93 | 25,305 | 19,50 | 74,15 | 27,85 | | | | | | | 83,32 | 704,864 | 58,52 | 77,90 | 9,23 | 609,862 | 58,10 | 49,9694 | O | | | | | | |
| D-289 | 3,20 | 51,80 | 55,00 | 1,10 | 47,10 | 58,40 | | | | | | | 117,00 | 5,43 | 2,196 | 3,50 | 23,12 | 93,88 | 0,00 | 206,145 | 15,02 | 25,88 | 37,07 | 200,089 | 14,93 | 56,9000 | O |
| D-289A | | | | | | | 180,00 | 7,50 | 1,397 | 5,50 | 32,68 | 147,32 | 0,00 | 205,866 | 13,57 | 37,02 | 58,36 | 199,798 | 13,48 | 77,5910 | O | | | | | | |
| D-289B | | | | | | | 307,00 | 11,58 | 0,809 | 9,50 | 51,79 | 255,21 | 177,80 | 206,469 | 12,46 | 59,29 | 100,51 | 200,400 | 12,37 | 118,9728 | P | | | | | | |
| D-289C | | | | | | | 497,00 | 17,66 | 0,496 | 15,50 | 80,46 | 416,54 | 432,40 | 206,542 | 11,85 | 92,69 | 163,88 | 200,475 | 11,76 | 181,0456 | Q | | | | | | |
| D-289C-06 | | 44,80 | 48,00 | 0,80 | 40,40 | 50,00 | 48,00 | 2,70 | 5,280 | 2,25 | 16,44 | 31,56 | 0,00 | 166,643 | 17,00 | 17,90 | 22,20 | 158,934 | 16,93 | 38,0266 | M | | | | | | |
| D-289C-01 | | | | | | | 76,00 | 3,65 | 3,394 | 3,50 | 22,01 | 53,99 | 0,00 | 183,255 | 15,13 | 24,22 | 33,12 | 175,763 | 15,02 | 49,2108 | M | | | | | | |
| D-289C-02 | | | | | | | 115,00 | 5,03 | 2,160 | 5,50 | 30,93 | 84,07 | 0,00 | 181,589 | 13,60 | 34,40 | 52,33 | 174,103 | 13,49 | 67,1057 | N | | | | | | |
| D-289C-03 | | | | | | | 176,00 | 7,09 | 1,398 | 8,50 | 44,32 | 131,68 | 0,00 | 184,054 | 12,67 | 49,68 | 80,21 | 176,558 | 12,56 | 93,9480 | N | | | | | | |
| D-289C-04 | | 275,00 | 10,49 | 0,880 | 13,50 | 66,62 | 208,38 | 170,60 | 183,381 | 11,99 | 75,13 | 127,69 | 175,893 | 11,87 | 138,6851 | P | | | | | | | | | | | |
| D-289D | | 40,00 | 43,20 | 0,60 | 35,80 | 45,30 | 82,00 | 2,67 | 4,769 | 3,50 | 21,35 | 60,66 | 0,00 | 289,258 | 17,10 | 26,70 | 20,79 | 263,721 | 16,96 | 43,9383 | M | | | | | | |
| D-290 | | | | | | | 125,00 | 3,69 | 3,035 | 5,50 | 29,89 | 95,12 | 0,00 | 288,652 | 15,53 | 37,80 | 32,55 | 264,631 | 15,40 | 59,9158 | N | | | | | | |
| D-291 | | | | | | | 190,00 | 5,20 | 1,964 | 8,50 | 42,70 | 147,31 | 0,00 | 289,258 | 14,55 | 56,20 | 50,66 | 262,739 | 14,41 | 83,8821 | N | | | | | | |
| D-292 | | | | | | | 275,00 | 7,20 | 1,335 | 12,50 | 59,78 | 215,23 | 197,70 | 287,389 | 13,92 | 77,50 | 74,26 | 263,721 | 13,79 | 115,8372 | O | | | | | | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|-------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-292A | 3,20 | 40,00 | 43,20 | 0,60 | 35,80 | 45,30 | 275,00 | 10,19 | 0,902 | 18,50 | 85,40 | 189,61 | 197,70 | 171,067 | 11,76 | 95,29 | 151,33 | 162,139 | 11,63 | 163,7699 | P | | | | |
| D-293 | | | | | | | 405,00 | 10,19 | 0,902 | 18,50 | 85,40 | 319,61 | 358,20 | 288,356 | 13,52 | 112,00 | 109,65 | 264,353 | 13,38 | 163,7699 | Q | | | | |
| D-293A | | | | | | | 405,00 | 12,18 | 0,742 | 22,50 | 102,48 | 302,53 | 358,20 | 224,422 | 12,40 | 114,51 | 157,54 | 215,495 | 12,27 | 195,7250 | R | | | | |
| D-294 | 32,00 | 35,20 | 0,60 | 27,80 | 36,90 | 58,50 | 1,54 | 9,314 | 3,50 | 20,40 | 38,10 | 0,00 | 354,874 | 19,64 | 24,00 | 12,97 | 321,343 | 19,45 | 35,1506 | L | | | | | |
| D-295 | | | | | | 88,50 | 2,12 | 5,927 | 5,50 | 28,40 | 60,10 | 0,00 | 356,229 | 17,92 | 34,50 | 20,46 | 320,073 | 17,72 | 47,9326 | M | | | | | |
| D-296 | | | | | | 135,00 | 2,99 | 3,835 | 8,50 | 40,40 | 94,60 | 0,00 | 362,819 | 16,90 | 51,10 | 31,45 | 321,781 | 16,71 | 67,1057 | N | | | | | |
| D-297 | | | | | | 190,00 | 4,14 | 2,608 | 12,50 | 56,40 | 133,60 | 110,50 | 348,429 | 16,01 | 66,50 | 46,20 | 322,088 | 15,82 | 92,6698 | O | | | | | |
| D-297A | | | | | | 190,00 | 5,86 | 1,762 | 18,50 | 80,40 | 109,60 | 110,50 | 193,133 | 13,22 | 87,80 | 98,04 | 180,093 | 13,02 | 131,0159 | P | | | | | |
| D-297B | | | | | | 230,00 | 5,57 | 1,863 | 17,50 | 76,40 | 153,60 | 172,10 | 286,135 | 14,67 | 83,40 | 74,36 | 273,095 | 14,47 | 124,6249 | P | | | | | |
| D-298 | | | | | | 280,00 | 5,86 | 1,762 | 18,50 | 80,40 | 199,60 | 235,40 | 351,728 | 15,60 | 97,00 | 68,30 | 322,476 | 15,40 | 131,0159 | P | | | | | |
| D-298A | | | | | | 280,00 | 7,00 | 1,449 | 22,50 | 96,40 | 183,60 | 235,40 | 266,016 | 14,13 | 105,40 | 100,70 | 252,976 | 13,94 | 156,5800 | Q | | | | | |
| D-298B | | | | | | 29,80 | 33,00 | 0,50 | 25,70 | 34,20 | 43,00 | 1,32 | 11,533 | 3,50 | 20,18 | 22,82 | 0,00 | 263,223 | 19,19 | 21,47 | 14,12 | 248,310 | 18,97 | 32,7340 | L |
| D-298C | | | | | | | | | | | 64,00 | 1,82 | 7,339 | 5,50 | 28,05 | 35,95 | 0,00 | 263,853 | 17,35 | 30,08 | 22,16 | 248,950 | 17,12 | 44,6373 | L |
| D-298D | | | | | | | | | | | 96,00 | 2,57 | 4,749 | 8,50 | 39,86 | 56,14 | 0,00 | 266,616 | 16,20 | 42,99 | 34,03 | 251,743 | 15,98 | 62,4922 | M |
| D-298E | 148,00 | 3,80 | 2,990 | 13,50 | 59,54 | | | | | | 88,46 | 0,00 | 264,505 | 15,34 | 64,51 | 54,30 | 249,643 | 15,12 | 92,2504 | N | | | | | |
| D-299 | 25,00 | 28,20 | 0,35 | 21,00 | 29,30 | 42,50 | 0,97 | 19,533 | 3,50 | 19,75 | 22,75 | 0,00 | 444,477 | 25,61 | 22,30 | 7,67 | 394,576 | 25,30 | 27,4614 | L | | | | | |
| D-299A | | | | | | 50,80 | 1,34 | 12,430 | 5,50 | 27,37 | 23,43 | 0,00 | 291,228 | 21,01 | 29,05 | 15,73 | 270,361 | 20,70 | 37,4474 | M | | | | | |
| D-300 | | | | | | 63,50 | 1,34 | 12,430 | 5,50 | 27,37 | 36,13 | 0,00 | 449,094 | 23,38 | 31,50 | 11,96 | 397,773 | 23,07 | 37,4474 | M | | | | | |
| D-300A | | | | | | 79,40 | 2,07 | 7,197 | 9,50 | 42,62 | 36,78 | 0,00 | 264,666 | 18,84 | 45,53 | 28,54 | 243,747 | 18,53 | 57,4193 | M | | | | | |
| D-301 | | | | | | 94,50 | 1,89 | 8,043 | 8,50 | 38,81 | 55,69 | 0,00 | 447,924 | 21,88 | 45,10 | 18,51 | 397,334 | 21,57 | 52,4263 | M | | | | | |
| D-301A | | | | | | 113,00 | 2,79 | 5,064 | 13,50 | 57,88 | 55,12 | 0,00 | 279,165 | 18,32 | 62,02 | 39,51 | 258,175 | 18,01 | 77,3913 | N | | | | | |
| D-302 | | | | | | 135,00 | 2,61 | 5,469 | 12,50 | 54,06 | 80,94 | 56,15 | 442,679 | 20,91 | 62,70 | 27,35 | 395,436 | 20,60 | 72,3983 | N | | | | | |
| D-302A | | | | | | 135,00 | 3,69 | 3,696 | 18,50 | 76,94 | 58,06 | 56,15 | 214,562 | 16,87 | 82,61 | 52,39 | 193,608 | 16,56 | 102,3562 | O | | | | | |
| D-303 | | | | | | 200,00 | 3,69 | 3,696 | 18,50 | 76,94 | 123,06 | 160,90 | 454,771 | 20,48 | 92,50 | 40,28 | 397,269 | 20,16 | 102,3562 | O | | | | | |
| D-303A | | | | | | 200,00 | 4,42 | 3,039 | 22,50 | 92,19 | 107,81 | 160,90 | 327,580 | 18,34 | 99,09 | 59,97 | 306,619 | 18,02 | 122,3281 | P | | | | | |
| D-303A-10 | | | | | | 24,00 | 27,20 | 0,35 | 20,00 | 28,40 | 32,00 | 0,74 | 30,910 | 2,50 | 16,20 | 15,80 | 0,00 | 488,372 | 30,22 | 18,75 | 5,00 | 409,553 | 29,87 | 21,5697 | L |
| D-303B | | | | | | 20,00 | 23,20 | 0,35 | 16,10 | 24,20 | 28,00 | 0,73 | 38,151 | 3,50 | 19,38 | 8,62 | 0,00 | 329,007 | 32,88 | 20,27 | 6,43 | 294,910 | 32,37 | 21,9691 | L |
| D-304 | | | | | | | | | | | 33,50 | 0,73 | 38,151 | 3,50 | 19,38 | 14,12 | 0,00 | 538,840 | 36,03 | 21,00 | 4,67 | 476,891 | 35,52 | 21,9691 | L |
| D-304A | | | | | | | | | | | 42,00 | 1,01 | 24,278 | 5,50 | 26,79 | 15,21 | 0,00 | 369,240 | 30,09 | 28,19 | 9,49 | 335,281 | 29,58 | 29,9579 | L |
| D-305 | 49,50 | 1,01 | 24,278 | 5,50 | 26,79 | | | | | | 22,71 | 0,00 | 551,326 | 32,82 | 29,90 | 7,36 | 475,851 | 32,31 | 29,9579 | L | | | | | |
| D-305A | 61,00 | 1,42 | 15,709 | 8,50 | 37,91 | | | | | | 23,09 | 0,00 | 362,670 | 27,80 | 40,07 | 14,81 | 328,797 | 27,30 | 41,9411 | M | | | | | |
| D-306 | 74,00 | 1,42 | 15,709 | 8,50 | 37,91 | | | | | | 36,09 | 0,00 | 566,892 | 30,87 | 43,80 | 11,40 | 474,423 | 30,36 | 41,9411 | M | | | | | |
| D-306A | 92,00 | 2,11 | 9,891 | 13,50 | 56,45 | | | | | | 35,55 | 0,00 | 351,616 | 26,12 | 59,88 | 23,94 | 317,702 | 25,61 | 61,9130 | M | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|-------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| VD-292A | 3,20 | 40,00 | 43,20 | 0,60 | 35,80 | 45,30 | 275,00 | 10,19 | 0,775 | 18,50 | 85,40 | 189,61 | 197,70 | 146,929 | 11,76 | 95,29 | 126,89 | 139,261 | 11,63 | 163,7699 | S | | | | |
| VD-293 | | | | | | | 405,00 | 10,19 | 0,775 | 18,50 | 85,40 | 319,61 | 358,20 | 247,668 | 13,52 | 114,00 | 67,67 | 225,501 | 13,38 | 163,7699 | T | | | | |
| VD-293A | | | | | | | 405,00 | 12,18 | 0,637 | 22,50 | 102,48 | 302,53 | 358,20 | 192,755 | 12,40 | 114,51 | 117,93 | 185,087 | 12,27 | 195,7250 | U | | | | |
| VD-294 | 32,00 | 35,20 | 0,60 | 27,80 | 36,90 | 58,50 | 1,54 | 8,000 | 3,50 | 20,40 | 38,10 | 0,00 | 304,800 | 19,64 | 24,20 | 7,96 | 274,400 | 19,45 | 35,1506 | O | | | | | |
| VD-295 | | | | | | 88,50 | 2,12 | 5,091 | 5,50 | 28,40 | 60,10 | 0,00 | 305,964 | 17,92 | 34,80 | 12,53 | 273,382 | 17,72 | 47,9326 | P | | | | | |
| VD-296 | | | | | | 135,00 | 2,99 | 3,294 | 8,50 | 40,40 | 94,60 | 0,00 | 311,624 | 16,90 | 51,90 | 19,35 | 273,741 | 16,71 | 67,1057 | Q | | | | | |
| VD-297 | | | | | | 190,00 | 4,14 | 2,240 | 12,50 | 56,40 | 133,60 | 110,50 | 299,264 | 16,01 | 67,50 | 28,41 | 274,400 | 15,82 | 92,6698 | Q | | | | | |
| VD-297A | | | | | | 190,00 | 5,86 | 1,514 | 18,50 | 80,40 | 109,60 | 110,50 | 165,881 | 13,22 | 87,80 | 84,37 | 154,681 | 13,02 | 131,0159 | S | | | | | |
| VD-297B | | | | | | 230,00 | 5,57 | 1,600 | 17,50 | 76,40 | 153,60 | 172,10 | 245,760 | 14,67 | 83,40 | 54,30 | 234,560 | 14,47 | 124,6249 | S | | | | | |
| VD-298 | | | | | | 280,00 | 5,86 | 1,514 | 18,50 | 80,40 | 199,60 | 235,40 | 302,097 | 15,60 | 98,50 | 37,57 | 274,703 | 15,40 | 131,0159 | S | | | | | |
| VD-298A | | | | | | 280,00 | 7,00 | 1,244 | 22,50 | 96,40 | 183,60 | 235,40 | 228,480 | 14,13 | 105,40 | 76,95 | 217,280 | 13,40 | 156,5800 | T | | | | | |
| VD-298B | | | | | | 29,80 | 33,00 | 0,50 | 25,70 | 34,20 | 43,00 | 1,32 | 9,906 | 3,50 | 20,18 | 22,82 | 0,00 | 226,081 | 19,19 | 21,47 | 11,20 | 213,273 | 18,97 | 32,7340 | O |
| VD-298C | | | | | | | | | | | 64,00 | 1,82 | 6,304 | 5,50 | 28,05 | 35,95 | 0,00 | 226,622 | 17,35 | 30,08 | 17,55 | 213,822 | 17,12 | 44,6373 | O |
| VD-298D | | | | | | | | | | | 96,00 | 2,57 | 4,079 | 8,50 | 39,86 | 56,14 | 0,00 | 228,995 | 16,20 | 42,99 | 26,83 | 216,221 | 15,98 | 62,4922 | P |
| VD-298E | 148,00 | 3,80 | 2,568 | 13,50 | 59,54 | | | | | | 88,46 | 0,00 | 227,182 | 15,34 | 64,51 | 42,97 | 214,417 | 15,12 | 92,2504 | P | | | | | |
| VD-299 | 25,00 | 28,20 | 0,35 | 21,00 | 29,30 | 42,50 | 0,97 | 16,777 | 3,50 | 19,75 | 22,75 | 0,00 | 381,759 | 25,61 | 22,30 | 4,71 | 338,900 | 25,30 | 27,4614 | O | | | | | |
| VD-299A | | | | | | 50,80 | 1,34 | 10,676 | 5,50 | 27,37 | 23,43 | 0,00 | 250,134 | 21,01 | 29,05 | 12,79 | 232,212 | 20,70 | 37,4474 | P | | | | | |
| VD-300 | | | | | | 63,50 | 1,34 | 10,676 | 5,50 | 27,37 | 36,13 | 0,00 | 385,725 | 23,38 | 31,80 | 7,40 | 338,442 | 23,07 | 37,4474 | P | | | | | |
| VD-300A | | | | | | 79,40 | 2,07 | 6,181 | 9,50 | 42,62 | 36,78 | 0,00 | 227,320 | 18,84 | 45,53 | 23,99 | 209,353 | 18,53 | 57,4193 | P | | | | | |
| VD-301 | | | | | | 94,50 | 1,89 | 6,908 | 8,50 | 38,81 | 55,69 | 0,00 | 384,720 | 21,88 | 45,45 | 11,39 | 338,850 | 21,57 | 52,4263 | P | | | | | |
| VD-301A | | | | | | 113,00 | 2,79 | 4,350 | 13,50 | 57,88 | 55,12 | 0,00 | 239,774 | 18,32 | 62,02 | 32,63 | 221,745 | 18,01 | 77,3913 | Q | | | | | |
| VD-302 | | | | | | 135,00 | 2,61 | 4,698 | 12,50 | 54,06 | 80,94 | 48,10 | 380,215 | 20,91 | 62,85 | 16,71 | 338,933 | 20,60 | 72,3983 | Q | | | | | |
| VD-302A | | | | | | 135,00 | 3,69 | 3,174 | 18,50 | 76,94 | 58,06 | 48,10 | 184,287 | 16,87 | 82,61 | 48,27 | 166,289 | 16,56 | 102,3562 | R | | | | | |
| VD-303 | | | | | | 200,00 | 3,69 | 3,174 | 18,50 | 76,94 | 123,06 | 160,90 | 390,601 | 20,48 | 93,50 | 24,76 | 338,038 | 20,16 | 102,3562 | R | | | | | |
| VD-303A | | | | | | 200,00 | 4,42 | 2,610 | 22,50 | 92,19 | 107,81 | 160,90 | 281,357 | 18,34 | 99,09 | 46,23 | 263,354 | 18,02 | 122,3281 | S | | | | | |
| VD-303A-10 | | | | | | 24,00 | 27,20 | 0,35 | 20,00 | 28,40 | 32,00 | 0,74 | 26,548 | 2,50 | 16,25 | 15,75 | 0,00 | 418,133 | 30,22 | 18,80 | 3,10 | 350,436 | 29,87 | 21,5697 | O |
| VD-303B | | | | | | 20,00 | 23,20 | 0,35 | 16,10 | 24,20 | 28,00 | 0,73 | 32,768 | 3,50 | 19,38 | 8,62 | 0,00 | 282,583 | 32,88 | 20,27 | 5,39 | 253,297 | 32,37 | 21,9691 | O |
| VD-304 | | | | | | | | | | | 33,50 | 0,73 | 32,768 | 3,50 | 19,38 | 14,12 | 0,00 | 462,807 | 36,03 | 21,27 | 2,92 | 400,753 | 35,52 | 21,9691 | O |
| VD-304A | | | | | | | | | | | 42,00 | 1,01 | 20,852 | 5,50 | 26,79 | 15,21 | 0,00 | 317,138 | 30,09 | 28,19 | 7,62 | 287,971 | 29,58 | 29,9579 | O |
| VD-305 | 49,50 | 1,01 | 20,852 | 5,50 | 26,79 | | | | | | 22,71 | 0,00 | 473,531 | 32,82 | 30,00 | 4,55 | 406,621 | 32,31 | 29,9579 | O | | | | | |
| VD-305A | 61,00 | 1,42 | 13,493 | 8,50 | 37,91 | | | | | | 23,09 | 0,00 | 311,496 | 27,80 | 40,07 | 11,98 | 282,402 | 27,30 | 41,9411 | P | | | | | |
| VD-306 | 74,00 | 1,42 | 13,493 | 8,50 | 37,91 | | | | | | 36,09 | 0,00 | 486,901 | 30,87 | 43,90 | 7,01 | 406,130 | 30,36 | 41,9411 | P | | | | | |
| VD-306A | 92,00 | 2,11 | 8,495 | 13,50 | 56,45 | | | | | | 35,55 | 0,00 | 302,001 | 26,12 | 59,88 | 19,60 | 272,872 | 25,61 | 61,9130 | P | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|---------|---------|---------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn | | | | | |
| VD-307 | 3,20 | 20,00 | 23,20 | 0,35 | 16,10 | 24,20 | 105,00 | 1,97 | 9,175 | 12,50 | 52,74 | 52,26 | 0,00 | 479,453 | 29,43 | 60,90 | 10,32 | 404,619 | 28,92 | 57,9186 | P | | | | | |
| VD-307A | | | | | | | 105,00 | 2,79 | 6,199 | 18,50 | 74,99 | 30,01 | 0,00 | 186,050 | 23,39 | 79,69 | 25,30 | 156,906 | 22,88 | 81,8849 | Q | | | | | |
| VD-308 | | | | | | | 155,00 | 2,79 | 6,199 | 18,50 | 74,99 | 80,01 | 122,40 | 496,018 | 28,80 | 89,50 | 15,22 | 406,058 | 28,29 | 81,8849 | Q | | | | | |
| VD-308A | | | | | | | 155,00 | 3,34 | 5,097 | 22,50 | 89,82 | 65,18 | 122,40 | 332,245 | 25,60 | 95,53 | 29,64 | 303,133 | 25,09 | 97,8625 | T | | | | | |
| VD-308A-01 | | | | | | | 18,80 | 22,00 | 0,35 | 14,80 | 22,90 | 56,00 | 1,21 | 18,411 | 7,50 | 34,04 | 21,96 | 0,00 | 404,254 | 32,97 | 35,86 | 7,15 | 370,794 | 32,38 | 35,6699 | Q |
| VD-308A-02 | | | | | | | | | | | | 70,00 | 1,47 | 14,535 | 9,50 | 41,41 | 28,59 | 0,00 | 415,495 | 32,07 | 43,72 | 8,66 | 381,976 | 31,49 | 43,1793 | R |
| VD-308A-03 | | | | | | | | | | | | 82,00 | 1,72 | 12,007 | 11,50 | 48,79 | 33,21 | 0,00 | 398,811 | 31,06 | 51,59 | 11,21 | 365,135 | 30,47 | 50,6888 | R |
| VD-308A-04 | | | | | | | | | | | | 95,00 | 1,98 | 10,228 | 13,50 | 56,16 | 38,84 | 0,00 | 397,299 | 30,52 | 59,44 | 13,23 | 363,716 | 29,93 | 58,1982 | R |
| VD-308A-05 | | | | | | | | | | | | 113,00 | 2,37 | 8,369 | 16,50 | 67,21 | 45,79 | 67,42 | 383,166 | 29,74 | 71,22 | 17,02 | 349,638 | 29,15 | 69,4624 | S |
| VD-308B | 18,00 | 21,20 | 0,35 | 14,00 | 22,30 | 120,00 | 1,78 | 12,586 | 12,50 | 75,95 | 44,05 | 83,56 | 554,404 | 34,78 | 85,00 | 8,19 | 440,503 | 34,71 | 52,1268 | R | | | | | | |
| VD-309 | 16,00 | 19,20 | 0,30 | 12,10 | 20,10 | 27,50 | 0,60 | 64,000 | 3,50 | 19,14 | 8,36 | 0,00 | 535,040 | 53,70 | 20,00 | 1,79 | 480,000 | 52,84 | 17,5753 | O | | | | | | |
| VD-310 | | | | | | 40,00 | 0,82 | 40,727 | 5,50 | 26,42 | 13,58 | 0,00 | 553,076 | 48,62 | 28,20 | 2,76 | 480,582 | 47,76 | 23,9663 | O | | | | | | |
| VD-310A | | | | | | 54,00 | 1,27 | 23,579 | 9,50 | 40,98 | 13,02 | 0,00 | 306,998 | 40,18 | 43,07 | 9,81 | 257,718 | 39,32 | 36,7484 | O | | | | | | |
| VD-311 | | | | | | 59,00 | 1,16 | 26,353 | 8,50 | 37,34 | 21,66 | 0,00 | 570,805 | 45,47 | 40,75 | 4,26 | 480,941 | 44,61 | 33,5529 | O | | | | | | |
| VD-312 | | | | | | 83,50 | 1,60 | 17,920 | 12,50 | 51,90 | 31,60 | 0,00 | 566,272 | 43,31 | 56,80 | 6,26 | 478,464 | 42,45 | 46,3349 | P | | | | | | |
| VD-313 | | | | | | 120,00 | 2,27 | 12,108 | 18,50 | 73,74 | 46,26 | 92,75 | 560,121 | 41,75 | 80,20 | 9,26 | 481,903 | 40,89 | 65,5079 | R | | | | | | |
| VD-313A | | | | | | 120,00 | 2,71 | 9,956 | 22,50 | 88,30 | 31,70 | 92,75 | 315,591 | 36,94 | 93,25 | 22,76 | 266,311 | 36,08 | 78,2900 | R | | | | | | |
| VD-313A-30 | | | | | | 15,40 | 18,60 | 0,30 | 11,50 | 19,40 | 65,00 | 1,34 | 23,925 | 10,50 | 44,53 | 20,47 | 0,00 | 489,815 | 45,76 | 46,80 | 6,29 | 435,440 | 44,81 | 38,4460 | P | |
| VD-313AA | | | | | | 13,80 | 17,00 | 0,30 | 9,90 | 17,80 | 22,00 | 0,53 | 99,748 | 3,50 | 19,03 | 2,97 | 0,00 | 296,007 | 66,32 | 19,74 | 2,26 | 225,430 | 65,09 | 15,1587 | O | |
| VD-313AB | | | | | | | | | | | 32,00 | 0,73 | 63,476 | 5,50 | 26,25 | 5,75 | 0,00 | 364,924 | 60,08 | 27,38 | 3,99 | 293,258 | 58,83 | 20,6710 | O | |
| VD-313AC | | | | | | | | | | | 46,00 | 1,02 | 41,073 | 8,50 | 37,08 | 8,92 | 0,00 | 366,417 | 55,33 | 38,82 | 6,14 | 294,901 | 54,08 | 28,9393 | O | |
| VD-313AD | | | | | | | | | | | 70,00 | 1,51 | 25,861 | 13,50 | 55,13 | 14,87 | 0,00 | 384,672 | 52,32 | 57,90 | 9,40 | 312,912 | 51,08 | 42,7200 | P | |
| VD-313A-02 | 3,30 | 16,20 | 19,50 | 0,35 | 12,10 | 20,30 | 25,00 | 0,60 | 69,735 | 3,50 | 19,72 | 5,28 | 0,00 | 368,025 | 55,06 | 20,51 | 3,22 | 313,110 | 54,09 | 18,9246 | P | | | | | |
| VD-313A-03 | | | | | | | 32,00 | 0,68 | 57,429 | 4,25 | 22,53 | 9,47 | 0,00 | 543,593 | 54,46 | 23,49 | 2,46 | 488,719 | 53,49 | 21,5052 | P | | | | | |
| VD-313A-04 | | | | | | | 38,00 | 0,83 | 44,377 | 5,50 | 27,22 | 10,78 | 0,00 | 478,333 | 51,06 | 28,46 | 3,74 | 423,355 | 50,10 | 25,8062 | P | | | | | |
| VD-313A-05 | | | | | | | 44,00 | 0,97 | 36,159 | 6,75 | 31,91 | 12,09 | 0,00 | 437,244 | 49,41 | 33,42 | 5,15 | 382,561 | 48,45 | 30,1073 | P | | | | | |
| VD-313A-06 | | | | | | | 51,00 | 1,11 | 30,509 | 8,00 | 36,59 | 14,41 | 0,00 | 439,503 | 47,91 | 38,39 | 6,10 | 384,719 | 46,95 | 34,4083 | Q | | | | | |
| VD-313A-07 | | | | | | | 64,00 | 1,30 | 25,033 | 9,75 | 43,16 | 20,84 | 0,00 | 521,800 | 47,48 | 45,35 | 5,70 | 466,867 | 46,52 | 40,4297 | Q | | | | | |
| VD-313A-08 | | | | | | | 76,00 | 1,53 | 20,772 | 11,75 | 50,65 | 25,35 | 0,00 | 526,487 | 46,44 | 53,29 | 6,75 | 471,735 | 45,78 | 47,3114 | R | | | | | |
| VD-313A-09 | | | | | | | 89,00 | 1,72 | 18,079 | 13,50 | 57,22 | 31,78 | 36,90 | 574,647 | 46,31 | 60,26 | 3,35 | 519,603 | 45,35 | 53,3328 | R | | | | | |
| VD-313A-10 | | | | | | | 102,00 | 1,95 | 15,747 | 15,50 | 64,71 | 37,29 | 65,90 | 587,128 | 45,94 | 69,05 | 7,21 | 518,851 | 44,98 | 60,2145 | R | | | | | |
| VD-313A-11 | | | | | | | 115,00 | 2,11 | 14,357 | 17,00 | 70,34 | 44,66 | 85,18 | 641,222 | 46,95 | 78,85 | 7,91 | 519,013 | 45,99 | 65,3758 | S | | | | | |
| VD-313A-12 | | | | | | | 127,00 | 2,34 | 12,846 | 19,00 | 77,84 | 49,16 | 101,00 | 631,550 | 46,35 | 86,90 | 8,82 | 515,121 | 45,40 | 72,2574 | S | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|---------|---------|---------|---|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-307 | 3,20 | 20,00 | 23,20 | 0,35 | 16,10 | 24,20 | 105,00 | 1,97 | 10,682 | 12,50 | 52,74 | 52,26 | 34,40 | 558,220 | 29,43 | 60,30 | 16,66 | 477,502 | 28,92 | 57,9186 | M | | | | | |
| D-307A | | | | | | | 105,00 | 2,79 | 7,218 | 18,50 | 74,99 | 30,01 | 34,40 | 216,616 | 23,39 | 79,69 | 25,31 | 182,683 | 22,88 | 81,8849 | N | | | | | |
| D-308 | | | | | | | 155,00 | 2,79 | 7,218 | 18,50 | 74,99 | 80,01 | 122,40 | 577,506 | 28,80 | 89,00 | 24,72 | 476,376 | 28,29 | 81,8849 | N | | | | | |
| D-308A | | | | | | | 155,00 | 3,34 | 5,935 | 22,50 | 89,82 | 65,18 | 122,40 | 386,828 | 25,60 | 95,53 | 37,75 | 352,934 | 25,09 | 97,8625 | O | | | | | |
| D-308A-01 | | | | | | | 18,80 | 22,00 | 0,35 | 14,80 | 22,90 | 56,00 | 1,21 | 21,435 | 7,50 | 34,04 | 21,96 | 0,00 | 470,668 | 32,97 | 35,86 | 9,91 | 431,710 | 32,38 | 35,6699 | N |
| D-308A-02 | | | | | | | | | | | | 70,00 | 1,47 | 16,923 | 9,50 | 41,41 | 28,59 | 0,00 | 483,755 | 32,07 | 43,72 | 12,27 | 444,729 | 31,49 | 43,1793 | O |
| D-308A-03 | | | | | | | | | | | | 82,00 | 1,72 | 13,980 | 11,50 | 48,79 | 33,21 | 0,00 | 464,330 | 31,06 | 51,59 | 15,37 | 425,121 | 30,47 | 50,6888 | O |
| D-308A-04 | | | | | | | | | | | | 95,00 | 1,98 | 11,909 | 13,50 | 56,16 | 38,84 | 0,00 | 462,570 | 30,52 | 59,44 | 18,09 | 423,469 | 29,93 | 58,1982 | O |
| D-308A-05 | | | | | | | | | | | | 113,00 | 2,37 | 9,743 | 16,50 | 67,21 | 45,79 | 67,42 | 446,114 | 29,74 | 71,22 | 22,73 | 407,079 | 29,15 | 69,4624 | P |
| D-308B | | | | | | | 18,00 | 21,20 | 0,35 | 14,00 | 22,30 | 120,00 | 1,78 | 14,653 | 12,50 | 76,50 | 43,50 | 83,56 | 637,425 | 34,78 | 84,90 | 13,28 | 514,336 | 34,71 | 52,1268 | O |
| D-309 | 16,00 | 19,20 | 0,30 | 12,10 | 20,10 | 27,50 | 0,60 | 74,514 | 3,50 | 19,14 | 8,36 | 0,00 | 622,939 | 53,70 | 19,91 | 2,83 | 565,563 | 52,84 | 17,5753 | L | | | | | | |
| D-310 | | | | | | 40,00 | 0,82 | 47,418 | 5,50 | 26,42 | 13,58 | 0,00 | 643,939 | 48,62 | 28,20 | 4,50 | 559,535 | 47,76 | 23,9663 | L | | | | | | |
| D-310A | | | | | | 54,00 | 1,27 | 27,453 | 9,50 | 40,98 | 13,02 | 0,00 | 357,433 | 40,18 | 43,07 | 10,90 | 300,057 | 39,32 | 36,7484 | L | | | | | | |
| D-311 | | | | | | 59,00 | 1,16 | 30,682 | 8,50 | 37,34 | 21,66 | 0,00 | 664,580 | 45,47 | 40,80 | 6,97 | 558,419 | 44,61 | 33,5529 | L | | | | | | |
| D-312 | | | | | | 83,50 | 1,60 | 20,864 | 12,50 | 51,90 | 31,60 | 24,99 | 659,302 | 43,31 | 56,50 | 10,16 | 563,328 | 42,45 | 46,3349 | M | | | | | | |
| D-313 | | | | | | 120,00 | 2,27 | 14,097 | 18,50 | 73,74 | 46,26 | 92,75 | 652,141 | 41,75 | 79,90 | 14,99 | 565,302 | 40,89 | 65,5079 | N | | | | | | |
| D-313A | | | | | | 120,00 | 2,71 | 11,591 | 22,50 | 88,30 | 31,70 | 92,75 | 367,438 | 36,94 | 93,25 | 26,33 | 310,062 | 36,08 | 78,2900 | O | | | | | | |
| D-313A-30 | | | | | | 15,40 | 18,60 | 0,30 | 11,50 | 19,40 | 65,00 | 1,34 | 27,856 | 10,50 | 44,53 | 20,47 | 0,00 | 570,285 | 45,76 | 46,80 | 8,78 | 506,976 | 44,81 | 38,4460 | M | |
| D-313AA | | | | | | 13,80 | 17,00 | 0,30 | 9,90 | 17,80 | 22,00 | 0,53 | 116,135 | 3,50 | 19,03 | 2,97 | 0,00 | 344,637 | 66,32 | 19,74 | 2,26 | 262,465 | 65,09 | 15,1587 | L | |
| D-313AB | | | | | | | | | | | 32,00 | 0,73 | 73,904 | 5,50 | 26,25 | 5,75 | 0,00 | 424,875 | 60,08 | 27,38 | 4,60 | 341,436 | 58,83 | 20,6710 | L | |
| D-313AC | 46,00 | 1,02 | 47,820 | 8,50 | 37,08 | | | | | | 8,92 | 0,00 | 426,614 | 55,33 | 38,82 | 7,10 | 343,349 | 54,08 | 28,9393 | L | | | | | | |
| D-313AD | 70,00 | 1,51 | 30,109 | 13,50 | 55,13 | | | | | | 14,87 | 0,00 | 447,868 | 52,32 | 57,90 | 11,00 | 364,319 | 51,08 | 42,7200 | M | | | | | | |
| D-313A-02 | 3,30 | 16,20 | 19,50 | 0,35 | 12,10 | 20,30 | 25,00 | 0,60 | 81,191 | 3,50 | 19,72 | 5,28 | 0,00 | 428,486 | 55,06 | 20,51 | 3,88 | 364,550 | 54,09 | 18,9246 | M | | | | | |
| D-313A-03 | | | | | | | 32,00 | 0,68 | 66,864 | 4,25 | 22,53 | 9,47 | 0,00 | 632,898 | 54,46 | 24,32 | 3,86 | 513,512 | 53,49 | 21,5052 | M | | | | | |
| D-313A-04 | | | | | | | 38,00 | 0,83 | 51,667 | 5,50 | 27,22 | 10,78 | 0,00 | 556,917 | 51,06 | 28,46 | 5,14 | 492,906 | 50,10 | 25,8062 | M | | | | | |
| D-313A-05 | | | | | | | 44,00 | 0,97 | 42,099 | 6,75 | 31,91 | 12,09 | 0,00 | 509,076 | 49,41 | 33,42 | 6,75 | 445,410 | 48,45 | 30,1073 | M | | | | | |
| D-313A-06 | | | | | | | 51,00 | 1,11 | 35,521 | 8,00 | 36,59 | 14,41 | 0,00 | 511,708 | 47,91 | 38,39 | 7,97 | 447,923 | 46,95 | 34,4083 | N | | | | | |
| D-313A-07 | | | | | | | 64,00 | 1,30 | 29,146 | 9,75 | 43,16 | 20,84 | 0,00 | 607,524 | 47,48 | 45,35 | 8,45 | 543,566 | 46,52 | 40,4297 | N | | | | | |
| D-313A-08 | | | | | | | 76,00 | 1,53 | 24,185 | 11,75 | 50,65 | 25,35 | 0,00 | 612,981 | 46,44 | 53,29 | 10,09 | 549,234 | 45,78 | 47,3114 | O | | | | | |
| D-313A-09 | | | | | | | 89,00 | 1,72 | 21,050 | 13,50 | 57,22 | 31,78 | 40,75 | 669,054 | 46,31 | 60,50 | 10,66 | 599,915 | 45,35 | 53,3328 | O | | | | | |
| D-313A-10 | | | | | | | 102,00 | 1,95 | 18,334 | 15,50 | 64,71 | 37,29 | 65,90 | 683,585 | 45,94 | 69,50 | 12,32 | 595,840 | 44,98 | 60,2145 | O | | | | | |
| D-313A-11 | | | | | | | 115,00 | 2,11 | 16,716 | 17,00 | 70,34 | 44,66 | 85,18 | 746,566 | 46,95 | 79,00 | 13,38 | 601,772 | 45,99 | 65,3758 | P | | | | | |
| D-313A-12 | | | | | | | 127,00 | 2,34 | 14,956 | 19,00 | 77,84 | 49,16 | 101,00 | 735,305 | 46,35 | 87,00 | 15,05 | 598,253 | 45,40 | 72,2574 | P | | | | | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Ldyn minimum length dynamic | shdyn maximum stroke dynamic | Fdyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-313A-13 | 3,30 | 16,20 | 19,50 | 0,35 | 12,10 | 20,30 | 152,00 | 2,76 | 12,491 | 22,75 | 91,90 | 60,10 | 131,20 | 750,754 | 45,83 | 104,00 | 17,97 | 599,568 | 44,88 | 85,1605 | P |
| D-313B | 3,60 | 56,40 | 60,00 | 1,10 | 51,30 | 63,30 | 122,00 | 5,40 | 2,725 | 3,50 | 25,70 | 96,30 | 0,00 | 262,424 | 18,65 | 28,65 | 38,24 | 254,382 | 18,53 | 78,4092 | AC |
| D-313C | | | | | | | 188,00 | 7,45 | 1,734 | 5,50 | 36,27 | 151,73 | 0,00 | 263,118 | 16,87 | 40,91 | 59,94 | 255,071 | 16,75 | 106,9216 | AC |
| D-313D | | | | | | | 319,00 | 11,51 | 1,004 | 9,50 | 57,41 | 261,59 | 163,00 | 262,625 | 15,49 | 65,42 | 103,70 | 254,584 | 15,37 | 163,9465 | AD |
| D-313E | | | | | | | 516,00 | 17,55 | 0,615 | 15,50 | 89,12 | 426,88 | 441,50 | 262,670 | 14,74 | 102,18 | 169,26 | 254,636 | 14,62 | 249,4838 | AF |
| D-313E-10 | 44,40 | 48,00 | 0,80 | 39,70 | 49,80 | 80,00 | 3,07 | 4,887 | 4,00 | 26,33 | 53,67 | 0,00 | 262,323 | 19,07 | 28,69 | 31,56 | 250,767 | 18,90 | 67,3379 | AA | |
| D-313E-11 | | | | | | 120,00 | 4,13 | 3,258 | 6,00 | 35,89 | 84,11 | 0,00 | 274,052 | 17,66 | 39,43 | 45,98 | 262,513 | 17,49 | 89,7838 | AB | |
| D-313E-12 | | | | | | 160,00 | 5,18 | 2,444 | 8,00 | 45,45 | 114,55 | 0,00 | 279,917 | 16,93 | 50,18 | 60,39 | 268,361 | 16,76 | 112,2298 | AC | |
| D-313E-13 | | | | | | 200,00 | 6,23 | 1,955 | 10,00 | 55,01 | 144,99 | 0,00 | 283,436 | 16,49 | 60,92 | 74,80 | 271,890 | 16,32 | 134,6758 | AD | |
| D-313E-14 | 36,40 | 40,00 | 0,60 | 31,80 | 41,60 | 280,00 | 8,32 | 1,396 | 14,00 | 74,14 | 205,86 | 181,45 | 287,457 | 15,97 | 82,41 | 103,66 | 275,909 | 15,80 | 179,5677 | AE | |
| D-313F | | | | | | 61,70 | 1,71 | 10,137 | 3,50 | 22,99 | 38,71 | 0,00 | 392,377 | 23,23 | 24,59 | 15,25 | 376,181 | 22,99 | 50,6045 | AA | |
| D-313G | | | | | | 92,80 | 2,36 | 6,451 | 5,50 | 32,02 | 60,78 | 0,00 | 392,101 | 21,12 | 34,53 | 23,99 | 375,886 | 20,87 | 69,0062 | AB | |
| D-313H | | | | | | 155,00 | 3,65 | 3,735 | 9,50 | 50,06 | 104,94 | 0,00 | 391,897 | 19,49 | 54,39 | 41,44 | 375,743 | 19,25 | 105,8094 | AB | |
| D-313J | 30,40 | 34,00 | 0,50 | 25,90 | 35,20 | 248,00 | 5,56 | 2,289 | 15,50 | 77,14 | 170,86 | 176,70 | 391,102 | 18,60 | 84,21 | 67,76 | 374,912 | 18,35 | 161,0144 | AD | |
| D-313JA | | | | | | 145,00 | 3,21 | 4,872 | 12,50 | 61,51 | 83,49 | 0,00 | 406,784 | 21,77 | 66,17 | 41,34 | 384,095 | 21,43 | 111,4209 | AB | |
| D-313J-01 | | | | | | 33,30 | 1,05 | 22,271 | 3,50 | 22,20 | 11,10 | 0,00 | 247,131 | 27,01 | 23,40 | 9,90 | 220,481 | 26,61 | 38,9266 | AA | |
| D-313J-02 | | | | | | 53,90 | 1,44 | 14,172 | 5,50 | 30,78 | 23,12 | 0,00 | 327,711 | 25,38 | 32,67 | 18,18 | 300,878 | 24,98 | 53,0817 | AA | |
| D-313J-03 | 28,00 | 31,60 | 0,40 | 23,60 | 32,60 | 62,70 | 1,64 | 11,992 | 6,50 | 35,06 | 27,64 | 0,00 | 331,418 | 24,65 | 37,29 | 21,38 | 304,716 | 24,25 | 60,1592 | AB | |
| D-313J-04 | | | | | | 72,20 | 1,84 | 10,393 | 7,50 | 39,35 | 32,85 | 0,00 | 341,411 | 24,22 | 41,93 | 24,31 | 314,597 | 23,02 | 67,2368 | AB | |
| D-313J-05 | | | | | | 92,00 | 2,03 | 9,170 | 8,50 | 43,64 | 48,36 | 0,00 | 443,507 | 25,30 | 46,56 | 23,32 | 416,699 | 24,90 | 74,3143 | AB | |
| D-313J-06 | | | | | | 109,00 | 2,25 | 9,523 | 11,50 | 55,73 | 53,27 | 0,00 | 507,228 | 28,99 | 59,30 | 24,02 | 473,278 | 28,48 | 85,3098 | AB | |
| D-313J-07 | 25,00 | 28,60 | 0,35 | 20,60 | 29,60 | 38,90 | 0,90 | 31,289 | 3,50 | 21,97 | 16,93 | 0,00 | 529,675 | 36,00 | 23,06 | 7,04 | 495,615 | 35,49 | 34,7558 | AA | |
| D-313J-08 | | | | | | 56,00 | 1,24 | 19,911 | 5,50 | 30,41 | 25,59 | 0,00 | 509,479 | 32,28 | 32,12 | 11,45 | 475,477 | 31,77 | 47,3943 | AA | |
| D-313J-09 | | | | | | 74,60 | 1,57 | 14,601 | 7,50 | 38,85 | 35,75 | 0,00 | 521,957 | 30,82 | 41,18 | 15,29 | 487,981 | 30,31 | 60,0328 | AB | |
| D-313J-10 | | | | | | 91,30 | 1,91 | 11,527 | 9,50 | 47,29 | 44,01 | 0,00 | 507,278 | 29,63 | 50,24 | 19,84 | 473,318 | 29,12 | 72,6713 | AB | |
| D-313K | 21,40 | 25,00 | 0,35 | 17,00 | 26,00 | 109,00 | 2,25 | 9,523 | 11,50 | 55,73 | 53,27 | 0,00 | 507,228 | 28,99 | 59,30 | 24,02 | 473,278 | 28,48 | 85,3098 | AB | |
| D-313K-01 | | | | | | 33,30 | 0,76 | 49,885 | 3,50 | 21,73 | 11,57 | 0,00 | 577,274 | 46,37 | 22,70 | 5,24 | 528,779 | 45,65 | 29,7510 | AA | |
| D-313L | | | | | | 43,00 | 0,97 | 34,919 | 5,00 | 27,95 | 15,05 | 0,00 | 525,394 | 42,77 | 29,33 | 8,05 | 477,348 | 42,05 | 37,8649 | AA | |
| D-313L-02 | | | | | | 48,20 | 1,04 | 31,745 | 5,50 | 30,03 | 18,17 | 0,00 | 576,821 | 41,78 | 31,55 | 8,24 | 528,552 | 41,05 | 40,5696 | AA | |
| D-313L-01 | 21,40 | 25,00 | 0,35 | 17,00 | 26,00 | 57,00 | 1,26 | 24,942 | 7,00 | 36,26 | 20,74 | 0,00 | 517,412 | 39,78 | 38,18 | 11,39 | 469,416 | 39,06 | 48,6835 | AA | |
| D-313L-01 | | | | | | 63,50 | 1,47 | 20,541 | 8,50 | 42,48 | 21,02 | 0,00 | 431,728 | 36,66 | 44,82 | 15,41 | 383,702 | 35,94 | 56,7974 | AA | |
| D-313L-03 | | | | | | 72,00 | 1,54 | 19,400 | 9,00 | 44,56 | 27,44 | 0,00 | 532,378 | 38,38 | 47,04 | 14,35 | 484,215 | 37,66 | 59,5020 | AA | |
| D-313M | | | | | | 78,00 | 1,61 | 18,379 | 9,50 | 46,63 | 31,37 | 0,00 | 576,486 | 38,25 | 49,25 | 14,23 | 528,385 | 37,53 | 62,2067 | AA | |
| D-313M-02 | 21,40 | 25,00 | 0,35 | 17,00 | 26,00 | 86,00 | 1,82 | 15,872 | 11,00 | 52,86 | 33,14 | 0,00 | 526,029 | 37,25 | 55,89 | 17,69 | 477,919 | 36,53 | 70,3206 | AB | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|---------|---------|----------|----------|-------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn | | | | | |
| VD-313A-13 | 3,30 | 16,20 | 19,50 | 0,35 | 12,10 | 20,30 | 152,00 | 2,76 | 10,728 | 22,75 | 91,90 | 60,10 | 131,20 | 644,819 | 45,83 | 103,80 | 10,66 | 517,112 | 44,88 | 85,1605 | S | | | | | |
| VD-313B | 3,60 | 56,40 | 60,00 | 1,10 | 51,30 | 63,30 | 122,00 | 5,40 | 2,341 | 3,50 | 25,70 | 96,30 | 0,00 | 225,395 | 18,65 | 28,65 | 22,93 | 218,488 | 18,53 | 78,4092 | AF | | | | | |
| VD-313C | | | | | | | 188,00 | 7,45 | 1,489 | 5,50 | 36,27 | 151,73 | 0,00 | 225,991 | 16,87 | 40,91 | 35,87 | 219,079 | 16,75 | 106,9216 | AF | | | | | |
| VD-313D | | | | | | | 319,00 | 11,51 | 0,862 | 9,50 | 57,41 | 261,59 | 163,00 | 225,567 | 15,49 | 65,42 | 62,20 | 218,661 | 15,37 | 163,9465 | AG | | | | | |
| VD-313E | | | | | | | 516,00 | 17,55 | 0,529 | 15,50 | 89,12 | 426,88 | 441,50 | 225,606 | 14,74 | 102,18 | 101,18 | 218,706 | 14,62 | 249,4838 | AJ | | | | | |
| VD-313E-10 | | | | | | | 44,40 | 48,00 | 0,80 | 39,70 | 49,80 | 80,00 | 3,07 | 4,198 | 4,00 | 26,33 | 53,67 | 0,00 | 225,308 | 19,07 | 28,69 | 22,73 | 215,383 | 18,90 | 67,3379 | AF |
| VD-313E-11 | | | | | | | | | | | | 120,00 | 4,13 | 2,798 | 6,00 | 35,89 | 84,11 | 0,00 | 235,382 | 17,66 | 39,43 | 32,26 | 225,471 | 17,49 | 89,7838 | AE |
| VD-313E-12 | | | | | | | | | | | | 160,00 | 5,18 | 2,099 | 8,00 | 45,45 | 114,55 | 0,00 | 240,420 | 16,93 | 50,18 | 41,77 | 230,495 | 16,76 | 112,2298 | AF |
| VD-313E-13 | | | | | | | | | | | | 200,00 | 6,23 | 1,679 | 10,00 | 55,01 | 144,99 | 0,00 | 243,442 | 16,49 | 60,92 | 51,30 | 233,525 | 16,32 | 134,6758 | AG |
| VD-313E-14 | | | | | | | | | | | | 280,00 | 8,32 | 1,199 | 14,00 | 74,14 | 205,86 | 181,45 | 246,896 | 15,97 | 82,41 | 70,37 | 236,977 | 15,80 | 179,5677 | AH |
| VD-313F | | | | | | | | | | | | 36,40 | 40,00 | 0,60 | 31,80 | 41,60 | 61,70 | 1,71 | 8,707 | 3,50 | 22,99 | 38,71 | 0,00 | 337,011 | 23,23 | 24,59 |
| VD-313G | 92,80 | 2,36 | 5,541 | 5,50 | 32,02 | 60,78 | | | | | | | | | | | 0,00 | 336,773 | 21,12 | 34,53 | 14,43 | 322,847 | 20,87 | 69,0062 | AE | |
| VD-313H | 155,00 | 3,65 | 3,208 | 9,50 | 50,06 | 104,94 | 0,00 | 336,599 | 19,49 | 54,39 | 24,94 | | | | | | 322,724 | 19,25 | 105,8094 | AE | | | | | | |
| VD-313J | 248,00 | 5,56 | 1,966 | 15,50 | 77,14 | 170,86 | 176,70 | 335,916 | 18,60 | 84,21 | 40,89 | | | | | | 322,010 | 18,35 | 161,0144 | AG | | | | | | |
| VD-313JA | 30,40 | 34,00 | 0,50 | 25,90 | 35,20 | 145,00 | 3,21 | 4,185 | 12,50 | 61,51 | 83,49 | | | | | | 0,00 | 349,385 | 21,77 | 66,17 | 28,06 | 329,897 | 21,43 | 111,4209 | AE | |
| VD-313J-01 | 28,00 | 31,60 | 0,40 | 23,60 | 32,60 | 33,30 | 1,05 | 19,128 | 3,50 | 22,20 | 11,10 | 0,00 | 212,260 | 27,01 | 23,40 | 9,90 | 189,370 | 26,61 | 38,9266 | AD | | | | | | |
| VD-313J-02 | | | | | | 53,90 | 1,44 | 12,173 | 5,50 | 30,78 | 23,12 | 0,00 | 281,470 | 25,38 | 32,67 | 14,33 | 258,423 | 24,98 | 53,0817 | AD | | | | | | |
| VD-313J-03 | | | | | | 62,70 | 1,64 | 10,300 | 6,50 | 35,06 | 27,64 | 0,00 | 284,653 | 24,65 | 37,29 | 16,77 | 261,719 | 24,25 | 60,1592 | AE | | | | | | |
| VD-313J-04 | | | | | | 72,20 | 1,84 | 8,927 | 7,50 | 39,35 | 32,85 | 0,00 | 293,237 | 24,22 | 41,93 | 18,86 | 270,206 | 23,02 | 67,2368 | AE | | | | | | |
| VD-313J-05 | | | | | | 92,00 | 2,03 | 7,876 | 8,50 | 43,64 | 48,36 | 0,00 | 380,927 | 25,30 | 46,56 | 15,69 | 357,901 | 24,90 | 74,3143 | AE | | | | | | |
| VD-313J-06 | | | | | | 25,00 | 28,60 | 0,35 | 20,60 | 29,60 | 38,90 | 0,90 | 26,874 | 3,50 | 21,97 | 16,93 | 0,00 | 454,935 | 36,00 | 23,06 | 4,42 | 425,682 | 35,49 | 34,7558 | AD | |
| VD-313J-07 | 56,00 | 1,24 | 17,102 | 5,50 | 30,41 | | | | | | 25,59 | 0,00 | 437,589 | 32,28 | 32,12 | 7,47 | 408,385 | 31,77 | 47,3943 | AD | | | | | | |
| VD-313J-08 | 74,60 | 1,57 | 12,541 | 7,50 | 38,85 | | | | | | 35,75 | 0,00 | 448,306 | 30,82 | 41,18 | 9,74 | 419,125 | 30,31 | 60,0328 | AE | | | | | | |
| VD-313J-09 | 91,30 | 1,91 | 9,901 | 9,50 | 47,29 | | | | | | 44,01 | 0,00 | 435,699 | 29,63 | 50,24 | 12,99 | 406,531 | 29,12 | 72,6713 | AE | | | | | | |
| VD-313J-10 | 109,00 | 2,25 | 8,179 | 11,50 | 55,73 | | | | | | 53,27 | 0,00 | 435,656 | 28,99 | 59,30 | 15,73 | 406,496 | 28,48 | 85,3098 | AE | | | | | | |
| VD-313K | 21,40 | 25,00 | 0,35 | 17,00 | 26,00 | 33,30 | 0,76 | 42,846 | 3,50 | 21,73 | 11,57 | 0,00 | 495,818 | 46,37 | 22,70 | 3,47 | 454,166 | 45,65 | 29,7510 | AD | | | | | | |
| VD-313K-01 | | | | | | 43,00 | 0,97 | 29,992 | 5,00 | 27,95 | 15,05 | 0,00 | 451,258 | 42,77 | 29,33 | 5,71 | 409,992 | 42,05 | 37,8649 | AD | | | | | | |
| VD-313L | | | | | | 48,20 | 1,04 | 27,266 | 5,50 | 30,03 | 18,17 | 0,00 | 495,429 | 41,78 | 31,55 | 5,45 | 453,971 | 41,05 | 40,5696 | AD | | | | | | |
| VD-313L-02 | | | | | | 57,00 | 1,26 | 21,423 | 7,00 | 36,26 | 20,74 | 0,00 | 444,403 | 39,78 | 38,18 | 8,15 | 403,179 | 39,06 | 48,6835 | AD | | | | | | |
| VD-313L-01 | | | | | | 63,50 | 1,47 | 17,642 | 8,50 | 42,48 | 21,02 | 0,00 | 370,809 | 36,66 | 44,82 | 12,03 | 329,560 | 35,94 | 56,7974 | AD | | | | | | |
| VD-313L-03 | | | | | | 72,00 | 1,54 | 16,662 | 9,00 | 44,56 | 27,44 | 0,00 | 457,257 | 38,38 | 47,04 | 10,09 | 415,890 | 37,66 | 59,5020 | AD | | | | | | |
| VD-313M | | | | | | 78,00 | 1,61 | 15,785 | 9,50 | 46,63 | 31,37 | 0,00 | 495,142 | 38,25 | 49,25 | 9,42 | 453,828 | 37,53 | 62,2067 | AD | | | | | | |
| VD-313M-02 | | | | | | 86,00 | 1,82 | 13,633 | 11,00 | 52,86 | 33,14 | 0,00 | 451,804 | 37,25 | 55,89 | 12,54 | 410,483 | 36,53 | 70,3206 | AE | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|---------|---------|----------|-------|-------|---------|-------|----------|----|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | | | |
| VD-313M-01 | 3,60 | 21,40 | 25,00 | 0,35 | 17,00 | 26,00 | 95,00 | 1,89 | 13,040 | 11,50 | 54,93 | 40,07 | 0,00 | 522,457 | 37,87 | 58,10 | 10,34 | 481,177 | 37,15 | 73,0252 | AE | | | | | | | | | | |
| VD-313M-03 | | | | | | | 101,00 | 2,10 | 11,535 | 13,00 | 61,16 | 39,84 | 0,00 | 459,564 | 36,66 | 64,74 | 14,47 | 418,274 | 35,94 | 81,1391 | AE | | | | | | | | | | |
| VD-313N | | | | | | | 123,00 | 2,46 | 9,675 | 15,50 | 71,54 | 51,46 | 63,50 | 497,891 | 36,37 | 75,81 | 15,23 | 456,557 | 35,65 | 94,6623 | AE | | | | | | | | | | |
| VD-313N-10 | | 18,90 | 22,50 | 0,35 | 14,60 | 23,40 | 60,00 | 1,18 | 29,025 | 7,50 | 38,02 | 21,98 | 0,00 | 638,076 | 51,15 | 40,50 | 4,16 | 565,986 | 50,18 | 45,3848 | AE | | | | | | | | | | |
| VD-3130 | | 14,40 | 18,00 | 0,35 | 10,00 | 18,90 | 26,00 | 0,54 | 140,625 | 3,50 | 21,36 | 4,64 | 0,00 | 652,163 | 99,40 | 22,14 | 1,63 | 542,813 | 97,49 | 20,0194 | AD | | | | | | | | | | |
| VD-313P | | | | | | | 36,80 | 0,74 | 89,489 | 5,50 | 29,46 | 7,34 | 0,00 | 657,276 | 88,76 | 30,69 | 2,54 | 546,776 | 86,85 | 27,2991 | AD | | | | | | | | | | |
| VD-313Q | | | | | | | 58,30 | 1,15 | 51,809 | 9,50 | 45,64 | 12,66 | 0,00 | 655,863 | 80,53 | 47,76 | 4,40 | 546,069 | 78,62 | 41,8587 | AD | | | | | | | | | | |
| VD-313R | | | | | | | 90,60 | 1,75 | 31,754 | 15,50 | 69,92 | 20,68 | 57,20 | 656,699 | 76,06 | 73,38 | 7,16 | 546,804 | 74,14 | 63,6980 | AD | | | | | | | | | | |
| VD-313R-01 | 4,00 | 66,00 | 70,00 | 1,40 | 60,00 | 73,70 | 133,00 | 6,69 | 2,226 | 3,50 | 29,12 | 103,88 | 0,00 | 231,255 | 21,37 | 32,68 | 31,09 | 223,324 | 21,23 | 113,2783 | AG | | | | | | | | | | |
| VD-313S | | | | | | | 145,00 | 6,69 | 2,226 | 3,50 | 29,12 | 115,88 | 0,00 | 257,969 | 21,83 | 32,68 | 24,96 | 250,038 | 21,70 | 113,2783 | AG | | | | | | | | | | |
| VD-313S-01 | | | | | | | 203,00 | 9,23 | 1,417 | 5,50 | 41,18 | 161,82 | 0,00 | 229,232 | 19,22 | 46,77 | 49,56 | 221,319 | 19,09 | 154,4704 | AH | | | | | | | | | | |
| VD-313T | | | | | | | 233,00 | 9,23 | 1,417 | 5,50 | 41,18 | 191,82 | 0,00 | 271,730 | 19,97 | 46,77 | 34,22 | 263,817 | 19,83 | 154,4704 | AH | | | | | | | | | | |
| VD-313T-01 | | | | | | | 312,00 | 12,99 | 0,917 | 8,50 | 59,28 | 252,72 | 0,00 | 231,648 | 17,91 | 67,92 | 75,23 | 223,733 | 17,77 | 216,2586 | AL | | | | | | | | | | |
| VD-313U | | | | | | | 379,00 | 14,24 | 0,820 | 9,50 | 65,32 | 313,68 | 202,89 | 257,266 | 18,09 | 74,98 | 68,20 | 249,342 | 17,96 | 236,8547 | AL | | | | | | | | | | |
| VD-313U-01 | | | | | | | 492,00 | 19,24 | 0,577 | 13,50 | 89,45 | 402,55 | 378,65 | 232,327 | 16,98 | 103,18 | 119,01 | 224,404 | 16,85 | 319,2389 | AO | | | | | | | | | | |
| VD-313V | | | | | | | 613,00 | 21,73 | 0,503 | 15,50 | 101,52 | 511,48 | 527,48 | 257,107 | 17,21 | 117,28 | 111,22 | 249,184 | 17,07 | 360,4310 | AR | | | | | | | | | | |
| VD-313W | | | | | | | 50,00 | 54,00 | 0,80 | 44,80 | 56,20 | 90,00 | 3,13 | 5,120 | 3,50 | 26,68 | 63,32 | 0,00 | 324,192 | 24,30 | 29,02 | 14,95 | 312,218 | 24,09 | 85,8169 | AD | | | | | |
| VD-314 | | | | | | | | | | | | 99,00 | 3,13 | 5,120 | 3,50 | 26,68 | 72,32 | 0,00 | 370,272 | 25,11 | 32,45 | 12,10 | 340,736 | 24,90 | 85,8169 | AD | | | | | |
| VD-315 | | | | | | | | | | | | 150,00 | 4,32 | 3,258 | 5,50 | 37,36 | 112,64 | 0,00 | 367,014 | 22,78 | 45,39 | 19,00 | 340,838 | 22,57 | 117,0231 | AE | | | | | |
| VD-316 | | | | | | | | | | | | 230,00 | 6,00 | 2,108 | 8,50 | 53,37 | 176,63 | 0,00 | 372,380 | 21,42 | 68,25 | 29,33 | 341,007 | 21,21 | 163,8323 | AF | | | | | |
| VD-317 | | | | | | | | | | | | 335,00 | 8,41 | 1,434 | 12,50 | 74,72 | 260,28 | 234,56 | 373,139 | 20,56 | 97,15 | 43,10 | 340,982 | 20,35 | 226,2446 | AG | | | | | |
| VD-317A | | | | | | | | | | | | 335,00 | 11,91 | 0,969 | 18,50 | 106,74 | 228,26 | 234,56 | 221,100 | 17,30 | 119,11 | 133,39 | 209,122 | 17,09 | 319,8630 | AH | | | | | |
| VD-318 | | | | | | | | | | | | 490,00 | 11,91 | 0,969 | 18,50 | 106,74 | 383,26 | 429,22 | 371,241 | 19,92 | 138,90 | 64,24 | 340,093 | 19,71 | 319,8630 | AH | | | | | |
| VD-318A | | | | | | | | | | | | 490,00 | 14,24 | 0,796 | 22,50 | 128,09 | 361,91 | 429,22 | 288,238 | 18,24 | 143,14 | 119,28 | 276,255 | 18,03 | 382,2753 | AJ | | | | | |
| VD-318B | | | | | | | | | | | | 45,00 | 49,00 | 0,80 | 39,80 | 50,80 | 68,00 | 2,38 | 7,023 | 3,50 | 26,06 | 41,94 | 0,00 | 294,573 | 24,58 | 28,09 | 16,53 | 280,301 | 24,33 | 77,2352 | AD |
| VD-318C | | | | | | | | | | | | | | | | | 103,00 | 3,28 | 4,469 | 5,50 | 36,38 | 66,62 | 0,00 | 297,766 | 22,27 | 39,57 | 25,62 | 283,493 | 22,02 | 105,3208 | AE |
| VD-318D | 156,00 | 4,62 | 2,892 | 8,50 | 51,85 | 104,15 | 0,00 | 301,184 | 20,81 | 56,78 | 38,98 | | | | | | 286,940 | 20,56 | 147,4491 | AE | | | | | | | | | | | |
| VD-318E | 243,00 | 6,84 | 1,821 | 13,50 | 77,65 | 165,35 | 92,00 | 301,076 | 19,75 | 85,48 | 61,94 | | | | | | 286,822 | 19,51 | 217,6629 | AF | | | | | | | | | | | |
| VD-319 | 40,00 | 44,00 | 0,60 | 34,90 | 45,80 | 71,00 | 1,80 | 10,000 | 3,50 | 25,50 | 45,50 | 0,00 | 455,000 | 28,87 | 29,50 | 7,56 | 415,000 | 28,57 | 68,6535 | AD | | | | | | | | | | | |
| VD-320 | | | | | | 105,00 | 2,48 | 6,364 | 5,50 | 35,50 | 69,50 | 0,00 | 442,273 | 26,10 | 39,72 | 11,84 | 415,418 | 25,80 | 93,6184 | AE | | | | | | | | | | | |
| VD-321 | | | | | | 160,00 | 3,49 | 4,118 | 8,50 | 50,50 | 109,50 | 0,00 | 450,882 | 24,62 | 59,12 | 18,30 | 415,388 | 24,31 | 131,0658 | AE | | | | | | | | | | | |
| VD-322 | | | | | | 235,00 | 4,84 | 2,800 | 12,50 | 70,50 | 164,50 | 133,45 | 460,600 | 23,81 | 86,63 | 26,90 | 415,436 | 23,56 | 180,9957 | AF | | | | | | | | | | | |
| VD-322A | | | | | | 235,00 | 6,85 | 1,892 | 18,50 | 100,50 | 134,50 | 133,45 | 254,459 | 19,52 | 109,75 | 88,04 | 236,959 | 19,22 | 255,8904 | AG | | | | | | | | | | | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|-------|---------|-------|----------|----|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-313M-01 | 3,60 | 21,40 | 25,00 | 0,35 | 17,00 | 26,00 | 95,00 | 1,89 | 15,182 | 11,50 | 54,93 | 40,07 | 0,00 | 608,289 | 37,87 | 58,10 | 16,44 | 560,228 | 37,15 | 73,0252 | AB | | | | | |
| D-313M-03 | | | | | | | 101,00 | 2,10 | 13,431 | 13,00 | 61,16 | 39,84 | 0,00 | 535,064 | 36,66 | 64,74 | 20,65 | 486,991 | 35,94 | 81,1391 | AB | | | | | |
| D-313N | | | | | | | 123,00 | 2,46 | 11,264 | 15,50 | 71,54 | 51,46 | 66,01 | 579,688 | 36,37 | 75,81 | 23,12 | 531,563 | 35,65 | 94,6623 | AB | | | | | |
| D-313N-10 | | 18,90 | 22,50 | 0,35 | 14,60 | 23,40 | 60,00 | 1,18 | 33,793 | 7,50 | 38,02 | 21,98 | 0,00 | 742,903 | 51,15 | 40,20 | 7,52 | 669,108 | 50,18 | 45,3848 | AB | | | | | |
| D-3130 | | 14,40 | 18,00 | 0,35 | 10,00 | 18,90 | 26,00 | 0,54 | 163,728 | 3,50 | 21,36 | 4,64 | 0,00 | 759,303 | 99,40 | 22,14 | 2,29 | 631,989 | 97,49 | 20,0194 | AA | | | | | |
| D-313P | | 36,80 | 0,74 | 104,190 | 5,50 | 29,46 | 7,34 | 0,00 | 765,257 | 88,76 | 30,69 | 3,59 | 636,603 | 86,85 | 27,2991 | AA | | | | | | | | | | |
| D-313Q | | 58,30 | 1,15 | 60,321 | 9,50 | 45,64 | 12,66 | 0,00 | 763,612 | 80,53 | 47,76 | 6,20 | 635,780 | 78,62 | 41,8587 | AA | | | | | | | | | | |
| D-313R | | 90,60 | 1,75 | 36,971 | 15,50 | 69,92 | 20,68 | 58,60 | 764,585 | 76,06 | 73,38 | 10,11 | 636,637 | 74,14 | 63,6980 | AA | | | | | | | | | | |
| D-313R-01 | 4,00 | 66,00 | 70,00 | 1,40 | 60,00 | 73,70 | 133,00 | 6,69 | 2,592 | 3,50 | 29,12 | 103,88 | 0,00 | 269,247 | 21,37 | 32,68 | 51,21 | 260,013 | 21,23 | 113,2783 | AD | | | | | |
| D-313S | | | | | | | 145,00 | 6,69 | 2,592 | 3,50 | 29,12 | 115,88 | 0,00 | 300,349 | 21,83 | 32,68 | 46,52 | 291,115 | 21,70 | 113,2783 | AD | | | | | |
| D-313S-01 | | | | | | | 203,00 | 9,23 | 1,649 | 5,50 | 41,18 | 161,82 | 0,00 | 266,891 | 19,22 | 46,77 | 81,04 | 257,678 | 19,09 | 154,4704 | AE | | | | | |
| D-313T | | | | | | | 233,00 | 9,23 | 1,649 | 5,50 | 41,18 | 191,82 | 0,00 | 316,372 | 19,97 | 46,77 | 69,32 | 307,159 | 19,83 | 154,4704 | AF | | | | | |
| D-313T-01 | | | | | | | 312,00 | 12,99 | 1,067 | 8,50 | 59,28 | 252,72 | 0,00 | 269,705 | 17,91 | 67,92 | 124,21 | 260,489 | 17,77 | 216,2586 | AH | | | | | |
| D-313U | | | | | | | 379,00 | 14,24 | 0,955 | 9,50 | 65,32 | 313,68 | 202,89 | 299,531 | 18,09 | 74,98 | 126,59 | 290,305 | 17,96 | 236,8547 | AH | | | | | |
| D-313U-01 | | | | | | | 492,00 | 19,24 | 0,672 | 13,50 | 89,45 | 402,55 | 378,65 | 270,495 | 16,98 | 103,18 | 196,78 | 261,271 | 16,85 | 319,2389 | AL | | | | | |
| D-313V | | | | | | | 613,00 | 21,73 | 0,585 | 15,50 | 101,52 | 511,48 | 527,48 | 299,346 | 17,21 | 117,28 | 206,77 | 290,122 | 17,07 | 360,4310 | AM | | | | | |
| D-313W | | | | | | | 50,00 | 54,00 | 0,80 | 44,80 | 56,20 | 90,00 | 3,13 | 5,961 | 3,50 | 26,68 | 63,32 | 0,00 | 377,452 | 24,30 | 29,02 | 26,79 | 363,510 | 24,09 | 85,8169 | AA |
| D-314 | | | | | | | | | | | | 99,00 | 3,13 | 5,961 | 3,50 | 26,68 | 72,32 | 0,00 | 431,102 | 25,11 | 33,00 | 24,83 | 393,435 | 24,90 | 85,8169 | AA |
| D-315 | | 150,00 | 4,32 | 3,793 | 5,50 | 37,36 | | | | | | 112,64 | 0,00 | 427,309 | 22,78 | 46,00 | 38,92 | 394,519 | 22,57 | 117,0231 | AB | | | | | |
| D-316 | | 230,00 | 6,00 | 2,455 | 8,50 | 53,37 | | | | | | 176,63 | 0,00 | 433,557 | 21,42 | 69,00 | 60,02 | 395,189 | 21,21 | 163,8323 | AC | | | | | |
| D-317 | | 335,00 | 8,41 | 1,669 | 12,50 | 74,72 | | | | | | 260,28 | 234,56 | 434,441 | 20,56 | 99,00 | 88,58 | 393,912 | 20,35 | 226,2446 | AD | | | | | |
| D-317A | | 335,00 | 11,91 | 1,128 | 18,50 | 106,74 | | | | | | 228,26 | 234,56 | 257,424 | 17,30 | 119,11 | 183,18 | 243,477 | 17,09 | 319,8630 | AE | | | | | |
| D-318 | | 490,00 | 11,91 | 1,128 | 18,50 | 106,74 | | | | | | 383,26 | 429,22 | 432,230 | 19,92 | 142,00 | 131,57 | 392,469 | 19,71 | 319,8630 | AE | | | | | |
| D-318A | | 490,00 | 14,24 | 0,927 | 22,50 | 128,09 | | | | | | 361,91 | 429,22 | 335,592 | 18,24 | 143,14 | 189,92 | 321,639 | 18,03 | 382,2753 | AF | | | | | |
| D-318B | | 45,00 | 49,00 | 0,80 | 39,80 | 50,80 | | | | | | 68,00 | 2,38 | 8,177 | 3,50 | 26,06 | 41,94 | 0,00 | 342,968 | 24,58 | 28,09 | 24,94 | 326,350 | 24,33 | 77,2352 | AA |
| D-318C | | | | | | | | | | | | 103,00 | 3,28 | 5,204 | 5,50 | 36,38 | 66,62 | 0,00 | 346,684 | 22,27 | 39,57 | 38,92 | 330,067 | 22,02 | 105,3208 | AB |
| D-318D | | | | | | | 156,00 | 4,62 | 3,367 | 8,50 | 51,85 | 104,15 | 0,00 | 350,664 | 20,81 | 56,78 | 59,68 | 334,080 | 20,56 | 147,4491 | AB | | | | | |
| D-318E | | | | | | | 243,00 | 6,84 | 2,120 | 13,50 | 77,65 | 165,35 | 101,06 | 350,539 | 19,75 | 85,48 | 94,81 | 333,943 | 19,51 | 217,6629 | AC | | | | | |
| D-319 | 40,00 | 44,00 | 0,60 | 34,90 | 45,80 | 71,00 | 1,80 | 11,643 | 3,50 | 25,50 | 45,50 | 0,00 | 529,750 | 28,87 | 30,00 | 15,56 | 477,357 | 28,57 | 68,6535 | AA | | | | | | |
| D-320 | | | | | | 105,00 | 2,48 | 7,409 | 5,50 | 35,50 | 69,50 | 0,00 | 514,932 | 26,10 | 40,00 | 24,22 | 481,591 | 25,80 | 93,6184 | AB | | | | | | |
| D-321 | | | | | | 160,00 | 3,49 | 4,794 | 8,50 | 50,50 | 109,50 | 0,00 | 524,956 | 24,62 | 60,00 | 37,61 | 479,412 | 24,31 | 131,0658 | AB | | | | | | |
| D-322 | | | | | | 235,00 | 4,84 | 3,260 | 12,50 | 70,50 | 164,50 | 133,45 | 536,270 | 23,81 | 88,00 | 55,34 | 479,220 | 23,56 | 180,9957 | AC | | | | | | |
| D-322A | | | | | | 235,00 | 6,85 | 2,203 | 18,50 | 100,50 | 134,50 | 133,45 | 296,264 | 19,52 | 109,75 | 117,95 | 275,889 | 19,22 | 255,8904 | AD | | | | | | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-323 | 4,00 | 40,00 | 44,00 | 0,60 | 34,90 | 45,80 | 340,00 | 6,85 | 2,203 | 18,50 | 100,50 | 239,50 | 282,20 | 527,547 | 22,99 | 124,00 | 82,00 | 475,784 | 22,69 | 255,8904 | AD |
| D-323A | | | | | | | | 340,00 | 8,19 | 1,811 | 22,50 | 120,50 | 219,50 | 282,20 | 397,539 | 20,79 | 131,75 | 121,61 | 377,164 | 20,48 | 305,8203 |
| D-324 | | 33,00 | 37,00 | 0,60 | 28,00 | 38,50 | 135,00 | 2,63 | 7,639 | 9,50 | 53,68 | 81,32 | 0,00 | 621,215 | 29,44 | 61,50 | 28,04 | 561,474 | 29,00 | 118,4273 | AA |
| D-324A | | 32,00 | 36,00 | 0,50 | 27,10 | 37,10 | 41,00 | 1,18 | 22,740 | 3,50 | 24,74 | 16,26 | 0,00 | 369,661 | 32,30 | 26,11 | 13,75 | 338,598 | 31,83 | 54,9228 | AA |
| D-325 | | | | | | | 53,50 | 1,18 | 22,740 | 3,50 | 24,74 | 28,76 | 0,00 | 653,910 | 36,56 | 28,20 | 9,68 | 575,321 | 36,09 | 54,9228 | AA |
| D-325A | | | | | | | 61,00 | 1,62 | 14,471 | 5,50 | 34,31 | 26,69 | 0,00 | 386,199 | 29,29 | 36,47 | 21,16 | 354,971 | 28,82 | 74,8948 | AA |
| D-326 | | | | | | | 79,50 | 1,62 | 14,471 | 5,50 | 34,31 | 45,19 | 0,00 | 653,910 | 33,30 | 39,50 | 15,12 | 578,835 | 32,83 | 74,8948 | AA |
| D-326A | | | | | | | 92,00 | 2,29 | 9,364 | 8,50 | 48,66 | 43,34 | 0,00 | 405,777 | 27,49 | 51,99 | 31,88 | 374,634 | 27,02 | 104,8527 | AB |
| D-327 | | | | | | | 120,00 | 2,29 | 9,364 | 8,50 | 48,66 | 71,34 | 0,00 | 667,955 | 31,43 | 58,00 | 23,29 | 580,538 | 30,96 | 104,8527 | AB |
| D-327A | | | | | | | 141,00 | 3,38 | 5,896 | 13,50 | 72,58 | 68,42 | 0,00 | 403,350 | 26,00 | 77,87 | 50,80 | 372,186 | 25,54 | 154,7825 | AB |
| D-328 | | | | | | | 170,00 | 3,17 | 6,367 | 12,50 | 67,80 | 102,20 | 62,66 | 650,727 | 29,91 | 79,00 | 34,34 | 579,414 | 29,45 | 144,7965 | AB |
| D-328A | | | | | | | 170,00 | 4,48 | 4,302 | 18,50 | 96,50 | 73,50 | 62,66 | 316,191 | 24,02 | 103,75 | 66,25 | 285,018 | 23,55 | 204,7123 | AC |
| D-329 | | | | | | | 250,00 | 4,48 | 4,302 | 18,50 | 96,50 | 153,50 | 198,44 | 660,363 | 29,18 | 116,00 | 50,70 | 576,489 | 28,71 | 204,7123 | AC |
| D-329A | | | | | | | 250,00 | 5,36 | 3,537 | 22,50 | 115,64 | 134,36 | 198,44 | 475,275 | 26,08 | 124,46 | 76,73 | 444,076 | 25,61 | 244,6562 | AD |
| D-329B | | 31,00 | 35,00 | 0,40 | 26,30 | 36,00 | 76,00 | 1,86 | 12,506 | 7,00 | 41,32 | 34,68 | 0,00 | 433,681 | 30,17 | 43,98 | 20,04 | 400,448 | 29,67 | 87,0652 | AA |
| D-329BE | | | | | | | 450,00 | 11,98 | 1,577 | 55,50 | 272,20 | 177,80 | 425,67 | 280,452 | 23,11 | 293,30 | 156,70 | 247,172 | 22,61 | 556,2496 | AH |
| D-329BH | | 30,00 | 34,00 | 0,40 | 25,20 | 35,00 | 330,00 | 7,65 | 2,646 | 36,50 | 180,92 | 149,08 | 298,08 | 394,525 | 26,16 | 194,38 | 124,42 | 358,901 | 25,63 | 360,4310 | AE |
| D-329B-01 | | 26,00 | 30,00 | 0,40 | 21,30 | 31,00 | 70,00 | 1,40 | 22,828 | 6,50 | 38,25 | 31,75 | 0,00 | 724,851 | 42,86 | 40,38 | 11,53 | 676,175 | 42,13 | 68,9656 | AA |
| D-329B-05 | | | | | | | 125,00 | 2,32 | 12,365 | 12,00 | 63,84 | 61,16 | 0,00 | 756,240 | 40,41 | 69,50 | 20,97 | 686,277 | 39,68 | 113,5904 | AC |
| D-330 | | 25,00 | 29,00 | 0,35 | 20,30 | 30,00 | 41,00 | 0,86 | 47,689 | 3,50 | 24,22 | 16,78 | 0,00 | 800,209 | 52,84 | 26,50 | 5,74 | 691,493 | 52,05 | 42,9085 | AA |
| D-331 | | | | | | | 60,50 | 1,18 | 30,348 | 5,50 | 33,49 | 27,01 | 0,00 | 819,718 | 48,17 | 37,00 | 8,75 | 713,169 | 47,37 | 58,5115 | AA |
| D-332 | | | | | | | 89,50 | 1,66 | 19,637 | 8,50 | 47,39 | 42,11 | 0,00 | 826,859 | 45,08 | 53,80 | 13,75 | 701,030 | 44,29 | 81,9161 | AA |
| D-333 | | | | | | | 130,00 | 2,30 | 13,353 | 12,50 | 65,93 | 64,07 | 36,20 | 855,528 | 43,60 | 77,00 | 20,04 | 707,707 | 42,81 | 113,1223 | AB |
| D-333A | | | | | | | 130,00 | 3,26 | 9,022 | 18,50 | 93,74 | 36,26 | 36,20 | 327,184 | 34,34 | 99,61 | 30,39 | 274,187 | 33,54 | 159,9315 | AC |
| D-334 | | | | | | | 185,00 | 3,26 | 9,022 | 18,50 | 93,74 | 91,26 | 141,62 | 823,409 | 41,78 | 106,50 | 29,63 | 708,248 | 40,99 | 159,9315 | AC |
| D-334A | | | | | | | 185,00 | 3,90 | 7,418 | 22,50 | 112,27 | 72,73 | 141,62 | 539,508 | 37,03 | 119,41 | 47,41 | 486,567 | 36,23 | 191,1377 | AD |
| D-334A-02 | | 23,00 | 27,00 | 0,35 | 18,20 | 28,10 | 37,00 | 0,75 | 61,243 | 3,50 | 24,09 | 12,91 | 0,00 | 790,646 | 60,10 | 25,20 | 4,70 | 722,667 | 59,10 | 39,4758 | AA |
| D-334A-03 | | | | | | | 78,00 | 1,50 | 25,218 | 8,50 | 47,09 | 30,91 | 0,00 | 779,479 | 50,30 | 49,70 | 11,80 | 713,660 | 49,30 | 75,3629 | AA |
| D-334A-04 | | | | | | | 112,00 | 2,10 | 17,148 | 12,50 | 65,48 | 46,52 | 0,00 | 797,726 | 48,30 | 69,30 | 17,10 | 732,221 | 47,30 | 104,0725 | AF |
| D-334A-10 | | | | | | | 505,00 | 7,40 | 4,420 | 48,50 | 289,20 | 215,80 | 493,29 | 953,748 | 48,70 | 335,00 | 64,94 | 751,331 | 42,60 | 362,4594 | AK |
| D-334B | | 21,00 | 25,00 | 0,35 | 16,20 | 26,10 | 24,00 | 0,51 | 140,806 | 2,00 | 17,13 | 6,87 | 0,00 | 967,228 | 90,70 | 18,30 | 2,19 | 802,592 | 80,64 | 26,2132 | AA |
| D-335 | | 20,00 | 24,00 | 0,35 | 15,20 | 25,10 | 33,50 | 0,70 | 93,143 | 3,50 | 23,93 | 9,58 | 0,00 | 891,843 | 78,19 | 24,90 | 3,56 | 801,029 | 76,84 | 34,3268 | AA |
| D-336 | | | | | | | 49,00 | 0,96 | 59,273 | 5,50 | 33,03 | 15,98 | 0,00 | 946,882 | 71,13 | 34,80 | 5,33 | 841,673 | 69,78 | 46,8092 | AA |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|---------|----------|----------|-------|-------|---------|-------|----------|----|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | | | |
| VD-323 | 4,00 | 40,00 | 44,00 | 0,60 | 34,90 | 45,80 | 340,00 | 6,85 | 1,892 | 18,50 | 100,50 | 239,50 | 282,20 | 453,108 | 22,99 | 130,90 | 10,59 | 395,595 | 22,69 | 255,8904 | AG | | | | | | | | | | |
| VD-323A | | | | | | | 340,00 | 8,19 | 1,556 | 22,50 | 120,50 | 219,50 | 282,20 | 341,444 | 20,79 | 131,75 | 78,76 | 323,944 | 20,48 | 305,8203 | AH | | | | | | | | | | |
| VD-324 | | | | | | | 33,00 | 37,00 | 0,60 | 28,00 | 38,50 | 135,00 | 2,63 | 6,561 | 9,50 | 53,68 | 81,32 | 0,00 | 533,559 | 29,44 | 60,35 | 13,55 | 489,793 | 29,00 | 118,4273 | AD | | | | | |
| VD-324A | | | | | | | | | | | | 32,00 | 36,00 | 0,50 | 27,10 | 37,10 | 41,00 | 1,18 | 19,531 | 3,50 | 24,74 | 16,26 | 0,00 | 317,500 | 32,30 | 26,11 | 10,22 | 290,820 | 31,83 | 54,9228 | AD |
| VD-325 | | | | | | | | | | | | | | | | | 53,50 | 1,18 | 19,531 | 3,50 | 24,74 | 28,76 | 0,00 | 561,641 | 36,56 | 27,80 | 4,69 | 501,953 | 36,09 | 54,9228 | AD |
| VD-325A | | | | | | | | | | | | | | | | | 61,00 | 1,62 | 12,429 | 5,50 | 34,31 | 26,69 | 0,00 | 331,705 | 29,29 | 36,47 | 15,48 | 304,883 | 28,82 | 74,8948 | AD |
| VD-326 | | | | | | | | | | | | | | | | | 79,50 | 1,62 | 12,429 | 5,50 | 34,31 | 45,19 | 0,00 | 561,641 | 33,30 | 39,08 | 7,35 | 502,379 | 32,83 | 74,8948 | AD |
| VD-326A | | | | | | | | | | | | | | | | | 92,00 | 2,29 | 8,042 | 8,50 | 48,66 | 43,34 | 0,00 | 348,520 | 27,49 | 51,99 | 22,84 | 321,772 | 27,02 | 104,8527 | AE |
| VD-327 | | | | | | | | | | | | | | | | | 120,00 | 2,29 | 8,042 | 8,50 | 48,66 | 71,34 | 0,00 | 573,704 | 31,43 | 57,51 | 11,35 | 502,562 | 30,96 | 104,8527 | AE |
| VD-327A | | | | | | | | | | | | | | | | | 141,00 | 3,38 | 5,064 | 13,50 | 72,58 | 68,42 | 0,00 | 346,435 | 26,00 | 77,87 | 36,49 | 319,669 | 25,54 | 154,7825 | AE |
| VD-328 | 170,00 | 3,17 | 5,469 | 12,50 | 67,80 | 102,20 | | | | | | | | | | | 45,60 | 558,906 | 29,91 | 78,10 | 16,69 | 502,578 | 29,45 | 144,7965 | AE | | | | | | |
| VD-328A | 170,00 | 4,48 | 3,695 | 18,50 | 96,50 | 73,50 | | | | | | | | | | | 45,60 | 271,575 | 24,02 | 103,75 | 60,37 | 244,800 | 23,55 | 204,7123 | AF | | | | | | |
| VD-329 | 250,00 | 4,48 | 3,695 | 18,50 | 96,50 | 153,50 | 198,44 | 567,183 | 29,18 | 114,30 | 24,86 | | | | | | 501,425 | 28,71 | 204,7123 | AF | | | | | | | | | | | |
| VD-329A | 250,00 | 5,36 | 3,038 | 22,50 | 115,64 | 134,36 | 198,44 | 408,212 | 26,08 | 124,46 | 50,43 | 381,415 | 25,61 | 244,6562 | AG | | | | | | | | | | | | | | | | |
| VD-329B | 31,00 | 35,00 | 0,40 | 26,30 | 36,00 | 76,00 | 1,86 | 10,741 | 7,00 | 41,32 | 34,68 | 0,00 | 372,487 | 30,17 | 43,98 | 16,92 | 343,943 | 29,67 | 87,0652 | AD | | | | | | | | | | | |
| VD-329BE | | | | | | 450,00 | 11,98 | 1,355 | 55,50 | 272,20 | 177,80 | 425,67 | 240,879 | 23,11 | 293,30 | 156,70 | 212,295 | 22,61 | 556,2496 | AL | | | | | | | | | | | |
| VD-329BH | 30,00 | 34,00 | 0,40 | 25,20 | 35,00 | 330,00 | 7,65 | 2,273 | 36,50 | 180,92 | 149,08 | 298,08 | 338,855 | 26,16 | 194,38 | 92,31 | 308,259 | 25,63 | 360,4310 | AH | | | | | | | | | | | |
| VD-329B-01 | 26,00 | 30,00 | 0,40 | 21,30 | 31,00 | 70,00 | 1,40 | 19,607 | 6,50 | 38,25 | 31,75 | 0,00 | 622,571 | 42,86 | 40,38 | 5,91 | 580,764 | 42,13 | 68,9656 | AD | | | | | | | | | | | |
| VD-329B-05 | | | | | | 125,00 | 2,32 | 10,621 | 12,00 | 63,84 | 61,16 | 0,00 | 649,531 | 40,41 | 68,87 | 10,16 | 596,131 | 39,68 | 113,5904 | AF | | | | | | | | | | | |
| VD-330 | 25,00 | 29,00 | 0,35 | 20,30 | 30,00 | 41,00 | 0,86 | 40,960 | 3,50 | 24,22 | 16,78 | 0,00 | 687,296 | 52,84 | 26,03 | 2,74 | 613,171 | 52,05 | 42,9085 | AD | | | | | | | | | | | |
| VD-331 | | | | | | 60,50 | 1,18 | 26,065 | 5,50 | 33,49 | 27,01 | 0,00 | 704,052 | 48,17 | 36,95 | 4,30 | 613,841 | 47,37 | 58,5115 | AD | | | | | | | | | | | |
| VD-332 | | | | | | 89,50 | 1,66 | 16,866 | 8,50 | 47,39 | 42,11 | 0,00 | 710,185 | 45,08 | 53,09 | 6,63 | 614,087 | 44,29 | 81,9161 | AD | | | | | | | | | | | |
| VD-333 | | | | | | 130,00 | 2,30 | 11,469 | 12,50 | 65,93 | 64,07 | 0,00 | 734,810 | 43,60 | 76,45 | 9,75 | 614,154 | 42,81 | 113,1223 | AH | | | | | | | | | | | |
| VD-333A | | | | | | 130,00 | 3,26 | 7,749 | 18,50 | 93,74 | 36,26 | 0,00 | 281,017 | 34,34 | 99,61 | 30,39 | 235,498 | 33,54 | 159,9315 | AH | | | | | | | | | | | |
| VD-334 | | | | | | 185,00 | 3,26 | 7,749 | 18,50 | 93,74 | 91,26 | 141,62 | 707,222 | 41,78 | 105,90 | 14,51 | 612,961 | 40,99 | 159,9315 | AJ | | | | | | | | | | | |
| VD-334A | | | | | | 185,00 | 3,90 | 6,372 | 22,50 | 112,27 | 72,73 | 141,62 | 463,381 | 37,03 | 119,41 | 33,29 | 417,910 | 36,23 | 191,1377 | AK | | | | | | | | | | | |
| VD-334A-02 | | | | | | 23,00 | 27,00 | 0,35 | 18,20 | 28,10 | 37,00 | 0,90 | 52,601 | 3,50 | 24,10 | 12,90 | 0,00 | 678,557 | 58,40 | 25,20 | 2,60 | 620,695 | 57,60 | 39,4758 | AF | | | | | | |
| VD-334A-03 | | | | | | | | | | | 78,00 | 1,70 | 21,659 | 8,50 | 47,10 | 30,90 | 0,00 | 669,274 | 48,60 | 49,75 | 6,30 | 611,877 | 47,90 | 75,3629 | AG | | | | | | |
| VD-334A-04 | | | | | | | | | | | 112,00 | 2,40 | 14,728 | 12,50 | 65,50 | 46,50 | 0,00 | 684,869 | 46,60 | 69,35 | 8,60 | 628,165 | 45,80 | 104,0725 | AH | | | | | | |
| VD-334A-10 | 505,00 | 7,40 | 3,796 | 48,50 | 291,50 | | | | | | 213,50 | 493,29 | 810,440 | 48,70 | 332,90 | 31,72 | 653,286 | 42,60 | 362,4594 | AR | | | | | | | | | | | |
| VD-334B | 21,00 | 25,00 | 0,35 | 16,20 | 26,10 | 24,00 | 0,51 | 120,937 | 2,00 | 17,13 | 6,87 | 0,00 | 830,748 | 90,70 | 18,20 | 1,06 | 701,436 | 80,64 | 26,2132 | AE | | | | | | | | | | | |
| VD-335 | 20,00 | 24,00 | 0,35 | 15,20 | 25,10 | 33,50 | 0,70 | 80,000 | 3,50 | 23,93 | 9,58 | 0,00 | 766,000 | 78,19 | 24,90 | 1,91 | 688,000 | 76,84 | 34,3268 | AG | | | | | | | | | | | |
| VD-336 | | | | | | 49,00 | 0,96 | 50,909 | 5,50 | 33,03 | 15,98 | 0,00 | 813,273 | 71,13 | 34,75 | 2,63 | 725,455 | 69,78 | 46,8092 | AG | | | | | | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-336A | 4,00 | 20,00 | 24,00 | 0,35 | 15,20 | 25,10 | 65,00 | 1,35 | 32,941 | 8,50 | 46,68 | 18,33 | 0,00 | 603,647 | 62,41 | 49,02 | 7,15 | 526,400 | 61,07 | 65,5329 | AG |
| VD-337 | | | | | | | 72,00 | 1,35 | 32,941 | 8,50 | 46,68 | 25,33 | 0,00 | 834,235 | 66,44 | 49,95 | 4,05 | 726,353 | 65,09 | 65,5329 | AG |
| VD-338 | | | | | | | 105,00 | 1,87 | 22,400 | 12,50 | 64,88 | 40,13 | 0,00 | 898,800 | 64,50 | 72,55 | 5,94 | 726,880 | 63,19 | 90,4978 | AE |
| VD-339 | | | | | | | 150,00 | 2,65 | 15,135 | 18,50 | 92,18 | 57,83 | 115,94 | 875,189 | 62,00 | 101,95 | 8,78 | 727,243 | 60,65 | 127,9452 | AE |
| VD-339A | | | | | | | 150,00 | 3,17 | 12,444 | 22,50 | 110,38 | 39,63 | 115,94 | 493,111 | 54,53 | 116,57 | 23,47 | 416,018 | 53,19 | 152,9101 | AF |
| VD-339A-01 | | 17,50 | 21,50 | 0,35 | 12,60 | 22,50 | 50,00 | 0,98 | 64,301 | 6,50 | 37,35 | 12,65 | 0,00 | 813,639 | 87,33 | 39,03 | 3,02 | 705,386 | 85,46 | 46,4191 | AD |
| VD-339A-02 | | 17,00 | 21,00 | 0,35 | 12,10 | 22,00 | 40,00 | 0,84 | 82,897 | 5,50 | 32,80 | 7,20 | 0,00 | 597,184 | 91,45 | 34,20 | 3,87 | 480,802 | 89,42 | 39,7878 | AD |
| VD-339A-04 | | | | | | | 65,00 | 1,30 | 53,639 | 8,50 | 46,35 | 18,65 | 0,00 | 1000,371 | 88,80 | 49,80 | 2,60 | 815,316 | 86,10 | 55,7030 | AG |
| VD-339A-05 | | | | | | | 85,00 | 1,80 | 36,475 | 12,50 | 64,40 | 20,60 | 0,00 | 751,378 | 80,70 | 67,70 | 6,80 | 631,012 | 79,00 | 76,9232 | AE |
| VD-339A-06 | | | | | | | 125,00 | 2,60 | 24,645 | 18,50 | 91,40 | 33,60 | 94,30 | 828,073 | 78,90 | 96,60 | 8,40 | 699,919 | 77,00 | 108,7534 | AE |
| VD-339A-10 | | | | | | | 505,00 | 7,98 | 6,656 | 68,50 | 336,90 | 168,10 | 498,65 | 1118,867 | 83,70 | 382,90 | 22,65 | 812,693 | 74,20 | 374,0057 | AN |
| VD-339B | | 16,00 | 20,00 | 0,30 | 11,20 | 21,00 | 28,80 | 0,58 | 156,250 | 3,50 | 23,74 | 5,06 | 0,00 | 791,250 | 119,00 | 24,61 | 1,63 | 654,688 | 116,70 | 27,4614 | AE |
| VD-339C | | | | | | | 40,60 | 0,80 | 99,432 | 5,50 | 32,73 | 7,87 | 0,00 | 782,727 | 106,10 | 34,10 | 2,61 | 646,307 | 103,70 | 37,4474 | AE |
| VD-339D | | | | | | | 64,40 | 1,23 | 57,566 | 9,50 | 50,71 | 13,69 | 0,00 | 787,961 | 96,39 | 53,07 | 4,45 | 652,220 | 94,01 | 57,4193 | AE |
| VD-339D-10 | | | | | | | 77,00 | 1,34 | 52,083 | 10,50 | 55,21 | 21,79 | 0,00 | 1135,000 | 101,00 | 60,72 | 3,00 | 847,917 | 98,20 | 62,4123 | AF |
| VD-339E | | | | | | | 100,00 | 1,88 | 35,282 | 15,50 | 77,69 | 22,31 | 62,40 | 787,218 | 91,01 | 81,54 | 7,28 | 651,310 | 88,63 | 87,3772 | AF |
| VD-339E-01 | | 15,00 | 19,00 | 0,57 | 10,20 | 20,00 | 35,00 | 1,75 | 147,490 | 4,50 | 28,18 | 6,82 | 0,00 | 1005,926 | 150,88 | 29,27 | 1,24 | 845,116 | 126,76 | 30,4260 | AF |
| VD-339E-03 | | 14,00 | 18,00 | 0,57 | 9,30 | 19,50 | 53,00 | 2,65 | 96,038 | 8,50 | 46,02 | 6,98 | 0,00 | 669,892 | 100,55 | 48,03 | 4,14 | 477,311 | 110,00 | 45,8730 | AF |
| VD-339E-02 | | | | | | | 83,00 | 1,35 | 62,794 | 13,00 | 66,16 | 16,84 | 46,40 | 1057,739 | 177,45 | 69,23 | 3,18 | 864,678 | 119,00 | 65,5329 | AD |
| VD-339F | 4,50 | 70,50 | 75,00 | 1,40 | 64,10 | 79,00 | 146,00 | 6,31 | 2,926 | 3,50 | 32,12 | 113,88 | 0,00 | 333,163 | 27,32 | 35,81 | 23,91 | 322,378 | 27,14 | 153,1430 | AG |
| VD-339G | | | | | | | 224,00 | 8,71 | 1,862 | 5,50 | 45,34 | 178,66 | 0,00 | 332,631 | 24,70 | 51,14 | 37,74 | 321,827 | 24,51 | 208,8313 | AK |
| VD-339H | | | | | | | 380,00 | 13,45 | 1,078 | 9,50 | 71,76 | 308,24 | 135,00 | 332,239 | 22,68 | 81,77 | 65,38 | 321,454 | 22,49 | 320,2080 | AL |
| VD-339J | | | | | | | 615,00 | 20,52 | 0,661 | 15,50 | 111,40 | 503,60 | 516,30 | 332,691 | 21,59 | 127,73 | 106,17 | 321,906 | 21,40 | 487,2731 | AO |
| VD-339J-09 | | 63,50 | 68,00 | 1,40 | 57,10 | 70,70 | 45,00 | 2,00 | 7,007 | 2,00 | 21,59 | 23,41 | 0,00 | 164,037 | 31,40 | 23,48 | 21,52 | 150,782 | 30,11 | 100,3180 | AG |
| VD-339J-10 | | | | | | | 91,00 | 4,73 | 4,004 | 3,50 | 31,03 | 59,97 | 0,00 | 240,109 | 26,25 | 34,17 | 37,09 | 227,534 | 26,04 | 137,9373 | AG |
| VD-339J-11 | | | | | | | 173,00 | 7,42 | 2,156 | 6,50 | 49,91 | 123,09 | 0,00 | 265,363 | 23,27 | 55,74 | 62,29 | 252,798 | 23,05 | 213,1758 | AK |
| VD-339J-12 | | | | | | | 325,00 | 12,73 | 1,121 | 12,50 | 87,68 | 237,32 | 0,00 | 266,053 | 21,27 | 98,90 | 119,46 | 253,471 | 21,05 | 363,6528 | AL |
| VD-339J-20 | | 53,50 | 58,00 | 1,00 | 47,80 | 59,30 | 50,00 | 2,60 | 10,414 | 2,25 | 22,30 | 27,70 | 0,00 | 288,466 | 31,50 | 23,90 | 17,30 | 271,803 | 31,30 | 89,8024 | AG |
| VD-339J-21 | | | | | | | 78,00 | 3,40 | 6,695 | 3,50 | 29,70 | 48,30 | 0,00 | 323,352 | 28,00 | 32,20 | 23,40 | 306,616 | 27,80 | 116,2149 | AL |
| VD-339J-22 | | | | | | | 120,00 | 4,50 | 4,260 | 5,50 | 41,50 | 78,50 | 0,00 | 334,429 | 25,30 | 45,40 | 35,00 | 317,814 | 25,20 | 158,4748 | AL |
| VD-339J-23 | | | | | | | 185,00 | 6,20 | 2,757 | 8,50 | 59,20 | 125,80 | 0,00 | 346,784 | 23,70 | 65,20 | 51,10 | 330,244 | 23,50 | 221,8648 | AG |
| VD-339J-04 | | | | | | | 210,00 | 9,00 | 1,896 | 12,50 | 82,75 | 127,25 | 0,00 | 241,226 | 21,10 | 92,00 | 113,40 | 223,691 | 20,85 | 305,2393 | AO |
| VD-339K | | 45,50 | 50,00 | 0,80 | 39,70 | 52,00 | 74,40 | 2,00 | 10,883 | 3,50 | 28,74 | 45,66 | 0,00 | 496,923 | 34,03 | 30,74 | 9,65 | 475,160 | 33,65 | 98,8369 | AO |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-336A | 4,00 | 20,00 | 24,00 | 0,35 | 15,20 | 25,10 | 65,00 | 1,35 | 38,353 | 8,50 | 46,68 | 18,33 | 0,00 | 702,818 | 62,41 | 49,02 | 10,57 | 612,880 | 61,07 | 65,5329 | AA |
| D-337 | | | | | | | 72,00 | 1,35 | 38,353 | 8,50 | 46,68 | 25,33 | 0,00 | 971,288 | 66,44 | 50,20 | 8,30 | 836,094 | 65,09 | 65,5329 | AA |
| D-338 | | | | | | | 105,00 | 1,87 | 26,080 | 12,50 | 64,88 | 40,13 | 0,00 | 1046,460 | 64,50 | 72,80 | 12,15 | 839,776 | 63,19 | 90,4978 | AB |
| D-339 | | | | | | | 150,00 | 2,65 | 17,622 | 18,50 | 92,18 | 57,83 | 115,94 | 1018,970 | 62,00 | 102,50 | 18,04 | 837,027 | 60,65 | 127,9452 | AB |
| D-339A | | | | | | | 150,00 | 3,17 | 14,489 | 22,50 | 110,38 | 39,63 | 115,94 | 574,122 | 54,53 | 116,57 | 31,45 | 484,364 | 53,19 | 152,9101 | AC |
| D-339A-01 | | 17,50 | 21,50 | 0,35 | 12,60 | 22,50 | 50,00 | 0,98 | 74,865 | 6,50 | 37,35 | 12,65 | 0,00 | 947,308 | 87,33 | 39,03 | 5,19 | 821,271 | 85,46 | 46,4191 | AA |
| D-339A-02 | | 17,00 | 21,00 | 0,35 | 12,10 | 22,00 | 40,00 | 0,84 | 96,516 | 5,50 | 32,80 | 7,20 | 0,00 | 695,293 | 91,45 | 34,20 | 5,23 | 559,791 | 89,42 | 39,7878 | AA |
| D-339A-04 | | | | | | | 65,00 | 1,10 | 62,451 | 8,50 | 46,32 | 18,68 | 0,00 | 1166,591 | 91,30 | 49,90 | 5,35 | 943,016 | 87,90 | 55,7030 | AA |
| D-339A-05 | | | | | | | 85,00 | 1,60 | 42,467 | 12,50 | 64,35 | 20,65 | 0,00 | 876,942 | 82,60 | 67,60 | 10,15 | 738,924 | 80,50 | 76,9232 | AF |
| D-339A-06 | | | | | | | 125,00 | 2,30 | 28,694 | 18,50 | 91,40 | 33,60 | 95,31 | 964,114 | 80,90 | 96,20 | 13,60 | 826,383 | 78,80 | 108,7534 | AK |
| D-339A-10 | | | | | | | 505,00 | 7,98 | 7,749 | 68,50 | 339,50 | 165,50 | 498,65 | 1282,532 | 83,70 | 384,00 | 46,09 | 937,682 | 74,20 | 374,0057 | AK |
| D-339B | | 16,00 | 20,00 | 0,30 | 11,20 | 21,00 | 28,80 | 0,58 | 181,920 | 3,50 | 23,74 | 5,06 | 0,00 | 921,241 | 119,00 | 24,61 | 2,50 | 762,243 | 116,70 | 27,4614 | AB |
| D-339C | | | | | | | 40,60 | 0,80 | 115,767 | 5,50 | 32,73 | 7,87 | 0,00 | 911,318 | 106,10 | 34,10 | 3,97 | 752,486 | 103,70 | 37,4474 | AB |
| D-339D | | | | | | | 64,40 | 1,23 | 67,023 | 9,50 | 50,71 | 13,69 | 0,00 | 917,411 | 96,39 | 53,07 | 6,82 | 759,371 | 94,01 | 57,4193 | AB |
| D-339D-10 | | | | | | | 77,00 | 1,34 | 60,640 | 10,50 | 55,21 | 21,79 | 0,00 | 1321,464 | 101,00 | 60,80 | 6,10 | 982,366 | 98,20 | 62,4123 | AC |
| D-339E | | | | | | | 100,00 | 1,88 | 41,079 | 15,50 | 77,69 | 22,31 | 64,01 | 916,546 | 91,01 | 81,54 | 11,13 | 758,311 | 88,63 | 87,3772 | AC |
| D-339E-01 | | 15,00 | 19,00 | 0,50 | 10,20 | 20,00 | 35,00 | 1,70 | 171,720 | 4,50 | 28,18 | 6,82 | 0,00 | 1171,185 | 176,65 | 29,27 | 2,34 | 983,957 | 126,90 | 30,4260 | AC |
| D-339E-03 | | 14,00 | 18,00 | 0,50 | 9,30 | 19,50 | 53,00 | 0,90 | 111,816 | 8,50 | 46,02 | 6,98 | 0,00 | 779,946 | 117,06 | 48,03 | 4,92 | 555,726 | 120,80 | 45,8730 | AC |
| D-339E-02 | | | | | | | 83,00 | 4,15 | 73,111 | 13,00 | 66,16 | 16,84 | 48,21 | 1231,511 | 206,00 | 69,23 | 5,83 | 1006,732 | 120,40 | 65,5329 | AA |
| D-339F | 4,50 | 70,50 | 75,00 | 1,40 | 64,10 | 79,00 | 146,00 | 7,30 | 3,406 | 3,50 | 32,12 | 113,88 | 0,00 | 387,897 | 27,32 | 35,81 | 46,15 | 375,340 | 27,14 | 153,1430 | AD |
| D-339G | | | | | | | 224,00 | 8,71 | 2,168 | 5,50 | 45,34 | 178,66 | 0,00 | 387,277 | 24,70 | 51,14 | 72,63 | 374,699 | 24,51 | 208,8313 | AG |
| D-339H | | | | | | | 380,00 | 13,45 | 1,255 | 9,50 | 71,76 | 308,24 | 156,20 | 386,821 | 22,68 | 81,77 | 125,61 | 374,264 | 22,49 | 320,2080 | AH |
| D-339J | | | | | | | 615,00 | 20,52 | 0,769 | 15,50 | 111,40 | 503,60 | 516,30 | 387,347 | 21,59 | 127,73 | 204,71 | 374,790 | 21,40 | 487,2731 | AL |
| D-339J-09 | | 63,50 | 68,00 | 1,40 | 57,10 | 70,70 | 45,00 | 3,33 | 8,158 | 2,00 | 21,59 | 23,41 | 0,00 | 190,986 | 31,40 | 23,38 | 21,62 | 176,369 | 30,11 | 100,3180 | AD |
| D-339J-10 | | | | | | | 91,00 | 4,73 | 4,662 | 3,50 | 31,03 | 59,97 | 0,00 | 279,555 | 26,25 | 34,17 | 49,47 | 264,915 | 26,04 | 137,9373 | AD |
| D-339J-11 | | | | | | | 173,00 | 7,42 | 2,510 | 6,50 | 49,91 | 123,09 | 0,00 | 308,959 | 23,27 | 55,74 | 88,02 | 294,329 | 23,05 | 213,1758 | AG |
| D-339J-12 | | | | | | | 325,00 | 12,73 | 1,305 | 12,50 | 87,68 | 237,32 | 0,00 | 309,762 | 21,27 | 98,90 | 169,05 | 295,112 | 21,05 | 363,6528 | AH |
| D-339J-20 | | 53,50 | 58,00 | 1,00 | 47,80 | 59,30 | 50,00 | 2,20 | 12,125 | 2,25 | 22,28 | 27,72 | 0,00 | 336,000 | 32,60 | 23,90 | 22,10 | 316,457 | 31,90 | 89,8024 | AL |
| D-339J-21 | | | | | | | 78,00 | 2,90 | 7,795 | 3,50 | 29,70 | 48,30 | 0,00 | 376,400 | 29,20 | 32,20 | 32,20 | 356,988 | 28,50 | 116,2149 | AD |
| D-339J-22 | | | | | | | 120,00 | 4,00 | 4,960 | 5,50 | 41,50 | 78,50 | 0,00 | 389,400 | 26,50 | 45,40 | 49,20 | 370,026 | 25,90 | 158,4748 | AD |
| D-339J-23 | | | | | | | 185,00 | 5,20 | 3,210 | 8,50 | 59,20 | 125,80 | 0,00 | 403,800 | 24,80 | 65,20 | 76,50 | 384,498 | 224,10 | 221,8648 | AG |
| D-339J-04 | | | | | | | 210,00 | 7,50 | 2,182 | 12,50 | 82,75 | 127,25 | 0,00 | 277,700 | 22,10 | 91,50 | 110,00 | 258,622 | 21,40 | 305,2393 | AG |
| D-339K | | 45,50 | 50,00 | 0,80 | 39,70 | 52,00 | 74,40 | 2,00 | 12,671 | 3,50 | 28,74 | 45,66 | 0,00 | 578,560 | 34,03 | 30,74 | 18,47 | 553,222 | 33,65 | 98,8369 | AL |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-339L | 4,50 | 45,50 | 50,00 | 0,80 | 39,70 | 52,00 | 112,00 | 2,76 | 8,063 | 5,50 | 40,02 | 71,98 | 0,00 | 580,403 | 30,97 | 43,16 | 28,93 | 555,088 | 30,59 | 134,7777 | AD |
| D-339L-10 | | | | | | | 160,00 | 3,99 | 5,218 | 8,50 | 56,94 | 103,06 | 0,00 | 537,714 | 28,40 | 61,78 | 48,01 | 512,465 | 27,97 | 188,6887 | AD |
| D-339M | | | | | | | 187,00 | 4,26 | 4,668 | 9,50 | 62,58 | 124,42 | 0,00 | 580,828 | 28,61 | 68,00 | 49,94 | 555,529 | 28,23 | 206,6591 | AG |
| D-339N | | | | | | | 299,00 | 6,50 | 2,861 | 15,50 | 96,42 | 202,58 | 204,70 | 579,623 | 27,30 | 105,26 | 81,65 | 554,333 | 26,92 | 314,4812 | AG |
| D-339N-02 | 36,50 | 41,00 | 0,60 | 31,20 | 41,90 | 35,00 | 0,90 | 38,182 | 2,25 | 21,14 | 13,86 | 0,00 | 529,200 | 45,50 | 22,20 | 9,20 | 488,727 | 44,90 | 61,2671 | AL | |
| D-339N-03 | | | | | | 52,00 | 1,30 | 24,545 | 3,50 | 27,88 | 24,12 | 0,00 | 592,036 | 40,90 | 29,50 | 13,30 | 552,273 | 40,30 | 79,2868 | AL | |
| D-339N-04 | | | | | | 78,00 | 1,70 | 15,620 | 5,50 | 38,67 | 39,33 | 0,00 | 614,328 | 37,30 | 41,20 | 20,40 | 574,810 | 36,70 | 108,1183 | AD | |
| D-339N-05 | | | | | | 115,00 | 2,50 | 10,107 | 8,50 | 54,85 | 60,15 | 0,00 | 607,933 | 34,70 | 58,70 | 31,70 | 569,021 | 34,20 | 151,3657 | AD | |
| D-339N-06 | | | | | | 165,00 | 3,40 | 6,873 | 12,50 | 76,43 | 88,57 | 0,00 | 608,717 | 33,20 | 82,10 | 46,40 | 569,749 | 32,60 | 209,0288 | AG | |
| D-339O | | | | | | 27,50 | 32,00 | 0,40 | 22,10 | 33,20 | 41,70 | 0,91 | 57,392 | 3,50 | 27,21 | 14,49 | 0,00 | 831,766 | 64,62 | 28,44 | 6,77 |
| D-339P | 60,40 | 1,25 | 36,522 | 5,50 | 37,61 | | | | | | 22,79 | 0,00 | 832,288 | 58,29 | 39,54 | 10,63 | 761,853 | 52,33 | 81,4590 | AD | |
| D-339Q | 97,70 | 1,94 | 21,144 | 9,50 | 58,42 | | | | | | 39,28 | 0,00 | 830,558 | 53,39 | 61,76 | 18,39 | 759,931 | 52,33 | 124,9038 | AC | |
| D-339R | 154,00 | 2,95 | 12,959 | 15,50 | 89,63 | | | | | | 64,37 | 76,30 | 834,173 | 50,78 | 95,07 | 29,89 | 763,703 | 49,73 | 190,0710 | AD | |
| D-339R-05 | 22,50 | 27,00 | 0,35 | 17,20 | 28,00 | 37,00 | 0,70 | 104,786 | 3,50 | 26,92 | 10,08 | 0,00 | 1056,240 | 95,04 | 28,10 | 4,05 | 932,593 | 93,20 | 48,8754 | AC | |
| D-339R-10 | | | | | | 70,00 | 1,33 | 48,900 | 7,50 | 47,39 | 22,61 | 0,00 | 1105,598 | 86,45 | 49,71 | 8,38 | 992,181 | 79,78 | 84,4212 | AC | |
| D-339R-12 | 18,00 | 22,50 | 0,40 | 12,60 | 23,60 | 33,50 | 0,60 | 204,660 | 3,50 | 26,70 | 6,80 | 0,00 | 1391,685 | 149,40 | 27,70 | 2,25 | 1187,026 | 146,20 | 39,1003 | AC | |
| D-339R-01 | | | | | | 70,00 | 1,10 | 95,508 | 7,50 | 52,50 | 17,50 | 0,00 | 1671,387 | 133,00 | 57,40 | 4,82 | 1203,398 | 123,45 | 67,5369 | AC | |
| D-339S | 17,50 | 22,00 | 0,65 | 12,10 | 23,00 | 31,80 | 1,59 | 222,708 | 3,50 | 26,68 | 5,12 | 0,00 | 1139,754 | 57,00 | 27,65 | 2,65 | 924,237 | 150,60 | 38,0142 | AB | |
| D-339T | | | | | | 44,90 | 2,24 | 141,723 | 5,50 | 36,79 | 8,11 | 0,00 | 1149,877 | 57,45 | 38,31 | 4,14 | 933,956 | 134,10 | 51,8376 | AB | |
| D-339T-10 | | | | | | 50,00 | 2,50 | 141,723 | 5,50 | 37,80 | 12,20 | 0,00 | 1729,023 | 93,60 | 41,50 | 3,37 | 1204,647 | 138,10 | 51,8376 | AC | |
| D-339U | | | | | | 70,90 | 3,54 | 82,050 | 9,50 | 56,99 | 13,91 | 0,00 | 1140,926 | 57,05 | 59,61 | 7,19 | 926,347 | 121,22 | 79,4843 | AC | |
| D-339V | 14,50 | 19,00 | 0,55 | 9,10 | 21,00 | 110,00 | 5,50 | 50,289 | 15,50 | 87,31 | 22,69 | 71,00 | 1141,191 | 57,05 | 91,59 | 11,74 | 925,818 | 114,23 | 120,9543 | AC | |
| D-339V-04 | | | | | | 31,00 | 0,50 | 391,512 | 3,50 | 26,57 | 4,43 | 0,00 | 1734,400 | 230,90 | 27,50 | 1,30 | 1370,294 | 225,40 | 31,4975 | AB | |
| D-339V-06 | | | | | | 63,00 | 1,00 | 161,211 | 8,50 | 51,67 | 11,33 | 0,00 | 1826,521 | 191,30 | 54,60 | 3,20 | 1354,173 | 184,20 | 60,1316 | AB | |
| D-339V-01 | | | | | | 90,00 | 4,50 | 109,623 | 12,50 | 71,75 | 18,25 | 57,00 | 2000,515 | 100,00 | 77,50 | 4,83 | 1370,294 | 174,90 | 83,0388 | AC | |
| D-339W | 5,00 | 80,00 | 85,00 | 1,40 | 73,10 | 89,20 | 164,00 | 7,20 | 3,553 | 3,50 | 35,97 | 128,03 | 0,00 | 454,906 | 32,39 | 40,21 | 53,58 | 439,840 | 32,17 | 214,5423 | AH |
| D-339X | | | | | | | 252,00 | 9,93 | 2,261 | 5,50 | 50,81 | 201,19 | 0,00 | 454,906 | 29,28 | 57,47 | 84,19 | 439,847 | 29,06 | 292,5576 | AK |
| D-339Y | | | | | | | 428,00 | 15,33 | 1,309 | 9,50 | 80,49 | 347,51 | 167,10 | 454,906 | 26,89 | 91,99 | 145,42 | 439,852 | 26,67 | 448,5884 | AP |
| D-339Z | | | | | | | 691,00 | 23,39 | 0,802 | 15,50 | 125,01 | 565,99 | 577,71 | 454,103 | 25,58 | 143,76 | 237,72 | 439,060 | 25,36 | 682,6345 | AS |
| D-339Z-01 | 70,00 | 75,00 | 1,20 | 63,30 | 78,00 | 117,00 | 4,98 | 5,304 | 3,50 | 34,40 | 82,61 | 0,00 | 438,119 | 33,01 | 37,85 | 46,21 | 419,794 | 32,73 | 187,7245 | AC | |
| D-339Z-02 | | | | | | 178,00 | 6,88 | 3,375 | 5,50 | 48,34 | 129,67 | 0,00 | 437,637 | 29,78 | 53,76 | 72,67 | 419,326 | 29,51 | 255,9879 | AD | |
| D-339Z-03 | | | | | | 273,00 | 9,69 | 2,184 | 8,50 | 69,25 | 203,76 | 0,00 | 444,982 | 27,83 | 77,63 | 111,00 | 426,670 | 27,56 | 358,3831 | AG | |
| D-339Z-04 | | | | | | 430,00 | 14,34 | 1,375 | 13,50 | 104,10 | 325,91 | 267,15 | 448,137 | 26,44 | 117,40 | 175,41 | 429,842 | 26,17 | 529,0417 | AK | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn |
| VD-339L | 4,50 | 45,50 | 50,00 | 0,80 | 39,70 | 52,00 | 112,00 | 2,76 | 6,926 | 5,50 | 40,02 | 71,98 | 0,00 | 498,506 | 30,97 | 43,16 | 15,03 | 476,763 | 30,59 | 134,7777 | AG |
| VD-339L-10 | | | | | | | 160,00 | 3,99 | 4,481 | 8,50 | 56,94 | 103,06 | 0,00 | 461,841 | 28,40 | 61,78 | 27,83 | 440,154 | 27,97 | 188,6887 | AG |
| VD-339M | | | | | | | 187,00 | 4,26 | 4,010 | 9,50 | 62,58 | 124,42 | 0,00 | 498,870 | 28,61 | 68,00 | 25,91 | 477,142 | 28,23 | 206,6591 | AK |
| VD-339N | | | | | | | 299,00 | 6,50 | 2,457 | 15,50 | 96,42 | 202,58 | 204,70 | 497,836 | 27,30 | 105,26 | 42,57 | 476,115 | 26,92 | 314,4812 | AO |
| VD-339N-02 | 36,50 | 41,00 | 0,60 | 31,20 | 41,90 | 35,00 | 1,10 | 32,794 | 2,25 | 21,20 | 13,80 | 0,00 | 452,560 | 44,44 | 22,20 | 6,90 | 419,766 | 43,95 | 61,2671 | AG | |
| VD-339N-03 | | | | | | 52,00 | 1,50 | 21,082 | 3,50 | 27,90 | 24,10 | 0,00 | 508,076 | 39,67 | 29,50 | 8,90 | 474,345 | 39,20 | 79,2868 | AG | |
| VD-339N-04 | | | | | | 78,00 | 2,10 | 13,416 | 5,50 | 38,70 | 39,30 | 0,00 | 527,241 | 36,06 | 41,20 | 13,00 | 493,702 | 35,60 | 108,1183 | AL | |
| VD-339N-05 | | | | | | 115,00 | 2,80 | 8,681 | 8,50 | 54,90 | 60,10 | 0,00 | 521,717 | 33,48 | 58,70 | 20,50 | 488,730 | 33,00 | 151,3657 | AO | |
| VD-339N-06 | | | | | | 165,00 | 4,00 | 5,903 | 12,50 | 76,45 | 88,55 | 0,00 | 522,707 | 31,99 | 82,10 | 30,00 | 489,355 | 31,50 | 209,0288 | AO | |
| VD-339O | | | | | | 27,50 | 32,00 | 0,40 | 22,10 | 33,20 | 41,70 | 0,91 | 49,294 | 3,50 | 27,21 | 14,49 | 0,00 | 714,400 | 64,62 | 28,44 | 4,03 |
| VD-339P | 60,40 | 1,25 | 31,369 | 5,50 | 37,61 | | | | | | 22,79 | 0,00 | 714,848 | 58,29 | 39,54 | 6,32 | 654,352 | 52,33 | 81,4590 | AG | |
| VD-339Q | 97,70 | 1,94 | 18,161 | 9,50 | 58,42 | | | | | | 39,28 | 0,00 | 713,362 | 53,39 | 61,76 | 10,96 | 652,701 | 52,33 | 124,9038 | AF | |
| VD-339R | 154,00 | 2,95 | 11,131 | 15,50 | 89,63 | | | | | | 64,37 | 70,70 | 716,467 | 50,78 | 95,07 | 17,72 | 655,941 | 49,73 | 190,0710 | AG | |
| VD-339R-05 | 22,50 | 27,00 | 0,35 | 17,20 | 28,00 | 37,00 | 0,90 | 90,000 | 3,50 | 26,95 | 10,05 | 0,00 | 904,500 | 92,70 | 28,20 | 2,40 | 792,000 | 91,10 | 48,8754 | AG | |
| VD-339R-10 | | | | | | 70,00 | 1,33 | 42,000 | 7,50 | 47,39 | 22,61 | 0,00 | 949,594 | 86,45 | 49,71 | 4,29 | 852,180 | 79,78 | 84,4212 | AF | |
| VD-339R-12 | 18,00 | 22,50 | 0,40 | 12,60 | 23,60 | 33,50 | 0,80 | 175,781 | 3,50 | 26,70 | 6,80 | 0,00 | 1195,313 | 146,50 | 27,85 | 1,20 | 993,164 | 143,50 | 39,1003 | AG | |
| VD-339R-01 | | | | | | 70,00 | 1,10 | 82,031 | 7,50 | 52,30 | 17,70 | 0,00 | 1451,953 | 133,00 | 57,35 | 2,24 | 1037,695 | 120,00 | 67,5369 | AF | |
| VD-339S | 17,50 | 22,00 | 0,66 | 12,10 | 23,10 | 31,80 | 1,59 | 191,283 | 3,50 | 26,68 | 5,12 | 0,00 | 978,930 | 114,00 | 27,65 | 1,77 | 793,824 | 148,00 | 38,0142 | AE | |
| VD-339T | | | | | | 44,90 | 2,24 | 121,725 | 5,50 | 36,79 | 8,11 | 0,00 | 987,624 | 114,90 | 38,31 | 2,74 | 802,171 | 130,00 | 51,8376 | AE | |
| VD-339T-10 | | | | | | 50,00 | 2,50 | 121,725 | 5,50 | 37,75 | 12,25 | 0,00 | 1491,136 | 187,20 | 41,30 | 1,55 | 1059,011 | 165,60 | 51,8376 | AF | |
| VD-339U | | | | | | 70,90 | 3,54 | 70,473 | 9,50 | 56,99 | 13,91 | 0,00 | 979,936 | 114,10 | 59,61 | 4,78 | 795,636 | 92,63 | 79,4843 | AF | |
| VD-339V | 14,50 | 19,00 | 0,55 | 9,10 | 21,00 | 110,00 | 5,50 | 43,193 | 15,50 | 87,31 | 22,69 | 69,50 | 980,164 | 114,10 | 91,59 | 7,81 | 795,181 | 92,58 | 120,9543 | AF | |
| VD-339V-04 | | | | | | 31,00 | 0,60 | 336,268 | 3,50 | 26,57 | 4,43 | 0,00 | 1489,669 | 227,23 | 27,50 | 0,65 | 1176,939 | 222,60 | 31,4975 | AF | |
| VD-339V-06 | | | | | | 63,00 | 1,10 | 138,463 | 8,50 | 51,67 | 11,33 | 0,00 | 1568,791 | 187,48 | 54,50 | 1,50 | 1176,939 | 182,00 | 60,1316 | AF | |
| VD-339V-01 | | | | | | 90,00 | 4,50 | 94,155 | 12,50 | 71,75 | 18,25 | 0,00 | 1718,233 | 200,00 | 77,45 | 2,23 | 1181,647 | 164,40 | 83,0388 | AF | |
| VD-339W | 5,00 | 80,00 | 85,00 | 1,40 | 73,10 | 89,20 | 164,00 | 7,20 | 3,052 | 3,50 | 35,97 | 128,03 | 0,00 | 390,717 | 32,39 | 40,21 | 29,92 | 377,777 | 32,17 | 214,5423 | AL |
| VD-339X | | | | | | | 252,00 | 9,93 | 1,942 | 5,50 | 50,81 | 201,19 | 0,00 | 390,717 | 29,28 | 57,47 | 47,02 | 377,783 | 29,06 | 292,5576 | AN |
| VD-339Y | | | | | | | 428,00 | 15,33 | 1,124 | 9,50 | 80,49 | 347,51 | 167,10 | 390,717 | 26,89 | 91,99 | 81,27 | 377,787 | 26,67 | 448,5884 | AT |
| VD-339Z | | | | | | | 691,00 | 23,39 | 0,689 | 15,50 | 125,01 | 565,99 | 577,71 | 390,027 | 25,58 | 143,76 | 133,12 | 377,107 | 25,36 | 682,6345 | AW |
| VD-339Z-01 | 70,00 | 75,00 | 1,20 | 63,30 | 78,00 | 117,00 | 4,98 | 4,555 | 3,50 | 34,40 | 82,61 | 0,00 | 376,298 | 33,01 | 37,85 | 30,87 | 360,559 | 32,73 | 187,7245 | AF | |
| VD-339Z-02 | | | | | | 178,00 | 6,88 | 2,899 | 5,50 | 48,34 | 129,67 | 0,00 | 375,884 | 29,78 | 53,76 | 48,59 | 360,158 | 29,51 | 255,9879 | AG | |
| VD-339Z-03 | | | | | | 273,00 | 9,69 | 1,876 | 8,50 | 69,25 | 203,76 | 0,00 | 382,194 | 27,83 | 77,63 | 73,18 | 366,465 | 27,56 | 358,3831 | AK | |
| VD-339Z-04 | | | | | | 430,00 | 14,34 | 1,181 | 13,50 | 104,10 | 325,91 | 267,15 | 384,903 | 26,44 | 117,40 | 114,95 | 369,189 | 26,17 | 529,0417 | AN | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | dynamic | | | | weight one spring in gram | price group | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|---------------------------|-------------|-----------------------------|----------------------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | | | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn |
| VD-340 | 5,00 | 63,00 | 68,00 | 1,00 | 56,50 | 71,00 | 120,00 | 3,74 | 6,249 | 3,50 | 33,42 | 86,58 | 0,00 | 541,039 | 36,62 | 38,75 | 14,71 | 507,717 | 36,30 | 168,9520 | AF |
| VD-341 | | | | | | | 180,00 | 5,16 | 3,977 | 5,50 | 46,80 | 133,20 | 0,00 | 529,678 | 33,12 | 51,45 | 23,10 | 511,182 | 32,79 | 230,3891 | AG |
| VD-342 | | | | | | | 275,00 | 7,26 | 2,573 | 8,50 | 66,87 | 208,13 | 0,00 | 535,526 | 31,10 | 76,50 | 35,68 | 510,750 | 30,78 | 322,5448 | AK |
| VD-343 | | | | | | | 395,00 | 10,05 | 1,750 | 12,50 | 93,63 | 301,37 | 253,74 | 527,292 | 29,68 | 104,50 | 52,89 | 508,279 | 29,36 | 445,4190 | AL |
| VD-343A | | | | | | | 395,00 | 14,23 | 1,182 | 18,50 | 133,78 | 261,22 | 253,74 | 308,819 | 24,98 | 149,42 | 183,08 | 290,327 | 24,65 | 629,7303 | AM |
| VD-344 | | | | | | | 585,00 | 14,23 | 1,182 | 18,50 | 133,78 | 451,22 | 503,35 | 533,439 | 28,90 | 153,50 | 78,06 | 510,124 | 28,58 | 629,7303 | AO |
| VD-344A | | | | | | | 585,00 | 17,01 | 0,972 | 22,50 | 160,54 | 424,46 | 503,35 | 412,591 | 26,46 | 179,56 | 160,57 | 394,104 | 26,13 | 752,6046 | AR |
| VD-344A-12 | | 55,00 | 60,00 | 1,00 | 48,50 | 62,20 | 80,00 | 3,00 | 9,391 | 3,50 | 32,45 | 47,55 | 0,00 | 446,563 | 35,43 | 34,95 | 20,80 | 423,084 | 35,10 | 147,4978 | AE |
| VD-344A-14 | | | | | | | 120,00 | 4,00 | 5,976 | 5,50 | 45,25 | 74,75 | 0,00 | 446,733 | 31,93 | 49,20 | 32,60 | 423,127 | 31,60 | 201,1334 | AF |
| VD-344A-10 | | | | | | | 190,00 | 5,35 | 3,652 | 9,00 | 67,67 | 122,33 | 0,00 | 446,786 | 32,68 | 74,00 | 51,51 | 423,658 | 30,32 | 294,9956 | AK |
| VD-344B | | 50,00 | 55,00 | 0,80 | 43,70 | 56,80 | 66,00 | 2,10 | 12,500 | 3,50 | 31,88 | 34,13 | 0,00 | 426,563 | 38,03 | 34,07 | 19,14 | 399,125 | 37,55 | 134,0889 | AE |
| VD-345 | | | | | | | 85,00 | 2,10 | 12,500 | 3,50 | 31,88 | 53,13 | 0,00 | 664,063 | 42,18 | 34,80 | 9,02 | 627,500 | 41,70 | 134,0889 | AF |
| VD-345A | | | | | | | 100,00 | 2,90 | 7,955 | 5,50 | 44,38 | 55,63 | 0,00 | 442,472 | 34,58 | 47,82 | 28,91 | 415,068 | 34,11 | 182,8485 | AF |
| VD-346 | | | | | | | 130,00 | 2,90 | 7,955 | 5,50 | 44,38 | 85,63 | 0,00 | 681,108 | 38,75 | 51,69 | 14,18 | 622,920 | 38,27 | 182,8485 | AG |
| VD-346A | | | | | | | 150,00 | 4,08 | 5,147 | 8,50 | 63,13 | 86,88 | 0,00 | 447,151 | 32,28 | 68,45 | 44,22 | 419,743 | 31,80 | 255,9879 | AG |
| VD-347 | | | | | | | 195,00 | 4,08 | 5,147 | 8,50 | 63,13 | 131,88 | 0,00 | 678,768 | 36,32 | 73,95 | 21,91 | 623,051 | 35,85 | 255,9879 | AH |
| VD-347A | | | | | | | 235,00 | 6,05 | 3,241 | 13,50 | 94,38 | 140,63 | 0,00 | 455,729 | 30,77 | 102,82 | 68,72 | 428,361 | 30,29 | 377,8870 | AH |
| VD-348 | | | | | | | 280,00 | 5,65 | 3,500 | 12,50 | 88,13 | 191,88 | 138,22 | 671,563 | 34,77 | 102,50 | 32,51 | 621,250 | 34,29 | 353,5072 | AK |
| VD-348A | | | | | | | 280,00 | 8,00 | 2,365 | 18,50 | 125,63 | 154,38 | 138,22 | 365,076 | 28,41 | 137,19 | 115,71 | 337,726 | 27,93 | 499,7860 | AL |
| VD-349 | | | | | | | 410,00 | 8,00 | 2,365 | 18,50 | 125,63 | 284,38 | 334,38 | 672,508 | 33,78 | 147,00 | 47,94 | 621,959 | 33,30 | 499,7860 | AM |
| VD-349A | | | | | | | 410,00 | 9,57 | 1,944 | 22,50 | 150,63 | 259,38 | 334,38 | 504,340 | 30,47 | 194,70 | 117,39 | 418,639 | 29,99 | 597,3052 | F |
| VD-349A-02 | | 45,00 | 50,00 | 0,80 | 38,70 | 51,60 | 50,00 | 1,50 | 18,466 | 3,25 | 29,45 | 20,55 | 0,00 | 379,471 | 48,17 | 31,80 | 13,50 | 336,077 | 47,60 | 102,3952 | AG |
| VD-349A-04 | | | | | | | 70,00 | 2,20 | 10,912 | 5,50 | 42,90 | 27,10 | 0,00 | 295,704 | 40,65 | 46,70 | 23,00 | 254,240 | 40,10 | 146,2788 | AH |
| VD-349A-10 | | | | | | | 95,00 | 2,81 | 8,573 | 7,00 | 52,75 | 42,25 | 0,00 | 362,204 | 34,90 | 56,63 | 34,87 | 328,961 | 34,15 | 197,4764 | AJ |
| VD-350 | | 40,00 | 45,00 | 0,50 | 34,00 | 46,50 | 64,00 | 1,38 | 24,414 | 3,50 | 30,93 | 33,07 | 0,00 | 807,373 | 53,19 | 32,90 | 5,60 | 759,277 | 52,46 | 107,2711 | AE |
| VD-350A | | | | | | | 80,00 | 1,90 | 15,536 | 5,50 | 42,89 | 37,11 | 0,00 | 576,549 | 44,20 | 45,59 | 16,76 | 534,601 | 43,67 | 146,2788 | AG |
| VD-351 | | | | | | | 95,00 | 1,90 | 15,536 | 5,50 | 42,89 | 52,61 | 0,00 | 817,361 | 48,61 | 46,99 | 8,80 | 753,662 | 47,87 | 146,2788 | AG |
| VD-351A | | | | | | | 110,00 | 2,41 | 11,393 | 7,50 | 54,85 | 55,15 | 0,00 | 628,337 | 43,01 | 58,53 | 20,29 | 586,410 | 42,28 | 185,2865 | AG |
| VD-351B | | | | | | | 130,00 | 2,80 | 9,494 | 9,00 | 63,82 | 66,18 | 0,00 | 628,337 | 42,80 | 68,23 | 24,34 | 586,466 | 41,62 | 214,5423 | AH |
| VD-352 | | | | | | | 140,00 | 2,67 | 10,053 | 8,50 | 60,83 | 79,17 | 0,00 | 795,884 | 45,18 | 65,00 | 13,58 | 753,964 | 44,45 | 204,7904 | AG |
| VD-353 | | | | | | | 205,00 | 3,70 | 6,836 | 12,50 | 84,75 | 120,25 | 0,00 | 822,021 | 43,81 | 94,00 | 19,97 | 758,789 | 43,07 | 282,8057 | AH |
| VD-353A | | | | | | | 205,00 | 5,24 | 4,619 | 18,50 | 120,63 | 84,37 | 0,00 | 389,695 | 34,98 | 129,69 | 72,36 | 347,848 | 34,24 | 399,8288 | AJ |
| VD-354 | | | | | | | 300,00 | 5,24 | 4,619 | 18,50 | 120,63 | 179,37 | 231,88 | 828,488 | 42,64 | 135,80 | 29,69 | 758,420 | 41,91 | 399,8288 | AL |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|---------|-------|----------|----|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | |
| D-340 | 5,00 | 63,00 | 68,00 | 1,00 | 56,50 | 71,00 | 120,00 | 3,74 | 7,275 | 3,50 | 33,42 | 86,58 | 0,00 | 629,924 | 36,62 | 39,80 | 30,55 | 583,489 | 36,30 | 168,9520 | AC | | | | |
| D-341 | | | | | | | 180,00 | 5,16 | 4,630 | 5,50 | 46,80 | 133,20 | 0,00 | 616,696 | 33,12 | 53,90 | 47,98 | 583,819 | 32,79 | 230,3891 | AD | | | | |
| D-342 | | | | | | | 275,00 | 7,26 | 2,996 | 8,50 | 66,87 | 208,13 | 0,00 | 623,505 | 31,10 | 79,90 | 74,06 | 584,473 | 30,78 | 322,5448 | AG | | | | |
| D-343 | | | | | | | 395,00 | 10,05 | 2,037 | 12,50 | 93,63 | 301,37 | 253,74 | 613,918 | 29,68 | 108,20 | 108,97 | 584,245 | 29,36 | 445,4190 | AH | | | | |
| D-343A | | | | | | | 395,00 | 14,23 | 1,376 | 18,50 | 133,78 | 261,22 | 253,74 | 359,554 | 24,98 | 149,42 | 230,80 | 338,024 | 24,65 | 629,7303 | AJ | | | | |
| D-344 | | | | | | | 585,00 | 14,23 | 1,376 | 18,50 | 133,78 | 451,22 | 503,35 | 621,076 | 28,90 | 161,00 | 161,40 | 583,606 | 28,58 | 629,7303 | AL | | | | |
| D-344A | | | | | | | 585,00 | 17,01 | 1,132 | 22,50 | 160,54 | 424,46 | 503,35 | 480,374 | 26,46 | 179,56 | 239,16 | 458,849 | 26,13 | 752,6046 | AM | | | | |
| D-344A-12 | 55,00 | 60,00 | 1,00 | 48,50 | 62,20 | 80,00 | 2,60 | 10,934 | 3,50 | 32,43 | 47,57 | 0,00 | 520,145 | 36,50 | 34,90 | 28,60 | 493,138 | 36,20 | 147,4978 | AC | | | | | |
| D-344A-14 | | | | | | 120,00 | 3,60 | 6,958 | 5,50 | 45,24 | 74,76 | 0,00 | 520,195 | 33,00 | 49,20 | 45,20 | 492,641 | 32,60 | 201,1334 | AG | | | | | |
| D-344A-10 | | | | | | 190,00 | 5,35 | 4,252 | 9,00 | 67,67 | 122,33 | 0,00 | 520,186 | 32,68 | 74,00 | 74,11 | 493,259 | 30,32 | 294,9956 | AG | | | | | |
| D-344B | 50,00 | 55,00 | 0,80 | 43,70 | 56,80 | 66,00 | 2,10 | 14,554 | 3,50 | 31,88 | 34,13 | 0,00 | 496,641 | 38,03 | 34,07 | 25,45 | 464,696 | 37,55 | 134,0889 | AB | | | | | |
| D-345 | | | | | | 85,00 | 2,10 | 14,554 | 3,50 | 31,88 | 53,13 | 0,00 | 773,158 | 42,18 | 36,00 | 18,82 | 713,125 | 41,70 | 134,0889 | AC | | | | | |
| D-345A | | | | | | 100,00 | 2,90 | 9,261 | 5,50 | 44,38 | 55,63 | 0,00 | 515,163 | 34,58 | 47,82 | 39,22 | 483,258 | 34,11 | 182,8485 | AC | | | | | |
| D-346 | | | | | | 130,00 | 2,90 | 9,261 | 5,50 | 44,38 | 85,63 | 0,00 | 793,004 | 38,75 | 53,00 | 29,57 | 713,125 | 38,27 | 182,8485 | AD | | | | | |
| D-346A | | | | | | 150,00 | 4,08 | 5,993 | 8,50 | 63,13 | 86,88 | 0,00 | 520,611 | 32,28 | 68,45 | 60,25 | 488,700 | 31,80 | 255,9879 | AD | | | | | |
| D-347 | | | | | | 195,00 | 4,08 | 5,993 | 8,50 | 63,13 | 131,88 | 0,00 | 790,280 | 36,32 | 76,00 | 45,69 | 713,125 | 35,85 | 255,9879 | AE | | | | | |
| D-347A | | | | | | 235,00 | 6,05 | 3,773 | 13,50 | 94,38 | 140,63 | 0,00 | 530,599 | 30,77 | 102,82 | 94,67 | 498,735 | 30,29 | 377,8870 | AE | | | | | |
| D-348 | | | | | | 280,00 | 5,65 | 4,075 | 12,50 | 88,13 | 191,88 | 138,22 | 781,891 | 34,77 | 104,00 | 66,81 | 717,200 | 34,29 | 353,5072 | AG | | | | | |
| D-348A | | | | | | 280,00 | 8,00 | 2,753 | 18,50 | 125,63 | 154,38 | 138,22 | 425,053 | 28,41 | 137,19 | 115,71 | 393,210 | 27,93 | 499,7860 | AH | | | | | |
| D-349 | | | | | | 410,00 | 8,00 | 2,753 | 18,50 | 125,63 | 284,38 | 334,38 | 782,992 | 33,78 | 149,00 | 98,69 | 718,632 | 33,30 | 499,7860 | AJ | | | | | |
| D-349A | | | | | | 410,00 | 9,57 | 2,264 | 22,50 | 150,63 | 259,38 | 334,38 | 587,196 | 30,47 | 194,70 | 159,70 | 487,415 | 29,99 | 597,3052 | AK | | | | | |
| D-349A-02 | | | | | | 45,00 | 50,00 | 0,80 | 38,70 | 51,60 | 50,00 | 1,30 | 21,499 | 3,25 | 29,44 | 20,56 | 0,00 | 442,028 | 49,50 | 31,70 | 14,20 | 393,439 | 47,70 | 102,3952 | AB |
| D-349A-04 | | | | | | | | | | | 70,00 | 1,80 | 12,704 | 5,50 | 42,89 | 27,11 | 0,00 | 344,411 | 41,60 | 46,70 | 23,30 | 296,008 | 40,90 | 146,2788 | AF |
| D-349A-10 | | | | | | | | | | | 95,00 | 2,81 | 9,982 | 7,00 | 52,75 | 42,25 | 0,00 | 421,709 | 34,90 | 56,63 | 38,37 | 383,004 | 34,15 | 197,4764 | AF |
| D-350 | 40,00 | 45,00 | 0,50 | 34,00 | 46,50 | 64,00 | 1,38 | 28,425 | 3,50 | 30,93 | 33,07 | 0,00 | 940,013 | 53,19 | 33,50 | 11,61 | 866,961 | 52,46 | 107,2711 | AB | | | | | |
| D-350A | | | | | | 80,00 | 1,90 | 18,089 | 5,50 | 42,89 | 37,11 | 0,00 | 671,268 | 44,20 | 45,59 | 23,49 | 622,429 | 43,67 | 146,2788 | AD | | | | | |
| D-351 | | | | | | 95,50 | 1,90 | 18,089 | 5,50 | 42,89 | 52,61 | 0,00 | 951,641 | 48,61 | 47,50 | 18,21 | 868,253 | 47,87 | 146,2788 | AD | | | | | |
| D-351A | | | | | | 110,00 | 2,41 | 13,265 | 7,50 | 54,85 | 55,15 | 0,00 | 731,563 | 43,01 | 58,53 | 30,27 | 682,748 | 42,28 | 185,2865 | AD | | | | | |
| D-351B | | | | | | 130,00 | 2,80 | 11,054 | 9,00 | 63,82 | 66,18 | 0,00 | 731,563 | 42,80 | 68,23 | 36,21 | 682,815 | 41,62 | 214,5423 | AE | | | | | |
| D-352 | | | | | | 140,00 | 2,67 | 11,704 | 8,50 | 60,83 | 79,17 | 0,00 | 926,636 | 45,18 | 66,00 | 28,22 | 866,125 | 44,45 | 204,7904 | AD | | | | | |
| D-353 | | | | | | 205,00 | 3,70 | 7,959 | 12,50 | 84,75 | 120,25 | 0,00 | 957,068 | 43,81 | 95,90 | 41,38 | 868,325 | 43,07 | 282,8057 | AE | | | | | |
| D-353A | | | | | | 205,00 | 5,24 | 5,378 | 18,50 | 120,63 | 84,37 | 0,00 | 453,716 | 34,98 | 129,69 | 75,31 | 404,994 | 34,24 | 399,8288 | AF | | | | | |
| D-354 | | | | | | 300,00 | 5,24 | 5,378 | 18,50 | 120,63 | 179,37 | 231,88 | 964,597 | 42,64 | 139,50 | 61,62 | 863,120 | 41,91 | 399,8288 | AH | | | | | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Ldyn minimum length dynamic | shdyn maximum stroke dynamic | Fdyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-354A | 5,00 | 40,00 | 45,00 | 0,50 | 34,00 | 46,50 | 300,00 | 6,26 | 4,422 | 22,50 | 144,55 | 155,45 | 231,88 | 687,347 | 38,00 | 155,58 | 94,68 | 638,576 | 37,27 | 477,8442 | AJ |
| D-354B | | 32,00 | 37,00 | 0,50 | 26,00 | 38,20 | 43,00 | 1,03 | 55,517 | 3,50 | 30,33 | 12,67 | 0,00 | 703,673 | 67,56 | 31,75 | 10,04 | 624,572 | 66,37 | 85,8169 | AB |
| D-355 | | | | | | | 51,00 | 1,03 | 55,517 | 3,50 | 30,33 | 20,67 | 0,00 | 1147,813 | 74,20 | 32,30 | 7,15 | 1038,177 | 73,00 | 85,8169 | AB |
| D-355A | | | | | | | 63,00 | 1,42 | 35,329 | 5,50 | 41,94 | 21,06 | 0,00 | 744,049 | 61,23 | 44,16 | 15,33 | 665,604 | 60,05 | 117,0231 | AC |
| D-356 | | | | | | | 75,00 | 1,42 | 35,329 | 5,50 | 41,94 | 33,06 | 0,00 | 1168,001 | 67,50 | 45,60 | 11,22 | 1038,681 | 66,40 | 117,0231 | AC |
| D-356A | | | | | | | 94,00 | 2,00 | 22,860 | 8,50 | 59,36 | 34,64 | 0,00 | 791,848 | 57,50 | 62,79 | 22,88 | 713,465 | 56,32 | 163,8323 | AC |
| D-357 | | | | | | | 110,00 | 2,00 | 22,860 | 8,50 | 59,36 | 50,64 | 0,00 | 1157,610 | 62,90 | 64,90 | 17,48 | 1030,992 | 61,80 | 163,8323 | AC |
| D-357A | | | | | | | 144,00 | 2,95 | 14,393 | 13,50 | 88,40 | 55,60 | 0,00 | 800,314 | 54,53 | 93,85 | 36,11 | 721,830 | 53,35 | 241,8477 | AD |
| D-358 | | | | | | | 160,00 | 2,76 | 15,545 | 12,50 | 82,59 | 77,41 | 0,00 | 1203,330 | 61,00 | 93,00 | 25,44 | 1041,508 | 59,80 | 226,2446 | AD |
| D-358A | | | | | | | 160,00 | 3,91 | 10,503 | 18,50 | 117,43 | 42,57 | 0,00 | 447,092 | 47,79 | 124,90 | 35,10 | 368,666 | 46,61 | 319,8630 | AE |
| D-359 | | | | | | | 230,00 | 3,91 | 10,503 | 18,50 | 117,43 | 112,57 | 172,10 | 1182,323 | 58,00 | 131,00 | 37,71 | 1039,827 | 57,60 | 319,8630 | AG |
| D-359A | | | | | | | 230,00 | 4,68 | 8,636 | 22,50 | 140,66 | 89,34 | 172,10 | 771,528 | 51,96 | 149,74 | 61,47 | 693,129 | 50,78 | 382,2753 | AH |
| D-359A-01 | | 29,00 | 34,00 | 0,40 | 23,10 | 35,20 | 48,00 | 1,02 | 65,267 | 4,00 | 33,01 | 14,99 | 0,00 | 978,405 | 83,50 | 34,51 | 8,00 | 880,452 | 82,00 | 84,8417 | AB |
| D-359A-02 | | | | | | | 68,00 | 1,37 | 43,511 | 6,00 | 44,51 | 23,49 | 0,00 | 1021,916 | 76,50 | 46,77 | 11,60 | 923,746 | 75,00 | 113,1223 | AC |
| D-359A-03 | | | | | | | 88,00 | 1,72 | 32,634 | 8,00 | 56,02 | 31,98 | 0,00 | 1043,672 | 72,90 | 59,03 | 15,23 | 945,393 | 71,40 | 141,4029 | AC |
| D-359A-04 | | | | | | | 107,00 | 2,07 | 26,107 | 10,00 | 67,52 | 39,48 | 0,00 | 1030,618 | 70,30 | 71,28 | 19,23 | 932,535 | 68,91 | 169,6834 | AC |
| D-359A-05 | | | | | | | 127,00 | 2,41 | 21,756 | 12,00 | 79,03 | 47,97 | 0,00 | 1043,672 | 68,90 | 83,54 | 22,84 | 945,501 | 67,50 | 197,9640 | AD |
| D-359A-06 | | | | | | | 147,00 | 2,76 | 18,648 | 14,00 | 90,53 | 56,47 | 0,00 | 1052,995 | 67,90 | 95,80 | 26,46 | 954,763 | 66,40 | 226,2446 | AD |
| D-359A-07 | | | | | | | 166,00 | 3,11 | 16,317 | 16,00 | 102,04 | 63,96 | 88,05 | 1043,672 | 66,90 | 108,06 | 30,46 | 945,393 | 65,48 | 254,5252 | AE |
| D-359A-08 | | | | | | | 186,00 | 3,45 | 14,504 | 18,00 | 113,54 | 72,46 | 123,47 | 1050,923 | 66,30 | 120,31 | 34,07 | 952,753 | 64,91 | 282,8057 | AE |
| D-359A-09 | | | | | | | 206,00 | 3,80 | 13,053 | 20,00 | 125,05 | 80,95 | 152,67 | 1056,725 | 65,90 | 132,57 | 37,68 | 958,511 | 64,45 | 311,0863 | AF |
| D-359A-20 | | 27,00 | 32,00 | 0,40 | 21,10 | 32,30 | 300,00 | 4,20 | 13,479 | 24,00 | 188,35 | 111,65 | 271,60 | 1504,887 | 84,68 | 212,00 | 33,52 | 1186,118 | 82,40 | 342,2924 | AF |
| D-359B | | 25,00 | 30,00 | 0,35 | 19,10 | 31,00 | 34,00 | 0,81 | 116,429 | 3,50 | 29,91 | 4,09 | 0,00 | 476,629 | 101,80 | 31,12 | 2,88 | 335,314 | 99,76 | 67,0445 | AB |
| D-360 | | | | | | | 41,00 | 0,81 | 116,429 | 3,50 | 29,91 | 11,09 | 0,00 | 1291,629 | 114,00 | 31,12 | 4,46 | 1150,314 | 111,00 | 67,0445 | AB |
| D-360A | | | | | | | 50,00 | 1,12 | 74,091 | 5,50 | 41,28 | 8,72 | 0,00 | 645,980 | 92,89 | 43,17 | 6,83 | 506,041 | 90,79 | 91,4243 | AB |
| D-361 | | | | | | | 60,00 | 1,12 | 74,091 | 5,50 | 41,28 | 18,72 | 0,00 | 1386,889 | 104,00 | 43,17 | 6,51 | 1246,950 | 101,00 | 91,4243 | AB |
| D-361A | | | | | | | 72,00 | 1,58 | 47,941 | 8,50 | 58,34 | 13,66 | 0,00 | 654,697 | 85,63 | 61,26 | 10,74 | 514,888 | 83,53 | 127,9940 | AC |
| D-362 | | | | | | | 87,50 | 1,58 | 47,941 | 8,50 | 58,34 | 29,16 | 0,00 | 1397,785 | 96,70 | 61,26 | 9,96 | 1257,976 | 94,60 | 127,9940 | AC |
| D-362A | | | | | | | 110,00 | 2,34 | 30,185 | 13,50 | 86,78 | 23,22 | 0,00 | 700,862 | 81,17 | 91,42 | 18,58 | 560,841 | 79,07 | 188,9435 | AD |
| D-363 | | | | | | | 125,00 | 2,19 | 32,600 | 12,50 | 81,09 | 43,91 | 0,00 | 1431,344 | 92,80 | 86,80 | 14,80 | 1245,320 | 90,70 | 176,7536 | AD |
| D-363A | | | | | | | 160,00 | 2,80 | 24,697 | 16,50 | 103,84 | 56,16 | 105,90 | 1386,889 | 88,80 | 109,51 | 19,52 | 1246,950 | 87,70 | 225,5132 | AE |
| D-364 | | | | | | | 180,00 | 3,10 | 22,027 | 18,50 | 115,22 | 64,78 | 134,90 | 1426,938 | 89,60 | 122,90 | 21,69 | 1257,743 | 87,50 | 249,8930 | AF |
| D-364A | | | | | | | 180,00 | 3,71 | 18,111 | 22,50 | 137,97 | 42,03 | 134,90 | 761,233 | 78,53 | 145,71 | 34,29 | 621,030 | 76,42 | 298,6526 | AF |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-354A | 5,00 | 40,00 | 45,00 | 0,50 | 34,00 | 46,50 | 300,00 | 6,26 | 3,798 | 22,50 | 144,55 | 155,45 | 231,88 | 590,359 | 38,00 | 155,58 | 66,50 | 548,470 | 37,27 | 477,8442 | AM |
| VD-354B | | 32,00 | 37,00 | 0,50 | 26,00 | 38,20 | 43,00 | 1,03 | 47,684 | 3,50 | 30,33 | 12,67 | 0,00 | 604,382 | 67,56 | 31,75 | 7,80 | 536,442 | 66,37 | 85,8169 | AE |
| VD-355 | | | | | | | 51,00 | 1,03 | 47,684 | 3,50 | 30,33 | 20,67 | 0,00 | 985,851 | 74,20 | 32,08 | 3,47 | 902,176 | 73,00 | 85,8169 | AE |
| VD-355A | | | | | | | 63,00 | 1,42 | 30,344 | 5,50 | 41,94 | 21,06 | 0,00 | 639,061 | 61,23 | 44,16 | 11,60 | 571,684 | 60,05 | 117,0231 | AF |
| VD-356 | | | | | | | 75,00 | 1,42 | 30,344 | 5,50 | 41,94 | 33,06 | 0,00 | 1003,191 | 67,50 | 45,20 | 5,41 | 904,257 | 66,40 | 117,0231 | AF |
| VD-356A | | | | | | | 94,00 | 2,00 | 19,634 | 8,50 | 59,36 | 34,64 | 0,00 | 680,115 | 57,50 | 62,79 | 16,74 | 612,792 | 56,32 | 163,8323 | AF |
| VD-357 | | | | | | | 110,00 | 2,00 | 19,634 | 8,50 | 59,36 | 50,64 | 0,00 | 994,266 | 62,90 | 63,95 | 8,36 | 904,167 | 61,80 | 163,8323 | AF |
| VD-357A | | | | | | | 144,00 | 2,95 | 12,362 | 13,50 | 88,40 | 55,60 | 0,00 | 687,387 | 54,53 | 93,85 | 26,26 | 619,977 | 53,35 | 241,8477 | AG |
| VD-358 | | | | | | | 160,00 | 2,76 | 13,351 | 12,50 | 82,59 | 77,41 | 0,00 | 1033,535 | 61,00 | 92,15 | 12,28 | 905,895 | 59,80 | 226,2446 | AG |
| VD-358A | | | | | | | 160,00 | 3,91 | 9,021 | 18,50 | 117,43 | 42,57 | 0,00 | 384,005 | 47,79 | 124,90 | 35,10 | 316,646 | 46,61 | 319,8630 | AH |
| VD-359 | | | | | | | 230,00 | 3,91 | 9,021 | 18,50 | 117,43 | 112,57 | 172,10 | 1015,493 | 58,00 | 129,90 | 18,27 | 903,026 | 57,60 | 319,8630 | AK |
| VD-359A | | | | | | | 230,00 | 4,68 | 7,417 | 22,50 | 140,66 | 89,34 | 172,10 | 662,662 | 51,96 | 149,74 | 45,65 | 595,326 | 50,78 | 382,2753 | AL |
| VD-359A-01 | | 29,00 | 34,00 | 0,40 | 23,10 | 35,20 | 48,00 | 1,02 | 56,058 | 4,00 | 33,01 | 14,99 | 0,00 | 840,347 | 83,50 | 34,51 | 5,38 | 756,216 | 82,00 | 84,8417 | AE |
| VD-359A-02 | | | | | | | 68,00 | 1,37 | 37,372 | 6,00 | 44,51 | 23,49 | 0,00 | 877,719 | 76,50 | 46,77 | 7,51 | 793,401 | 75,00 | 113,1223 | AF |
| VD-359A-03 | | | | | | | 88,00 | 1,72 | 28,029 | 8,00 | 56,02 | 31,98 | 0,00 | 896,405 | 72,90 | 59,03 | 9,65 | 811,994 | 71,40 | 141,4029 | AF |
| VD-359A-04 | | | | | | | 107,00 | 2,07 | 22,423 | 10,00 | 67,52 | 39,48 | 0,00 | 885,194 | 70,30 | 71,28 | 12,33 | 800,950 | 68,91 | 169,6834 | AF |
| VD-359A-05 | | | | | | | 127,00 | 2,41 | 18,686 | 12,00 | 79,03 | 47,97 | 0,00 | 896,405 | 68,90 | 83,54 | 14,47 | 812,087 | 67,50 | 197,9640 | AG |
| VD-359A-06 | | | | | | | 147,00 | 2,76 | 16,016 | 14,00 | 90,53 | 56,47 | 0,00 | 904,413 | 67,90 | 95,80 | 16,60 | 820,042 | 66,40 | 226,2446 | AG |
| VD-359A-07 | | | | | | | 166,00 | 3,11 | 14,014 | 16,00 | 102,04 | 63,96 | 88,05 | 896,405 | 66,90 | 108,06 | 19,29 | 811,994 | 65,48 | 254,5252 | AH |
| VD-359A-08 | | | | | | | 186,00 | 3,45 | 12,457 | 18,00 | 113,54 | 72,46 | 123,47 | 902,634 | 66,30 | 120,31 | 21,42 | 818,316 | 64,91 | 282,8057 | AH |
| VD-359A-09 | | | | | | | 206,00 | 3,80 | 11,212 | 20,00 | 125,05 | 80,95 | 152,67 | 907,617 | 65,90 | 132,57 | 23,54 | 823,261 | 64,45 | 311,0863 | AJ |
| VD-359A-20 | | 27,00 | 32,00 | 0,40 | 21,10 | 32,30 | 300,00 | 4,20 | 11,577 | 24,00 | 185,75 | 114,25 | 271,60 | 1322,640 | 84,68 | 210,50 | 16,29 | 1036,116 | 82,40 | 342,2924 | AJ |
| VD-359B | | 25,00 | 30,00 | 0,35 | 19,10 | 31,00 | 34,00 | 0,81 | 100,000 | 3,50 | 29,91 | 4,09 | 0,00 | 409,375 | 101,80 | 31,12 | 2,88 | 288,000 | 99,76 | 67,0445 | AE |
| VD-360 | | | | | | | 41,00 | 0,81 | 100,000 | 3,50 | 29,91 | 11,09 | 0,00 | 1109,375 | 114,00 | 31,12 | 2,57 | 988,000 | 111,00 | 67,0445 | AE |
| VD-360A | | | | | | | 50,00 | 1,12 | 63,636 | 5,50 | 41,28 | 8,72 | 0,00 | 554,830 | 92,89 | 43,17 | 6,83 | 434,636 | 90,79 | 91,4243 | AE |
| VD-361 | | | | | | | 60,00 | 1,12 | 63,636 | 5,50 | 41,28 | 18,72 | 0,00 | 1191,193 | 104,00 | 43,17 | 3,30 | 1071,000 | 101,00 | 91,4243 | AE |
| VD-361A | | | | | | | 72,00 | 1,58 | 41,176 | 8,50 | 58,34 | 13,66 | 0,00 | 562,316 | 85,63 | 61,26 | 10,74 | 442,235 | 83,53 | 127,9940 | AF |
| VD-362 | | | | | | | 87,50 | 1,58 | 41,176 | 8,50 | 58,34 | 29,16 | 0,00 | 1200,551 | 96,70 | 61,26 | 4,98 | 1080,471 | 94,60 | 127,9940 | AF |
| VD-362A | | | | | | | 110,00 | 2,34 | 25,926 | 13,50 | 86,78 | 23,22 | 0,00 | 601,968 | 81,17 | 91,42 | 18,58 | 481,704 | 79,07 | 188,9435 | AG |
| VD-363 | | | | | | | 125,00 | 2,19 | 28,000 | 12,50 | 81,09 | 43,91 | 0,00 | 1229,375 | 92,80 | 85,99 | 7,08 | 1092,280 | 90,70 | 176,7536 | AG |
| VD-363A | | | | | | | 160,00 | 2,80 | 21,212 | 16,50 | 103,84 | 56,16 | 105,90 | 1191,193 | 88,80 | 109,51 | 9,91 | 1071,000 | 87,70 | 225,5132 | AH |
| VD-364 | | | | | | | 180,00 | 3,10 | 18,919 | 18,50 | 115,22 | 64,78 | 134,90 | 1225,591 | 89,60 | 121,90 | 10,53 | 1099,189 | 87,50 | 249,8930 | AJ |
| VD-364A | | | | | | | 180,00 | 3,71 | 15,556 | 22,50 | 137,97 | 42,03 | 134,90 | 653,819 | 78,53 | 145,71 | 33,02 | 533,400 | 76,42 | 298,6526 | AJ |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn |
| VD-364B | 5,50 | 89,50 | 95,00 | 1,70 | 81,80 | 99,70 | 181,00 | 8,05 | 3,191 | 3,50 | 39,82 | 141,18 | 0,00 | 450,496 | 37,78 | 44,61 | 34,29 | 435,215 | 37,51 | 290,4232 | AN |
| VD-364C | | | | | | | 278,00 | 11,11 | 2,031 | 5,50 | 56,29 | 221,71 | 0,00 | 450,206 | 34,13 | 63,81 | 53,95 | 434,937 | 33,87 | 396,0316 | AO |
| VD-364D | | | | | | | 472,00 | 17,15 | 1,176 | 9,50 | 89,23 | 382,77 | 0,00 | 449,993 | 31,34 | 102,22 | 93,27 | 434,720 | 31,07 | 607,2485 | AT |
| VD-364E | | | | | | | 763,00 | 26,17 | 0,721 | 15,50 | 138,64 | 624,36 | 634,10 | 449,879 | 29,81 | 159,84 | 152,16 | 434,601 | 29,54 | 924,0738 | AX |
| VD-364E-02 | 74,50 | 80,00 | 1,20 | 67,60 | 81,50 | 80,00 | 4,20 | 8,606 | 2,25 | 28,05 | 51,95 | 0,00 | 447,088 | 43,51 | 30,40 | 21,00 | 426,864 | 43,30 | 186,8060 | AN | |
| VD-364E-04 | | | | | | 120,00 | 5,50 | 5,533 | 3,50 | 37,50 | 82,50 | 0,00 | 456,432 | 38,18 | 41,20 | 31,60 | 435,962 | 37,90 | 241,7489 | AN | |
| VD-364E-06 | | | | | | 165,00 | 7,60 | 3,521 | 5,50 | 52,60 | 112,40 | 0,00 | 395,725 | 33,46 | 58,40 | 60,70 | 375,305 | 33,20 | 329,6576 | AO | |
| VD-364E-08 | 64,50 | 70,00 | 1,20 | 57,60 | 71,50 | 65,00 | 2,70 | 13,262 | 2,25 | 27,20 | 37,80 | 0,00 | 501,290 | 46,02 | 29,20 | 16,10 | 474,767 | 45,70 | 161,7314 | AM | |
| VD-364E-10 | | | | | | 95,00 | 3,70 | 8,525 | 3,50 | 36,20 | 58,80 | 0,00 | 501,290 | 40,30 | 39,20 | 25,00 | 475,714 | 39,95 | 209,2994 | AN | |
| VD-364E-12 | | | | | | 147,00 | 5,10 | 5,425 | 5,50 | 50,55 | 96,45 | 0,00 | 523,262 | 36,64 | 55,20 | 36,50 | 498,035 | 36,30 | 285,4083 | AO | |
| VD-364E-14 | | | | | | 220,00 | 7,20 | 3,510 | 8,50 | 72,10 | 147,90 | 0,00 | 519,193 | 34,02 | 79,30 | 57,10 | 493,918 | 33,70 | 399,5716 | AO | |
| VD-364E-16 | | | | | | 335,00 | 10,20 | 2,387 | 12,50 | 100,90 | 234,10 | 0,00 | 558,819 | 33,08 | 112,00 | 73,20 | 532,322 | 32,70 | 551,7893 | AQ | |
| VD-364F | 54,50 | 60,00 | 1,00 | 47,50 | 62,20 | 85,40 | 2,20 | 14,132 | 3,50 | 35,01 | 50,39 | 0,00 | 712,104 | 48,65 | 37,39 | 12,14 | 678,474 | 48,07 | 176,8499 | AF | |
| VD-364G | | | | | | 128,00 | 3,04 | 8,993 | 5,50 | 48,73 | 79,27 | 0,00 | 712,875 | 44,26 | 52,47 | 19,02 | 679,244 | 43,67 | 241,1589 | AK | |
| VD-364H | | | | | | 213,00 | 4,69 | 5,206 | 9,50 | 76,17 | 136,83 | 0,00 | 712,402 | 40,87 | 82,63 | 32,91 | 678,771 | 40,28 | 369,7770 | AN | |
| VD-364J | | | | | | 341,00 | 7,15 | 3,191 | 15,50 | 117,33 | 223,67 | 218,30 | 713,745 | 39,05 | 127,87 | 53,44 | 680,115 | 38,46 | 562,7042 | AQ | |
| VD-364J-01 | 50,50 | 56,00 | 1,00 | 43,50 | 58,00 | 53,00 | 1,60 | 27,631 | 2,25 | 26,20 | 26,80 | 0,00 | 740,520 | 56,71 | 27,80 | 7,00 | 696,310 | 56,10 | 126,6269 | AF | |
| VD-364J-02 | | | | | | 77,00 | 2,10 | 17,763 | 3,50 | 34,65 | 42,35 | 0,00 | 752,264 | 50,11 | 36,90 | 10,40 | 712,297 | 50,00 | 163,8701 | AN | |
| VD-364J-03 | | | | | | 117,00 | 3,00 | 11,304 | 5,50 | 48,15 | 68,85 | 0,00 | 778,262 | 45,78 | 51,70 | 14,70 | 738,134 | 45,20 | 223,4592 | AO | |
| VD-364J-04 | | | | | | 175,00 | 4,20 | 7,314 | 8,50 | 68,34 | 106,66 | 0,00 | 780,110 | 42,77 | 73,63 | 22,20 | 741,400 | 42,20 | 321,7812 | AM | |
| VD-364J-05 | | | | | | 605,00 | 16,24 | 1,397 | 44,50 | 311,18 | 293,82 | 560,52 | 410,499 | 34,20 | 338,89 | 215,10 | 371,780 | 33,00 | 1385,4470 | AQ | |
| VD-364J-20 | 42,50 | 48,00 | 0,60 | 36,20 | 48,90 | 45,00 | 1,30 | 46,356 | 2,25 | 25,75 | 19,25 | 0,00 | 892,360 | 70,20 | 26,95 | 4,50 | 836,733 | 69,40 | 106,5672 | AF | |
| VD-364J-21 | | | | | | 63,00 | 1,60 | 29,801 | 3,50 | 33,95 | 29,05 | 0,00 | 865,705 | 61,35 | 35,95 | 7,60 | 806,104 | 60,50 | 137,9105 | AF | |
| VD-364J-22 | | | | | | 92,00 | 2,20 | 18,964 | 5,50 | 47,00 | 45,00 | 0,00 | 853,379 | 55,28 | 49,95 | 12,10 | 797,435 | 54,50 | 188,0597 | AK | |
| VD-364J-23 | | | | | | 135,00 | 3,10 | 12,271 | 8,50 | 66,65 | 68,35 | 0,00 | 838,710 | 51,29 | 71,25 | 19,50 | 782,264 | 50,50 | 263,2836 | AM | |
| VD-364J-24 | | | | | | 185,00 | 4,30 | 8,344 | 12,50 | 92,80 | 92,20 | 0,00 | 769,330 | 47,98 | 99,45 | 33,80 | 713,842 | 47,20 | 363,5821 | AF | |
| VD-364J-08 | 36,50 | 42,00 | 0,50 | 30,00 | 43,40 | 44,00 | 1,00 | 65,863 | 2,50 | 27,05 | 16,95 | 0,00 | 1116,375 | 87,31 | 28,30 | 2,70 | 1034,046 | 86,10 | 96,9061 | AF | |
| VD-364J-09 | | | | | | 70,00 | 1,50 | 36,590 | 4,50 | 39,90 | 30,10 | 0,00 | 1101,372 | 74,51 | 42,00 | 4,95 | 1024,532 | 73,40 | 139,9754 | AK | |
| VD-364J-10 | | | | | | 102,00 | 1,79 | 25,332 | 6,50 | 52,69 | 49,31 | 0,00 | 1249,197 | 71,61 | 61,20 | 7,34 | 1033,539 | 73,30 | 183,0448 | AK | |
| VD-364J-11 | | | | | | 135,00 | 2,50 | 19,371 | 8,50 | 71,00 | 63,70 | 0,00 | 1239,800 | 64,00 | 82,00 | 10,20 | 1026,685 | 65,50 | 226,1142 | AM | |
| VD-364K | 32,50 | 38,00 | 0,50 | 26,00 | 39,30 | 48,60 | 1,01 | 66,641 | 3,50 | 33,18 | 15,42 | 0,00 | 1027,386 | 96,40 | 34,65 | 4,95 | 929,640 | 94,70 | 105,4609 | AF | |
| VD-364L | | | | | | 70,00 | 1,40 | 42,408 | 5,50 | 45,86 | 24,14 | 0,00 | 1023,751 | 86,70 | 48,17 | 7,83 | 925,763 | 85,00 | 143,8104 | AK | |
| VD-364M | | | | | | 113,00 | 2,15 | 24,552 | 9,50 | 71,21 | 41,79 | 0,00 | 1025,983 | 79,50 | 75,19 | 13,47 | 928,307 | 77,80 | 220,5092 | AK | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-364B | 5,50 | 89,50 | 95,00 | 1,70 | 81,80 | 99,70 | 181,00 | 8,05 | 3,715 | 3,50 | 39,82 | 141,18 | 0,00 | 524,507 | 37,78 | 44,61 | 60,09 | 506,715 | 37,51 | 290,4232 | AK |
| D-364C | | | | | | | 278,00 | 11,11 | 2,364 | 5,50 | 56,29 | 221,71 | 0,00 | 524,169 | 34,13 | 63,81 | 94,49 | 506,391 | 33,87 | 396,0316 | AL |
| D-364D | | | | | | | 472,00 | 17,15 | 1,369 | 9,50 | 89,23 | 382,77 | 161,60 | 523,920 | 31,34 | 102,22 | 163,24 | 506,138 | 31,07 | 607,2485 | AP |
| D-364E | | | | | | | 763,00 | 26,17 | 0,839 | 15,50 | 138,64 | 624,36 | 634,10 | 523,787 | 29,81 | 159,84 | 266,43 | 506,000 | 29,54 | 924,0738 | AT |
| D-364E-02 | 74,50 | 80,00 | 1,20 | 67,60 | 81,50 | 80,00 | 3,60 | 10,020 | 2,25 | 28,02 | 51,98 | 0,00 | 520,839 | 44,60 | 30,40 | 30,30 | 496,991 | 44,20 | 186,8060 | AK | |
| D-364E-04 | | | | | | 120,00 | 4,80 | 6,441 | 3,50 | 37,47 | 82,53 | 0,00 | 531,610 | 39,30 | 41,10 | 45,50 | 508,228 | 38,90 | 241,7489 | AK | |
| D-364E-06 | | | | | | 165,00 | 6,70 | 4,099 | 5,50 | 52,60 | 112,40 | 0,00 | 460,737 | 34,40 | 58,30 | 80,10 | 437,372 | 34,00 | 329,6576 | AL | |
| D-364E-08 | 64,50 | 70,00 | 1,20 | 57,60 | 71,50 | 65,00 | 2,40 | 15,440 | 2,25 | 27,17 | 37,83 | 0,00 | 584,108 | 47,20 | 29,10 | 22,60 | 554,308 | 46,80 | 161,7314 | AK | |
| D-364E-10 | | | | | | 95,00 | 3,20 | 9,926 | 3,50 | 36,15 | 58,85 | 0,00 | 584,141 | 41,50 | 39,10 | 35,20 | 554,859 | 41,10 | 209,2994 | AK | |
| D-364E-12 | | | | | | 147,00 | 4,50 | 6,317 | 5,50 | 50,52 | 96,48 | 0,00 | 609,416 | 37,90 | 55,20 | 53,80 | 579,855 | 37,40 | 285,4083 | AL | |
| D-364E-14 | | | | | | 220,00 | 6,40 | 4,087 | 8,50 | 72,07 | 147,93 | 0,00 | 604,612 | 35,30 | 79,30 | 83,80 | 575,062 | 34,80 | 399,5716 | AP | |
| D-364E-16 | 54,50 | 60,00 | 1,00 | 47,50 | 62,20 | 335,00 | 8,70 | 2,779 | 12,50 | 100,81 | 234,19 | 90,60 | 650,875 | 34,40 | 111,40 | 116,00 | 621,443 | 34,00 | 551,7893 | AM | |
| D-364F | | | | | | 85,40 | 2,20 | 16,454 | 3,50 | 35,01 | 50,39 | 0,00 | 829,093 | 48,65 | 37,39 | 21,21 | 789,937 | 48,07 | 176,8499 | AC | |
| D-364G | | | | | | 128,00 | 3,04 | 10,470 | 5,50 | 48,73 | 79,27 | 0,00 | 829,990 | 44,26 | 52,47 | 33,30 | 790,835 | 43,67 | 241,1589 | AG | |
| D-364H | | | | | | 213,00 | 4,69 | 6,062 | 9,50 | 76,17 | 136,83 | 0,00 | 829,439 | 40,87 | 82,63 | 57,56 | 790,284 | 40,28 | 369,7770 | AK | |
| D-364J | 50,50 | 56,00 | 1,00 | 43,50 | 58,00 | 341,00 | 7,15 | 3,715 | 15,50 | 117,33 | 223,67 | 218,30 | 831,004 | 39,05 | 127,87 | 93,75 | 791,848 | 38,46 | 562,7042 | AM | |
| D-364J-01 | | | | | | 53,00 | 1,40 | 32,171 | 2,25 | 26,18 | 26,82 | 0,00 | 862,821 | 58,50 | 27,60 | 11,80 | 817,138 | 57,80 | 126,6269 | AC | |
| D-364J-02 | | | | | | 77,00 | 1,80 | 20,681 | 3,50 | 34,61 | 42,39 | 0,00 | 876,677 | 51,90 | 36,80 | 18,20 | 831,385 | 51,30 | 163,8701 | AG | |
| D-364J-03 | | | | | | 117,00 | 2,50 | 13,161 | 5,50 | 48,10 | 68,90 | 0,00 | 906,778 | 47,70 | 51,60 | 27,80 | 860,715 | 47,00 | 223,4592 | AG | |
| D-364J-04 | 42,50 | 48,00 | 0,60 | 36,20 | 48,90 | 175,00 | 3,70 | 8,516 | 8,50 | 68,34 | 104,64 | 0,00 | 908,300 | 44,60 | 73,63 | 42,90 | 863,270 | 44,00 | 321,7812 | AK | |
| D-364J-05 | | | | | | 605,00 | 16,24 | 1,627 | 44,50 | 311,18 | 293,82 | 560,52 | 477,938 | 34,20 | 389,90 | 215,10 | 349,884 | 33,00 | 1385,4470 | AM | |
| D-364J-20 | | | | | | 45,00 | 1,00 | 53,972 | 2,25 | 24,61 | 20,39 | 0,00 | 1100,490 | 73,30 | 26,90 | 7,90 | 976,894 | 71,40 | 106,5672 | AC | |
| D-364J-21 | | | | | | 63,00 | 1,30 | 34,696 | 3,50 | 32,18 | 30,82 | 0,00 | 1069,341 | 64,40 | 35,80 | 12,70 | 943,740 | 62,50 | 137,9105 | AC | |
| D-364J-22 | 36,50 | 42,00 | 0,50 | 30,00 | 43,40 | 92,00 | 1,90 | 22,079 | 5,50 | 47,00 | 45,00 | 0,00 | 993,500 | 58,20 | 49,90 | 20,20 | 929,546 | 56,30 | 188,0597 | AG | |
| D-364J-23 | | | | | | 135,00 | 2,70 | 14,287 | 8,50 | 66,65 | 68,35 | 0,00 | 976,500 | 54,20 | 71,10 | 31,80 | 912,922 | 52,40 | 263,2836 | AK | |
| D-364J-24 | | | | | | 185,00 | 3,70 | 9,715 | 12,50 | 92,78 | 92,22 | 0,00 | 895,915 | 49,80 | 99,40 | 50,20 | 831,602 | 48,90 | 363,5821 | AK | |
| D-364J-08 | | | | | | 44,00 | 0,90 | 76,683 | 2,50 | 27,03 | 16,97 | 0,00 | 1301,313 | 90,10 | 28,45 | 5,70 | 1192,423 | 88,54 | 96,9061 | AC | |
| D-364J-09 | 32,50 | 38,00 | 0,50 | 26,00 | 39,30 | 70,00 | 1,30 | 42,602 | 4,50 | 39,86 | 30,14 | 0,00 | 1284,016 | 77,20 | 42,00 | 10,00 | 1192,849 | 75,80 | 139,9754 | AC | |
| D-364J-10 | | | | | | 102,00 | 1,79 | 29,494 | 6,50 | 52,69 | 49,31 | 0,00 | 1454,422 | 74,60 | 61,50 | 15,37 | 1194,487 | 73,30 | 183,0448 | AG | |
| D-364J-11 | | | | | | 135,00 | 2,20 | 22,554 | 8,50 | 71,00 | 64,00 | 0,00 | 1443,450 | 71,00 | 82,00 | 20,20 | 1195,400 | 63,50 | 226,1142 | AG | |
| D-364K | 32,50 | 38,00 | 0,50 | 26,00 | 39,30 | 48,60 | 1,01 | 77,589 | 3,50 | 33,18 | 15,42 | 0,00 | 1196,171 | 96,40 | 34,65 | 7,57 | 1082,367 | 94,70 | 105,4609 | AC | |
| D-364L | | | | | | 70,00 | 1,40 | 49,375 | 5,50 | 45,86 | 24,14 | 0,00 | 1191,939 | 86,70 | 48,17 | 11,93 | 1077,853 | 85,00 | 143,8104 | AG | |
| D-364M | | | | | | 113,00 | 2,15 | 28,585 | 9,50 | 71,21 | 41,79 | 0,00 | 1194,538 | 79,50 | 75,19 | 20,59 | 1080,815 | 77,80 | 220,5092 | AG | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-364N | 5,50 | 32,50 | 38,00 | 0,50 | 26,00 | 39,30 | 177,00 | 3,29 | 17,520 | 15,50 | 109,24 | 67,76 | 77,60 | 1187,161 | 75,30 | 115,74 | 33,71 | 1073,281 | 73,60 | 335,5575 | AJ |
| D-3640 | | 22,50 | 28,00 | 0,35 | 16,00 | 29,00 | 39,30 | 0,74 | 233,831 | 3,50 | 32,66 | 6,64 | 0,00 | 1553,052 | 195,00 | 33,87 | 3,52 | 1269,704 | 191,00 | 73,0114 | AC |
| D-364P | | | | | | | 55,50 | 1,02 | 148,802 | 5,50 | 45,03 | 10,47 | 0,00 | 1557,304 | 174,00 | 46,92 | 5,52 | 1276,719 | 170,00 | 99,5610 | AC |
| D-364Q | | | | | | | 87,80 | 1,57 | 86,148 | 9,50 | 69,79 | 18,01 | 0,00 | 1551,821 | 158,00 | 73,06 | 9,56 | 1269,827 | 154,00 | 152,6602 | AC |
| D-364R | | | | | | | 136,00 | 2,39 | 52,801 | 15,50 | 106,92 | 29,08 | 82,20 | 1535,703 | 149,00 | 112,26 | 15,72 | 1253,487 | 145,00 | 232,3091 | AG |
| D-364R-18 | | | | | | | 170,00 | 2,81 | 44,238 | 18,50 | 125,48 | 44,52 | 132,07 | 1969,525 | 158,00 | 131,84 | 14,85 | 1688,136 | 149,00 | 272,1335 | AL |
| D-364R-20 | | | | | | | 345,00 | 5,69 | 20,719 | 39,50 | 255,43 | 89,57 | 328,36 | 1855,849 | 145,00 | 269,02 | 33,91 | 1574,248 | 141,00 | 550,9043 | AL |
| D-364R-21 | | | | | | | 375,00 | 5,82 | 20,208 | 40,50 | 261,62 | 113,38 | 359,70 | 2291,209 | 152,00 | 290,50 | 32,62 | 1707,546 | 147,00 | 564,1791 | AL |
| D-364R-30 | 5,60 | 63,40 | 69,00 | 1,20 | 56,00 | 71,00 | 56,00 | 3,06 | 11,233 | 3,50 | 36,53 | 19,47 | 0,00 | 218,719 | 38,90 | 39,40 | 16,60 | 186,463 | 37,13 | 213,2791 | AF |
| D-364R-31 | | | | | | | 88,00 | 4,22 | 7,148 | 5,50 | 51,00 | 37,00 | 0,00 | 264,467 | 33,70 | 55,50 | 32,50 | 232,313 | 33,64 | 290,8351 | AG |
| D-364R-32 | | | | | | | 136,00 | 5,94 | 4,625 | 8,50 | 72,71 | 63,29 | 0,00 | 292,723 | 33,70 | 79,67 | 56,33 | 260,539 | 31,38 | 407,1691 | AH |
| D-364R-33 | | | | | | | 200,00 | 8,22 | 3,145 | 12,50 | 101,66 | 98,34 | 0,00 | 309,300 | 30,60 | 111,89 | 88,11 | 277,120 | 30,02 | 562,2811 | AK |
| D-364R-34 | | | | | | | 296,00 | 11,64 | 2,125 | 18,50 | 145,08 | 150,92 | 0,00 | 320,724 | 25,40 | 160,22 | 135,78 | 288,547 | 29,07 | 794,9492 | AL |
| D-364R-40 | | 48,40 | 54,00 | 0,80 | 41,40 | 55,50 | 38,00 | 1,70 | 25,247 | 3,50 | 34,96 | 3,04 | 0,00 | 76,849 | 43,90 | 37,04 | 0,96 | 24,237 | 43,18 | 162,8187 | AE |
| D-364R-41 | | | | | | | 59,40 | 2,34 | 16,066 | 5,50 | 48,53 | 10,87 | 0,00 | 174,625 | 40,25 | 51,80 | 7,60 | 122,105 | 39,44 | 222,0255 | AF |
| D-364R-42 | | | | | | | 92,00 | 3,30 | 10,396 | 8,50 | 68,89 | 23,11 | 0,00 | 240,214 | 38,74 | 73,94 | 18,06 | 187,751 | 37,08 | 310,8357 | AG |
| D-364R-43 | | | | | | | 135,00 | 4,56 | 7,069 | 12,50 | 96,04 | 38,96 | 0,00 | 275,394 | 36,10 | 103,46 | 31,54 | 222,964 | 35,60 | 429,2493 | AH |
| D-364R-44 | | | | | | | 200,00 | 6,46 | 4,777 | 18,50 | 136,77 | 63,23 | 0,00 | 302,028 | 35,00 | 147,76 | 52,24 | 249,526 | 34,60 | 606,8697 | AK |
| D-364R-48 | | 28,00 | 33,60 | 0,60 | 21,40 | 34,80 | 66,00 | 1,22 | 82,982 | 5,50 | 46,24 | 19,77 | 0,00 | 1640,136 | 126,50 | 48,36 | 7,45 | 1463,799 | 122,00 | 128,4445 | AG |
| D-364R-49 | | | | | | | 125,00 | 2,13 | 39,687 | 11,50 | 84,46 | 40,55 | 0,00 | 1609,108 | 111,40 | 88,89 | 15,88 | 1433,096 | 109,00 | 231,2001 | AH |
| D-365RA | | 22,40 | 28,00 | 0,50 | 15,80 | 29,10 | 66,00 | 1,29 | 118,854 | 7,50 | 58,41 | 7,59 | 0,00 | 902,341 | 166,30 | 61,02 | 4,98 | 591,894 | 161,70 | 130,1571 | AC |
| D-364RB | | | | | | | 125,00 | 2,11 | 66,030 | 13,50 | 96,17 | 28,83 | 61,10 | 1903,357 | 167,00 | 100,86 | 11,61 | 1593,966 | 163,00 | 212,3616 | AF |
| D-364R-02 | 5,80 | 33,20 | 39,00 | 0,50 | 26,40 | 40,40 | 51,00 | 0,97 | 96,935 | 3,25 | 33,26 | 17,74 | 0,00 | 1719,492 | 123,00 | 35,90 | 5,84 | 1463,723 | 108,00 | 114,3598 | AC |
| D-364R-03 | | | | | | | 64,00 | 1,16 | 74,127 | 4,25 | 39,93 | 24,07 | 0,00 | 1784,495 | 116,00 | 44,40 | 7,69 | 1452,889 | 101,00 | 136,1427 | AC |
| D-364R-04 | | | | | | | 76,00 | 1,36 | 60,008 | 5,25 | 46,59 | 29,41 | 0,00 | 1764,728 | 110,00 | 51,50 | 9,36 | 1470,185 | 108,00 | 157,9255 | AC |
| D-364R-05 | | | | | | | 89,00 | 1,50 | 52,507 | 6,00 | 54,00 | 35,00 | 0,00 | 1837,732 | 110,00 | 61,00 | 10,73 | 1470,185 | 101,00 | 174,2626 | AE |
| D-364R-06 | | | | | | | 102,00 | 1,69 | 45,006 | 7,00 | 61,00 | 41,00 | 0,00 | 1845,233 | 107,00 | 69,50 | 12,58 | 1462,685 | 101,00 | 196,0455 | AE |
| D-364R-07 | | | | | | | 115,00 | 1,88 | 39,380 | 8,00 | 68,30 | 46,70 | 0,00 | 1839,045 | 105,00 | 77,80 | 14,36 | 1464,935 | 100,00 | 217,8283 | AE |
| D-364R-08 | | | | | | | 127,00 | 2,03 | 36,005 | 8,75 | 75,80 | 51,20 | 0,00 | 1843,433 | 105,00 | 86,20 | 15,66 | 1468,985 | 100,00 | 234,1654 | AG |
| D-364R-09 | | | | | | | 152,00 | 2,36 | 30,004 | 10,50 | 90,50 | 61,50 | 0,00 | 1845,233 | 102,00 | 103,00 | 18,77 | 1470,185 | 99,00 | 272,2854 | AG |
| D-364R-10 | | | | | | | 178,00 | 2,74 | 25,203 | 12,50 | 105,00 | 73,00 | 71,00 | 1839,832 | 100,00 | 119,50 | 22,28 | 1474,386 | 100,00 | 315,8510 | AH |
| D-364R-11 | | | | | | | 203,00 | 3,12 | 21,727 | 14,50 | 118,50 | 84,50 | 125,10 | 1835,921 | 98,60 | 135,50 | 25,99 | 1466,564 | 97,00 | 359,4167 | AJ |
| D-364R-12 | | | | | | | 254,00 | 3,69 | 18,002 | 17,50 | 152,50 | 101,50 | 198,90 | 1827,231 | 91,30 | 172,50 | 31,36 | 1467,185 | 76,40 | 424,7652 | AK |
| D-364R-50 | 6,00 | 109,00 | 115,00 | 2,20 | 100,00 | 121,00 | 196,00 | 11,38 | 2,913 | 3,50 | 45,50 | 150,50 | 0,00 | 438,403 | 40,80 | 51,75 | 97,18 | 420,185 | 39,44 | 420,9319 | AR |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-364N | 5,50 | 32,50 | 38,00 | 0,50 | 26,00 | 39,30 | 177,00 | 3,29 | 15,048 | 15,50 | 109,24 | 67,76 | 68,40 | 1019,648 | 75,30 | 115,74 | 22,23 | 921,837 | 73,60 | 335,5575 | AM |
| VD-3640 | | 22,50 | 28,00 | 0,35 | 16,00 | 29,00 | 39,30 | 0,74 | 200,837 | 3,50 | 32,66 | 6,64 | 0,00 | 1333,910 | 195,00 | 33,87 | 2,51 | 1090,544 | 191,00 | 73,0114 | AF |
| VD-364P | | | | | | | 55,50 | 1,02 | 127,805 | 5,50 | 45,03 | 10,47 | 0,00 | 1337,561 | 174,00 | 46,92 | 3,92 | 1096,569 | 170,00 | 99,5610 | AF |
| VD-364Q | | | | | | | 87,80 | 1,57 | 73,992 | 9,50 | 69,79 | 18,01 | 0,00 | 1332,853 | 158,00 | 73,06 | 6,81 | 1090,649 | 154,00 | 152,6602 | AF |
| VD-364R | | | | | | | 136,00 | 2,39 | 45,350 | 15,50 | 106,92 | 29,08 | 79,50 | 1319,009 | 149,00 | 112,26 | 11,32 | 1076,615 | 145,00 | 232,3091 | AK |
| VD-364R-18 | | | | | | | 170,00 | 2,81 | 37,996 | 18,50 | 125,48 | 44,52 | 132,07 | 1691,616 | 158,00 | 131,84 | 7,61 | 1449,933 | 149,00 | 272,1335 | AO |
| VD-364R-20 | | | | | | | 345,00 | 5,69 | 17,796 | 39,50 | 255,43 | 89,57 | 328,36 | 1593,981 | 145,00 | 269,02 | 19,54 | 1352,114 | 141,00 | 550,9043 | AO |
| VD-364R-21 | | | | | | | 375,00 | 5,82 | 17,356 | 40,50 | 261,62 | 113,38 | 359,70 | 1967,909 | 152,00 | 289,90 | 14,47 | 1477,018 | 147,00 | 564,1791 | AO |
| VD-364R-30 | 5,60 | 63,40 | 69,00 | 1,20 | 56,00 | 71,00 | 56,00 | 3,06 | 9,648 | 3,50 | 36,53 | 19,47 | 0,00 | 187,857 | 38,90 | 39,40 | 16,60 | 160,152 | 37,13 | 213,2791 | AJ |
| VD-364R-31 | | | | | | | 88,00 | 4,22 | 6,139 | 5,50 | 51,00 | 37,00 | 0,00 | 227,149 | 33,70 | 55,50 | 32,50 | 199,532 | 33,64 | 290,8351 | AK |
| VD-364R-32 | | | | | | | 136,00 | 5,94 | 3,973 | 8,50 | 72,71 | 63,29 | 0,00 | 251,418 | 33,70 | 79,67 | 56,33 | 223,776 | 31,38 | 407,1691 | AL |
| VD-364R-33 | | | | | | | 200,00 | 8,22 | 2,701 | 12,50 | 101,66 | 98,34 | 0,00 | 265,656 | 30,60 | 111,89 | 88,11 | 238,017 | 30,02 | 562,2811 | AN |
| VD-364R-34 | | | | | | | 296,00 | 11,64 | 1,825 | 18,50 | 145,08 | 150,92 | 0,00 | 275,469 | 25,40 | 160,22 | 135,78 | 247,831 | 29,07 | 794,9492 | AO |
| VD-364R-40 | | 48,40 | 54,00 | 0,80 | 41,40 | 55,50 | 38,00 | 1,70 | 21,685 | 3,50 | 34,96 | 3,04 | 0,00 | 66,005 | 43,90 | 37,04 | 0,96 | 20,817 | 43,18 | 162,8187 | AH |
| VD-364R-41 | | | | | | | 59,40 | 2,34 | 13,799 | 5,50 | 48,53 | 10,87 | 0,00 | 149,985 | 40,25 | 51,80 | 7,60 | 104,876 | 39,44 | 222,0255 | AJ |
| VD-364R-42 | | | | | | | 92,00 | 3,30 | 8,929 | 8,50 | 68,89 | 23,11 | 0,00 | 206,319 | 38,74 | 73,94 | 18,06 | 161,259 | 37,08 | 310,8357 | AK |
| VD-364R-43 | | | | | | | 135,00 | 4,56 | 6,072 | 12,50 | 96,04 | 38,96 | 0,00 | 236,535 | 36,10 | 103,46 | 31,54 | 191,503 | 35,60 | 429,2493 | AL |
| VD-364R-44 | | | | | | | 200,00 | 6,46 | 4,103 | 18,50 | 136,77 | 63,23 | 0,00 | 259,411 | 35,00 | 147,76 | 52,24 | 214,316 | 34,60 | 606,8697 | AN |
| VD-364R-48 | | 28,00 | 33,60 | 0,60 | 21,40 | 34,80 | 66,00 | 1,22 | 71,273 | 5,50 | 46,24 | 19,77 | 0,00 | 1408,705 | 126,50 | 48,36 | 4,20 | 1257,251 | 122,00 | 128,4445 | AK |
| VD-364R-49 | | | | | | | 125,00 | 2,13 | 34,087 | 11,50 | 84,46 | 40,55 | 0,00 | 1382,056 | 111,40 | 88,89 | 9,24 | 1230,880 | 109,00 | 231,2001 | AL |
| VD-365RA | | 22,40 | 28,00 | 0,50 | 15,80 | 29,10 | 66,00 | 1,29 | 102,083 | 7,50 | 58,41 | 7,59 | 0,00 | 775,017 | 166,30 | 61,02 | 4,98 | 508,375 | 161,70 | 130,1571 | AF |
| VD-364RB | | | | | | | 125,00 | 2,11 | 56,713 | 13,50 | 96,17 | 28,83 | 56,40 | 1634,785 | 167,00 | 100,86 | 7,20 | 1369,051 | 163,00 | 212,3616 | AJ |
| VD-364R-02 | 5,80 | 33,20 | 39,00 | 0,50 | 26,40 | 40,40 | 51,00 | 0,97 | 83,257 | 3,25 | 33,26 | 17,74 | 0,00 | 1476,864 | 123,00 | 35,55 | 2,94 | 1286,326 | 108,00 | 114,3598 | AF |
| VD-364R-03 | | | | | | | 64,00 | 1,16 | 63,667 | 4,25 | 39,93 | 24,07 | 0,00 | 1532,695 | 116,00 | 43,75 | 3,82 | 1289,264 | 101,00 | 136,1427 | AF |
| VD-364R-04 | | | | | | | 76,00 | 1,36 | 51,540 | 5,25 | 46,59 | 29,41 | 0,00 | 1515,717 | 110,00 | 50,97 | 4,71 | 1290,052 | 108,00 | 157,9255 | AF |
| VD-364R-05 | | | | | | | 89,00 | 1,50 | 45,098 | 6,00 | 52,90 | 36,10 | 0,00 | 1628,027 | 110,00 | 60,39 | 5,38 | 1290,246 | 101,00 | 174,2626 | AH |
| VD-364R-06 | | | | | | | 102,00 | 1,69 | 38,655 | 7,00 | 61,50 | 40,50 | 0,00 | 1565,535 | 107,00 | 68,61 | 6,27 | 1290,697 | 101,00 | 196,0455 | AH |
| VD-364R-07 | | | | | | | 115,00 | 1,88 | 33,823 | 8,00 | 67,00 | 48,00 | 0,00 | 1623,518 | 105,00 | 76,84 | 7,17 | 1290,697 | 100,00 | 217,8283 | AH |
| VD-364R-08 | | | | | | | 127,00 | 2,03 | 30,924 | 8,75 | 74,30 | 52,70 | 0,00 | 1629,703 | 105,00 | 85,26 | 7,84 | 1290,774 | 100,00 | 234,1654 | AK |
| VD-364R-09 | | | | | | | 152,00 | 2,36 | 25,770 | 10,50 | 88,80 | 63,20 | 0,00 | 1628,672 | 102,00 | 102,30 | 9,64 | 1280,775 | 99,00 | 272,2854 | AK |
| VD-364R-10 | | | | | | | 178,00 | 2,74 | 21,647 | 12,50 | 102,80 | 75,20 | 57,90 | 1627,847 | 100,00 | 123,75 | 14,39 | 1174,344 | 100,00 | 315,8510 | AL |
| VD-364R-11 | | | | | | | 203,00 | 3,12 | 18,661 | 14,50 | 115,80 | 87,20 | 125,10 | 1627,250 | 98,60 | 133,90 | 13,04 | 1289,484 | 97,00 | 359,4167 | AM |
| VD-364R-12 | | | | | | | 254,00 | 3,69 | 15,462 | 17,50 | 149,40 | 104,60 | 198,90 | 1617,333 | 91,30 | 171,50 | 16,26 | 1275,621 | 76,40 | 424,7652 | AN |
| VD-364R-50 | 6,00 | 109,00 | 115,00 | 2,20 | 100,00 | 121,00 | 196,00 | 11,38 | 2,502 | 3,50 | 45,50 | 150,50 | 0,00 | 376,542 | 40,80 | 51,75 | 74,44 | 360,895 | 39,44 | 420,9319 | AU |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-364R-51 | 6,00 | 109,00 | 115,00 | 2,20 | 100,00 | 121,00 | 300,00 | 15,70 | 1,592 | 5,50 | 64,64 | 235,36 | 0,00 | 374,723 | 36,50 | 74,76 | 117,80 | 358,605 | 35,35 | 573,9981 | AW |
| VD-364R-52 | | | | | | | 465,00 | 22,11 | 1,030 | 8,50 | 93,35 | 371,65 | 0,00 | 382,871 | 34,80 | 108,53 | 177,36 | 367,230 | 32,93 | 803,5974 | BA |
| VD-364R-53 | | | | | | | 725,00 | 32,73 | 0,649 | 13,50 | 141,20 | 583,80 | 503,52 | 378,674 | 32,65 | 165,30 | 285,10 | 363,041 | 31,06 | 1186,2628 | BE |
| VD-364R-56 | 84,00 | 90,00 | 1,50 | 76,30 | 91,80 | 95,00 | 6,40 | 5,466 | 3,50 | 41,30 | 53,70 | 0,00 | 293,550 | 40,45 | 45,80 | 49,00 | 268,950 | 40,10 | 324,3879 | AU | |
| VD-364R-57 | | | | | | 165,00 | 9,00 | 3,479 | 5,50 | 58,10 | 106,90 | 0,00 | 371,869 | 37,24 | 65,80 | 99,00 | 345,083 | 36,90 | 442,3472 | AW | |
| VD-364R-58 | | | | | | 210,00 | 12,60 | 2,251 | 8,50 | 83,15 | 126,85 | 0,00 | 285,527 | 33,13 | 94,10 | 115,00 | 260,879 | 32,80 | 619,2860 | BE | |
| VD-364R-60 | 71,00 | 77,00 | 1,20 | 63,00 | 80,00 | 102,00 | 3,59 | 9,053 | 3,50 | 39,51 | 62,49 | 0,00 | 565,685 | 48,65 | 42,77 | 30,26 | 536,181 | 47,23 | 274,1850 | AK | |
| VD-364R-61 | | | | | | 153,00 | 4,10 | 5,761 | 5,50 | 55,23 | 97,77 | 0,00 | 563,216 | 44,25 | 60,34 | 47,79 | 533,787 | 42,58 | 373,8887 | AL | |
| VD-364R-62 | | | | | | 230,00 | 6,98 | 3,728 | 8,50 | 78,81 | 151,19 | 0,00 | 563,555 | 40,96 | 86,72 | 73,80 | 534,078 | 39,63 | 523,4441 | AN | |
| VD-364R-63 | 55,00 | 61,00 | 1,00 | 47,80 | 62,30 | 365,00 | 8,60 | 2,347 | 13,50 | 118,11 | 246,89 | 0,00 | 579,431 | 38,85 | 130,67 | 113,41 | 549,961 | 37,85 | 772,7033 | AQ | |
| VD-364R-70 | | | | | | 85,00 | 2,20 | 19,474 | 3,50 | 37,80 | 47,20 | 0,00 | 919,177 | 58,88 | 40,30 | 11,00 | 870,491 | 69,90 | 212,3969 | AK | |
| VD-364R-71 | | | | | | 120,00 | 3,10 | 12,393 | 5,50 | 52,50 | 67,50 | 0,00 | 836,500 | 52,15 | 56,70 | 21,60 | 784,451 | 61,90 | 289,6321 | AL | |
| VD-364R-72 | 40,00 | 46,00 | 0,50 | 32,90 | 47,20 | 180,00 | 4,30 | 8,019 | 8,50 | 74,60 | 105,40 | 0,00 | 845,175 | 48,76 | 80,65 | 32,50 | 796,662 | 57,70 | 405,4849 | AN | |
| VD-364R-80 | | | | | | 42,00 | 1,22 | 50,625 | 3,50 | 36,50 | 5,50 | 0,00 | 278,438 | 76,80 | 38,25 | 3,75 | 189,844 | 75,29 | 154,4704 | AE | |
| VD-364R-81 | | | | | | 66,00 | 1,69 | 32,216 | 5,50 | 50,50 | 15,50 | 0,00 | 499,347 | 72,40 | 53,25 | 12,75 | 410,753 | 70,39 | 210,6415 | AF | |
| VD-364R-82 | 33,00 | 39,00 | 0,50 | 25,90 | 40,30 | 102,00 | 2,37 | 20,846 | 8,50 | 71,50 | 30,50 | 0,00 | 635,790 | 69,25 | 75,75 | 25,34 | 547,197 | 67,15 | 294,8981 | AH | |
| VD-364R-83 | | | | | | 150,00 | 3,29 | 14,175 | 12,50 | 99,50 | 50,50 | 0,00 | 715,838 | 66,26 | 105,75 | 37,27 | 627,244 | 65,18 | 407,2402 | AK | |
| VD-364R-84 | | | | | | 220,00 | 4,65 | 9,578 | 18,50 | 141,50 | 78,50 | 91,40 | 751,850 | 64,65 | 150,75 | 55,16 | 663,256 | 63,45 | 575,7535 | AO | |
| VD-364R-90 | 26,00 | 32,00 | 0,40 | 19,00 | 32,90 | 47,00 | 1,00 | 90,158 | 3,50 | 36,05 | 10,95 | 0,00 | 986,968 | 124,10 | 37,58 | 6,97 | 849,286 | 120,30 | 127,4381 | AF | |
| VD-364R-91 | | | | | | 68,00 | 1,39 | 57,373 | 5,50 | 49,80 | 18,20 | 0,00 | 1044,342 | 112,60 | 52,20 | 10,13 | 906,495 | 108,00 | 173,7792 | AF | |
| VD-364R-92 | | | | | | 100,00 | 1,95 | 37,124 | 8,50 | 70,41 | 29,59 | 0,00 | 1098,340 | 102,40 | 74,12 | 13,42 | 960,764 | 101,00 | 243,2909 | AK | |
| VD-364R-93 | 6,30 | 98,70 | 105,00 | 1,70 | 90,20 | 109,70 | 152,00 | 2,89 | 23,374 | 13,50 | 104,78 | 47,22 | 0,00 | 1103,840 | 97,00 | 110,67 | 23,43 | 966,057 | 95,50 | 359,1438 | AL |
| VD-364R-13 | | | | | | | 125,00 | 2,06 | 56,104 | 11,50 | 89,84 | 35,16 | 0,00 | 1972,426 | 168,00 | 94,85 | 6,13 | 1691,541 | 159,00 | 246,4506 | AK |
| VD-364S | | | | | | | 180,00 | 7,99 | 4,096 | 3,50 | 44,97 | 135,03 | 0,00 | 553,059 | 48,40 | 50,13 | 44,23 | 531,936 | 48,10 | 420,2243 | AN |
| VD-364T | 80,00 | 86,30 | 1,20 | 72,00 | 88,70 | 291,00 | 11,03 | 2,606 | 5,50 | 63,47 | 227,53 | 0,00 | 593,050 | 43,80 | 71,58 | 61,10 | 571,916 | 43,40 | 573,0331 | AW | |
| VD-364U | | | | | | 494,00 | 17,02 | 1,509 | 9,50 | 100,47 | 393,53 | 0,00 | 593,845 | 40,20 | 114,48 | 65,21 | 572,704 | 39,90 | 878,6508 | BA | |
| VD-364V | | | | | | 798,00 | 25,97 | 0,925 | 15,50 | 155,97 | 642,03 | 645,90 | 593,806 | 38,30 | 178,83 | 171,61 | 572,660 | 37,90 | 1337,0772 | BF | |
| VD-364W | 80,00 | 86,30 | 1,20 | 72,00 | 88,70 | 102,00 | 4,48 | 7,692 | 3,50 | 42,19 | 59,81 | 0,00 | 460,064 | 48,10 | 45,96 | 40,74 | 431,053 | 47,60 | 340,6073 | AK | |
| VD-365 | | | | | | 145,00 | 4,48 | 7,692 | 3,50 | 42,19 | 102,81 | 0,00 | 790,815 | 53,90 | 47,50 | 20,09 | 749,958 | 53,40 | 340,6073 | AL | |
| VD-365A | | | | | | 153,00 | 7,19 | 4,895 | 5,50 | 59,10 | 93,90 | 0,00 | 459,640 | 42,08 | 65,02 | 79,98 | 430,650 | 41,64 | 464,1940 | AL | |
| VD-366 | | | | | | 220,00 | 6,19 | 4,895 | 5,50 | 59,10 | 160,90 | 0,00 | 787,598 | 49,00 | 66,70 | 31,93 | 750,377 | 48,50 | 464,4645 | AN | |
| VD-366A | | | | | | 230,00 | 8,71 | 3,167 | 8,50 | 84,46 | 145,54 | 0,00 | 460,969 | 40,10 | 93,62 | 98,94 | 431,949 | 39,60 | 650,2503 | AO | |
| VD-367 | | | | | | 355,00 | 8,71 | 3,167 | 8,50 | 90,70 | 264,30 | 0,00 | 837,102 | 47,10 | 118,00 | 47,93 | 750,637 | 46,50 | 650,2503 | AQ | |
| VD-367A | | | | | | 365,00 | 12,90 | 1,994 | 13,50 | 126,73 | 238,27 | 0,00 | 475,163 | 38,20 | 141,27 | 157,15 | 446,160 | 37,70 | 959,8934 | AS | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|--------|-------|---------|---------|--------|--------|---------|---------|----------|----------|--------|--------|-------|-------|-------|--------|--------|---------|---------|-------|-------|---------|---------|----------|----------|----|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-51 | 6,00 | 109,00 | 115,00 | 2,20 | 100,00 | 121,00 | 300,00 | 15,70 | 1,854 | 5,50 | 64,64 | 235,36 | 0,00 | 436,285 | 36,50 | 74,76 | 128,69 | 417,519 | 35,35 | 573,9981 | AS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-52 | | | | | | | 465,00 | 22,11 | 1,199 | 8,50 | 93,35 | 371,65 | 0,00 | 445,771 | 34,80 | 108,53 | 198,88 | 427,560 | 32,93 | 803,5974 | AX | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-53 | | | | | | | 725,00 | 32,73 | 0,755 | 13,50 | 141,20 | 583,80 | 503,52 | 440,884 | 32,65 | 165,30 | 315,87 | 422,683 | 31,06 | 1186,2628 | BB | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-56 | 84,00 | 90,00 | 1,50 | 76,30 | 91,80 | 95,00 | 5,60 | 6,365 | 3,50 | 41,27 | 53,73 | 0,00 | 341,966 | 41,10 | 45,50 | 49,00 | 315,045 | 40,77 | 324,3879 | AG | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-57 | | | | | | 165,00 | 7,80 | 4,050 | 5,50 | 58,00 | 107,00 | 0,00 | 433,367 | 38,10 | 64,60 | 98,50 | 406,636 | 37,76 | 442,3472 | AH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-58 | | | | | | 210,00 | 10,00 | 2,621 | 8,50 | 83,09 | 126,91 | 0,00 | 332,592 | 33,80 | 93,20 | 115,00 | 306,097 | 33,43 | 619,2860 | AK | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-60 | 71,00 | 77,00 | 1,20 | 63,00 | 80,00 | 102,00 | 3,59 | 10,540 | 3,50 | 39,51 | 62,49 | 0,00 | 658,619 | 48,65 | 42,77 | 39,51 | 624,268 | 47,23 | 274,1850 | AG | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-61 | | | | | | 153,00 | 4,10 | 6,707 | 5,50 | 55,23 | 97,77 | 0,00 | 655,744 | 44,25 | 60,34 | 62,40 | 621,480 | 42,58 | 373,8887 | AH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-62 | | | | | | 230,00 | 6,98 | 4,340 | 8,50 | 78,81 | 151,19 | 0,00 | 656,139 | 40,96 | 86,72 | 96,40 | 621,819 | 39,63 | 523,4441 | AK | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-63 | 55,00 | 61,00 | 1,00 | 47,80 | 62,30 | 365,00 | 8,60 | 2,733 | 13,50 | 118,11 | 246,89 | 0,00 | 674,623 | 38,85 | 130,67 | 150,66 | 640,312 | 37,85 | 772,7033 | AM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-70 | | | | | | 85,00 | 1,90 | 22,673 | 3,50 | 37,75 | 47,25 | 0,00 | 1071,318 | 61,10 | 40,20 | 19,10 | 1015,768 | 60,33 | 212,3969 | AG | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-71 | | | | | | 120,00 | 2,70 | 14,429 | 5,50 | 52,46 | 67,54 | 0,00 | 974,502 | 54,20 | 56,30 | 32,60 | 919,097 | 53,39 | 289,6321 | AH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-72 | 40,00 | 46,00 | 0,50 | 32,90 | 47,20 | 180,00 | 3,80 | 9,336 | 8,50 | 76,74 | 103,26 | 0,00 | 964,046 | 50,00 | 80,40 | 51,20 | 929,876 | 49,56 | 405,4849 | AK | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-80 | | | | | | 42,00 | 1,22 | 58,942 | 3,50 | 36,50 | 5,50 | 0,00 | 324,181 | 76,80 | 38,25 | 3,75 | 221,032 | 75,29 | 154,4704 | AB | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-81 | | | | | | 66,00 | 1,69 | 37,509 | 5,50 | 50,50 | 15,50 | 0,00 | 581,382 | 72,40 | 53,25 | 12,75 | 478,234 | 70,39 | 210,6415 | AC | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-82 | 33,00 | 39,00 | 0,50 | 25,90 | 40,30 | 102,00 | 2,37 | 24,270 | 8,50 | 71,50 | 30,50 | 0,00 | 740,242 | 69,25 | 75,75 | 26,25 | 637,093 | 67,15 | 294,8981 | AE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-83 | | | | | | 150,00 | 3,29 | 16,504 | 12,50 | 99,50 | 50,50 | 0,00 | 833,439 | 66,26 | 105,75 | 44,25 | 730,291 | 65,18 | 407,2402 | AG | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-84 | | | | | | 220,00 | 4,65 | 11,151 | 18,50 | 141,50 | 78,50 | 101,30 | 875,368 | 64,65 | 150,75 | 69,00 | 772,219 | 63,45 | 575,7535 | AL | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-90 | 26,00 | 32,00 | 0,40 | 19,00 | 32,90 | 47,00 | 1,00 | 104,969 | 3,50 | 36,05 | 10,95 | 0,00 | 1149,113 | 124,10 | 37,58 | 8,21 | 988,812 | 120,30 | 127,4381 | AC | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-91 | | | | | | 68,00 | 1,39 | 66,799 | 5,50 | 49,80 | 18,20 | 0,00 | 1215,912 | 112,60 | 52,20 | 12,54 | 1055,420 | 108,00 | 173,7792 | AC | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-92 | | | | | | 100,00 | 1,95 | 43,223 | 8,50 | 70,41 | 29,59 | 0,00 | 1278,781 | 102,40 | 74,12 | 18,85 | 1118,603 | 101,00 | 243,2909 | AG | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-93 | 6,30 | 98,70 | 105,00 | 1,70 | 90,20 | 109,70 | 152,00 | 2,89 | 27,214 | 13,50 | 104,78 | 47,22 | 0,00 | 1285,185 | 97,00 | 110,67 | 29,85 | 1124,767 | 95,50 | 359,1438 | AH | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364R-13 | | | | | | | 125,00 | 2,06 | 65,321 | 11,50 | 89,84 | 35,16 | 0,00 | 2296,468 | 168,00 | 95,50 | 11,53 | 1926,978 | 16,40 | 246,4506 | AG | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364S | | | | | | | 180,00 | 7,99 | 4,769 | 3,50 | 44,97 | 135,03 | 0,00 | 643,918 | 48,40 | 50,13 | 66,87 | 619,326 | 48,10 | 420,2243 | AR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364T | 80,00 | 86,30 | 1,20 | 72,00 | 88,70 | 291,00 | 11,03 | 3,035 | 5,50 | 63,47 | 227,53 | 0,00 | 690,479 | 43,80 | 71,58 | 99,21 | 665,874 | 43,40 | 573,0331 | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364U | | | | | | 494,00 | 17,02 | 1,757 | 9,50 | 100,47 | 393,53 | 0,00 | 691,406 | 40,20 | 114,48 | 171,16 | 666,791 | 39,90 | 878,6508 | AX | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364V | | | | | | 798,00 | 25,97 | 1,077 | 15,50 | 155,97 | 642,03 | 645,90 | 691,360 | 38,30 | 178,83 | 279,26 | 666,740 | 37,90 | 1337,0772 | BC | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D-364W | 102,00 | 145,00 | 4,48 | 8,956 | 3,50 | 42,19 | 59,81 | 0,00 | 535,646 | 48,10 | 45,96 | 53,70 | 501,869 | 47,60 | 340,6073 | AG | D-365 | 153,00 | 6,17 | 5,699 | 5,50 | 59,10 | 93,90 | 0,00 | 535,160 | 43,21 | 65,02 | 79,98 | 501,400 | 42,70 | 461,2560 | AH | | | | | | | | | | | | | | | |
| D-365 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 220,00 | 6,19 | 5,699 | 5,50 | 59,10 | 160,90 | 0,00 | 916,989 | 49,00 | 67,50 | 59,71 | 869,095 | 48,50 | 464,4645 | AK |
| D-365A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 230,00 | 8,71 | 3,688 | 8,50 | 84,46 | 145,54 | 0,00 | 536,699 | 40,10 | 93,62 | 98,94 | 502,912 | 39,60 | 650,2503 | AL |
| D-366 | 355,00 | 8,71 | 3,688 | 8,50 | 92,50 | 262,50 | 0,00 | 967,989 | 47,10 | 118,00 | 91,77 | 873,955 | 46,50 | 650,2503 | AM | D-367 | 365,00 | 12,90 | 2,322 | 13,50 | 126,73 | 238,27 | 0,00 | 553,225 | 38,20 | 141,27 | 157,15 | 519,458 | 37,70 | 959,8934 | AO | | | | | | | | | | | | | | | | |
| D-366A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 220,00 | 6,19 | 5,699 | 5,50 | 59,10 | 160,90 | 0,00 | 916,989 | 49,00 | 67,50 | 59,71 | 869,095 | 48,50 | 464,4645 | AK | |
| D-366A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 230,00 | 8,71 | 3,688 | 8,50 | 84,46 | 145,54 | 0,00 | 536,699 | 40,10 | 93,62 | 98,94 | 502,912 | 39,60 | 650,2503 | AL | |
| D-367 | 355,00 | 8,71 | 3,688 | 8,50 | 92,50 | 262,50 | 0,00 | 967,989 | 47,10 | 118,00 | 91,77 | 873,955 | 46,50 | 650,2503 | AM | D-367A | 365,00 | 12,90 | 2,322 | 13,50 | 126,73 | 238,27 | 0,00 | 553,225 | 38,20 | 141,27 | 157,15 | 519,458 | 37,70 | 959,8934 | AO | | | | | | | | | | | | | | | | |
| D-367A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 220,00 | 6,19 | 5,699 | 5,50 | 59,10 | 160,90 | 0,00 | 916,989 | 49,00 | 67,50 | 59,71 | 869,095 | 48,50 | 464,4645 | AK | |
| D-367A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 230,00 | 8,71 | 3,688 | 8,50 | 84,46 | 145,54 | 0,00 | 536,699 | 40,10 | 93,62 | 98,94 | 502,912 | 39,60 | 650,2503 | AL | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-368 | 6,30 | 80,00 | 86,30 | 1,20 | 72,00 | 88,70 | 490,00 | 12,07 | 2,508 | 12,50 | 118,27 | 371,73 | 302,80 | 932,126 | 44,20 | 140,50 | 134,58 | 876,389 | 43,70 | 897,9647 | AP |
| D-368A | | | | | | | 490,00 | 17,08 | 1,694 | 18,50 | 169,00 | 321,00 | 302,80 | 543,875 | 37,10 | 188,93 | 215,35 | 510,100 | 36,59 | 1269,5364 | AR |
| D-369 | | | | | | | 720,00 | 17,08 | 1,694 | 18,50 | 169,00 | 551,00 | 612,30 | 933,562 | 42,90 | 203,00 | 199,34 | 875,949 | 42,40 | 1269,5364 | AT |
| D-369A | | | | | | | 720,00 | 20,42 | 1,393 | 22,50 | 202,81 | 517,19 | 612,30 | 720,488 | 39,20 | 227,04 | 294,44 | 686,735 | 38,70 | 1517,2508 | AU |
| D-369B | 72,00 | 78,30 | 1,20 | 64,30 | 81,90 | 75,00 | 2,50 | 19,110 | 2,25 | 30,97 | 44,03 | 0,00 | 841,392 | 61,60 | 33,10 | 22,50 | 800,689 | 61,10 | 236,8769 | AG | |
| D-369C | | | | | | 110,00 | 3,40 | 12,285 | 3,50 | 41,18 | 68,82 | 0,00 | 845,433 | 54,40 | 44,50 | 35,00 | 804,647 | 53,80 | 306,5466 | AH | |
| D-369D | | | | | | 165,00 | 4,60 | 7,818 | 5,50 | 57,50 | 107,50 | 0,00 | 840,385 | 49,20 | 62,70 | 55,30 | 799,733 | 48,60 | 418,0181 | AK | |
| D-369E | | | | | | 210,00 | 6,60 | 5,058 | 8,50 | 82,00 | 128,00 | 0,00 | 647,476 | 43,10 | 90,00 | 100,00 | 607,008 | 42,50 | 585,2253 | AK | |
| D-369G | 63,00 | 69,30 | 1,20 | 55,00 | 72,00 | 310,00 | 9,10 | 3,440 | 12,50 | 114,65 | 195,35 | 0,00 | 671,948 | 41,50 | 126,40 | 144,00 | 631,531 | 40,90 | 808,1683 | AM | |
| D-370 | | | | | | 105,00 | 2,47 | 18,338 | 3,50 | 40,16 | 64,84 | 0,00 | 1188,958 | 63,10 | 45,80 | 22,69 | 1085,580 | 62,30 | 268,2283 | AG | |
| D-371 | | | | | | 155,00 | 3,41 | 11,669 | 5,50 | 55,91 | 99,09 | 0,00 | 1156,284 | 57,10 | 63,10 | 36,09 | 1072,410 | 56,30 | 365,7658 | AH | |
| D-372 | | | | | | 235,00 | 4,80 | 7,551 | 8,50 | 79,54 | 155,46 | 0,00 | 1173,856 | 53,80 | 91,80 | 55,32 | 1081,265 | 53,10 | 512,0721 | AK | |
| D-373 | 50,00 | 56,30 | 0,60 | 42,60 | 57,70 | 340,00 | 6,65 | 5,135 | 12,50 | 111,04 | 228,96 | 140,80 | 1175,608 | 51,70 | 129,00 | 81,21 | 1083,380 | 51,00 | 707,1472 | AM | |
| D-373A | | | | | | 340,00 | 9,41 | 3,469 | 18,50 | 158,29 | 181,71 | 140,80 | 630,407 | 42,10 | 172,86 | 131,90 | 579,852 | 41,30 | 999,7599 | AN | |
| D-374 | | | | | | 500,00 | 9,41 | 3,469 | 18,50 | 158,29 | 341,71 | 400,50 | 1185,488 | 50,40 | 188,00 | 120,29 | 1082,408 | 49,60 | 999,7599 | AO | |
| D-374A | | | | | | 500,00 | 11,25 | 2,853 | 22,50 | 189,79 | 310,21 | 400,50 | 884,881 | 45,30 | 207,51 | 160,50 | 834,328 | 44,60 | 1194,8350 | AR | |
| D-374B | 50,00 | 56,30 | 0,60 | 42,60 | 57,70 | 64,00 | 1,60 | 36,682 | 3,50 | 38,94 | 25,06 | 0,00 | 919,309 | 72,30 | 41,09 | 15,85 | 840,382 | 71,17 | 212,8796 | AC | |
| D-375 | | | | | | 80,00 | 1,60 | 36,682 | 3,50 | 38,94 | 41,06 | 0,00 | 1506,220 | 81,10 | 44,50 | 13,95 | 1302,207 | 79,90 | 212,8796 | AC | |
| D-375A | | | | | | 94,00 | 2,20 | 23,343 | 5,50 | 53,99 | 40,01 | 0,00 | 933,982 | 65,45 | 57,36 | 29,38 | 855,288 | 64,20 | 290,2903 | AD | |
| D-376 | | | | | | 115,00 | 2,20 | 23,343 | 5,50 | 53,99 | 61,01 | 0,00 | 1424,186 | 72,80 | 58,50 | 21,78 | 1318,881 | 71,60 | 290,2903 | AG | |
| D-376A | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 140,00 | 3,10 | 15,104 | 8,50 | 76,56 | 63,44 | 0,00 | 958,149 | 61,20 | 81,77 | 44,80 | 879,524 | 60,00 | 406,4065 | AJ | |
| D-377 | | | | | | 175,00 | 3,10 | 15,104 | 8,50 | 76,56 | 98,44 | 0,00 | 1486,800 | 69,10 | 88,50 | 33,97 | 1306,523 | 67,90 | 406,4065 | AH | |
| D-377A | | | | | | 217,00 | 4,59 | 9,510 | 13,50 | 114,19 | 102,81 | 0,00 | 977,729 | 58,30 | 122,46 | 70,36 | 899,087 | 57,10 | 599,9333 | AK | |
| D-378 | | | | | | 250,00 | 4,30 | 10,271 | 12,50 | 106,67 | 143,33 | 0,00 | 1472,179 | 66,20 | 122,00 | 49,65 | 1314,679 | 65,00 | 561,2280 | AK | |
| D-378A | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 250,00 | 6,08 | 6,940 | 18,50 | 151,82 | 98,18 | 0,00 | 681,373 | 52,40 | 163,16 | 81,75 | 602,654 | 51,20 | 793,4602 | AL | |
| D-379 | | | | | | 365,00 | 6,08 | 6,940 | 18,50 | 151,82 | 213,18 | 276,50 | 1479,452 | 64,40 | 175,00 | 73,27 | 1318,565 | 63,20 | 793,4602 | AM | |
| D-379A | | | | | | 365,00 | 7,27 | 5,706 | 22,50 | 181,92 | 183,08 | 276,50 | 1044,680 | 57,10 | 195,71 | 99,42 | 965,981 | 55,90 | 948,2817 | AN | |
| D-379B | | | | | | 47,00 | 1,20 | 71,644 | 3,50 | 38,19 | 8,81 | 0,00 | 631,306 | 95,20 | 39,96 | 7,04 | 504,376 | 93,30 | 170,3037 | AB | |
| D-380 | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 60,00 | 1,20 | 71,644 | 3,50 | 38,19 | 21,81 | 0,00 | 1562,682 | 109,00 | 39,96 | 9,29 | 1435,752 | 107,00 | 170,3037 | AC | |
| D-380A | | | | | | 68,00 | 1,65 | 45,592 | 5,50 | 52,81 | 15,19 | 0,00 | 692,529 | 85,70 | 55,59 | 12,41 | 565,795 | 83,70 | 232,2323 | AD | |
| D-381 | | | | | | 90,00 | 1,65 | 45,592 | 5,50 | 52,81 | 37,19 | 0,00 | 1695,550 | 100,00 | 55,59 | 13,49 | 1568,815 | 98,80 | 232,2323 | AE | |
| D-381A | | | | | | 100,00 | 2,33 | 29,501 | 8,50 | 74,74 | 25,26 | 0,00 | 745,094 | 79,70 | 79,04 | 20,96 | 618,333 | 77,80 | 325,1252 | AE | |
| D-382 | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 135,00 | 2,33 | 29,501 | 8,50 | 74,74 | 60,26 | 0,00 | 1777,615 | 95,20 | 81,50 | 20,72 | 1578,282 | 93,30 | 325,1252 | AG | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|----------|---------|----------|----------|----|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| VD-368 | 6,30 | 80,00 | 86,30 | 1,20 | 72,00 | 88,70 | 490,00 | 12,07 | 2,154 | 12,50 | 118,27 | 371,73 | 302,80 | 800,599 | 44,20 | 141,50 | 70,40 | 750,573 | 43,70 | 897,9647 | AT | | | | | |
| VD-368A | | | | | | | 490,00 | 17,08 | 1,455 | 18,50 | 169,00 | 321,00 | 302,80 | 467,132 | 37,10 | 188,93 | 215,35 | 438,123 | 36,59 | 1269,5364 | AU | | | | | |
| VD-369 | | | | | | | 720,00 | 17,08 | 1,455 | 18,50 | 169,00 | 551,00 | 612,30 | 801,833 | 42,90 | 207,50 | 104,57 | 745,800 | 42,40 | 1269,5364 | AX | | | | | |
| VD-369A | | | | | | | 720,00 | 20,42 | 1,197 | 22,50 | 202,81 | 517,19 | 612,30 | 618,824 | 39,20 | 227,04 | 208,03 | 589,834 | 38,70 | 1517,2508 | AY | | | | | |
| VD-369B | | | | | | | 72,00 | 78,30 | 1,20 | 64,30 | 81,90 | 75,00 | 2,80 | 16,413 | 2,25 | 31,00 | 44,00 | 0,00 | 722,176 | 59,88 | 33,50 | 15,10 | 681,143 | 67,50 | 236,8769 | AK |
| VD-369C | | | | | | | | | | | | 110,00 | 3,50 | 10,551 | 3,50 | 41,20 | 68,80 | 0,00 | 725,927 | 52,64 | 44,60 | 23,00 | 690,053 | 59,10 | 306,5466 | AK |
| VD-369D | | | | | | | | | | | | 165,00 | 5,20 | 6,714 | 5,50 | 57,55 | 107,45 | 0,00 | 721,467 | 47,49 | 62,75 | 36,50 | 686,552 | 53,20 | 418,0181 | AN |
| VD-369E | | | | | | | | | | | | 210,00 | 7,50 | 4,345 | 8,50 | 82,05 | 127,95 | 0,00 | 555,897 | 41,75 | 90,10 | 79,20 | 520,922 | 47,10 | 585,2253 | AQ |
| VD-369G | | | | | | | | | | | | 310,00 | 10,40 | 2,954 | 12,50 | 114,80 | 195,20 | 0,00 | 576,690 | 40,11 | 128,50 | 114,00 | 536,216 | 45,20 | 808,1683 | AT |
| VD-370 | 63,00 | 69,30 | 1,20 | 55,00 | 72,00 | 105,00 | 2,47 | 15,750 | 3,50 | 40,16 | 64,84 | 0,00 | 1021,191 | 63,10 | 46,30 | 11,91 | 924,525 | 62,30 | 268,2283 | AK | | | | | | |
| VD-371 | | | | | | 155,00 | 3,41 | 10,023 | 5,50 | 55,91 | 99,09 | 0,00 | 993,127 | 57,10 | 62,50 | 18,69 | 927,102 | 56,30 | 365,7658 | AL | | | | | | |
| VD-372 | | | | | | 235,00 | 4,80 | 6,485 | 8,50 | 79,54 | 155,46 | 0,00 | 1008,220 | 53,80 | 92,00 | 28,86 | 927,397 | 53,10 | 512,0721 | AN | | | | | | |
| VD-373 | | | | | | 340,00 | 6,65 | 4,410 | 12,50 | 111,04 | 228,96 | 140,80 | 1009,725 | 51,70 | 129,90 | 42,72 | 926,541 | 51,00 | 707,1472 | AQ | | | | | | |
| VD-373A | | | | | | 340,00 | 9,41 | 2,980 | 18,50 | 158,29 | 181,71 | 140,80 | 541,454 | 42,10 | 172,86 | 131,90 | 498,032 | 41,30 | 999,7599 | AR | | | | | | |
| VD-374 | | | | | | 500,00 | 9,41 | 2,980 | 18,50 | 158,29 | 341,71 | 400,50 | 1018,211 | 50,40 | 189,80 | 62,91 | 924,312 | 49,60 | 999,7599 | AS | | | | | | |
| VD-374A | | | | | | 500,00 | 11,25 | 2,450 | 22,50 | 189,79 | 310,21 | 400,50 | 760,021 | 45,30 | 207,51 | 128,35 | 716,601 | 44,60 | 1194,8350 | AU | | | | | | |
| VD-374B | | | | | | 50,00 | 56,30 | 0,60 | 42,60 | 57,70 | 64,00 | 1,60 | 31,506 | 3,50 | 38,94 | 25,06 | 0,00 | 789,591 | 72,30 | 41,09 | 14,80 | 721,801 | 71,17 | 212,8796 | AF | |
| VD-375 | | | | | | | | | | | 80,00 | 1,60 | 31,506 | 3,50 | 38,94 | 41,06 | 0,00 | 1293,686 | 81,10 | 44,20 | 7,25 | 1127,912 | 79,90 | 212,8796 | AF | |
| VD-375A | | | | | | | | | | | 94,00 | 2,20 | 20,049 | 5,50 | 53,99 | 40,01 | 0,00 | 802,193 | 65,45 | 57,36 | 22,91 | 734,604 | 64,20 | 290,2903 | AG | |
| VD-376 | 115,00 | 2,20 | 20,049 | 5,50 | 53,99 | | | | | | 61,01 | 0,00 | 1223,227 | 72,80 | 58,70 | 11,38 | 1128,771 | 71,60 | 290,2903 | AK | | | | | | |
| VD-376A | 140,00 | 3,10 | 12,973 | 8,50 | 76,56 | | | | | | 63,44 | 0,00 | 822,950 | 61,20 | 81,77 | 34,52 | 755,419 | 60,00 | 406,4065 | AM | | | | | | |
| VD-377 | 175,00 | 3,10 | 12,973 | 8,50 | 76,56 | | | | | | 98,44 | 0,00 | 1277,006 | 69,10 | 88,20 | 17,60 | 1126,059 | 67,90 | 406,4065 | AL | | | | | | |
| VD-377A | 217,00 | 4,59 | 8,168 | 13,50 | 114,19 | | | | | | 102,81 | 0,00 | 839,767 | 58,30 | 122,46 | 53,70 | 772,222 | 57,10 | 599,9333 | AN | | | | | | |
| VD-378 | 250,00 | 4,30 | 8,822 | 12,50 | 106,67 | | | | | | 143,33 | 0,00 | 1264,448 | 66,20 | 122,00 | 26,32 | 1129,172 | 65,00 | 561,2280 | AN | | | | | | |
| VD-378A | 250,00 | 6,08 | 5,961 | 18,50 | 151,82 | | | | | | 98,18 | 0,00 | 585,228 | 52,40 | 163,16 | 81,75 | 517,617 | 51,20 | 793,4602 | AO | | | | | | |
| VD-379 | 365,00 | 6,08 | 5,961 | 18,50 | 151,82 | | | | | | 213,18 | 276,50 | 1270,695 | 64,40 | 175,50 | 38,64 | 1129,530 | 63,20 | 793,4602 | AQ | | | | | | |
| VD-379A | 365,00 | 7,27 | 4,901 | 22,50 | 181,92 | 183,08 | 276,50 | 897,271 | 57,10 | 195,71 | 83,05 | 829,677 | 55,90 | 948,2817 | AR | | | | | | | | | | | |
| VD-379B | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 47,00 | 1,20 | 61,535 | 3,50 | 38,19 | 8,81 | 0,00 | 542,226 | 95,20 | 39,96 | 7,04 | 433,206 | 93,30 | 170,3037 | AE | | | | | | |
| VD-380 | | | | | | 60,00 | 1,20 | 61,535 | 3,50 | 38,19 | 21,81 | 0,00 | 1342,181 | 109,00 | 39,96 | 5,81 | 1233,161 | 107,00 | 170,3037 | AF | | | | | | |
| VD-380A | | | | | | 68,00 | 1,65 | 39,159 | 5,50 | 52,81 | 15,19 | 0,00 | 594,810 | 85,70 | 55,59 | 12,41 | 485,959 | 83,70 | 232,2323 | AG | | | | | | |
| VD-381 | | | | | | 90,00 | 1,65 | 39,159 | 5,50 | 52,81 | 37,19 | 0,00 | 1456,300 | 100,00 | 55,59 | 7,52 | 1347,449 | 98,80 | 232,2323 | AH | | | | | | |
| VD-381A | | | | | | 100,00 | 2,33 | 25,338 | 8,50 | 74,74 | 25,26 | 0,00 | 639,958 | 79,70 | 79,04 | 20,96 | 531,083 | 77,80 | 325,1252 | AH | | | | | | |
| VD-382 | | | | | | 135,00 | 2,33 | 25,338 | 8,50 | 74,74 | 60,26 | 0,00 | 1526,786 | 95,20 | 81,50 | 10,82 | 1355,580 | 93,30 | 325,1252 | AK | | | | | | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-382A | 6,30 | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 152,00 | 3,44 | 15,954 | 13,50 | 111,30 | 40,70 | 0,00 | 649,342 | 75,30 | 118,13 | 33,87 | 540,346 | 73,40 | 479,9467 | AK |
| VD-383 | | | | | | | 195,00 | 3,22 | 17,230 | 12,50 | 103,99 | 91,01 | 0,00 | 1568,138 | 91,90 | 116,50 | 16,06 | 1352,539 | 90,00 | 448,9824 | AM |
| VD-383A | | | | | | | 195,00 | 4,56 | 11,642 | 18,50 | 147,85 | 47,15 | 0,00 | 548,878 | 71,38 | 157,20 | 37,80 | 440,058 | 69,40 | 634,7682 | AN |
| VD-384 | | | | | | | 280,00 | 4,56 | 11,642 | 18,50 | 147,85 | 132,15 | 204,80 | 1538,428 | 88,60 | 163,60 | 23,51 | 1355,101 | 86,70 | 634,7682 | AQ |
| VD-384A | | | | | | | 280,00 | 5,45 | 9,572 | 22,50 | 177,10 | 102,90 | 204,80 | 985,004 | 77,90 | 188,48 | 57,86 | 876,040 | 76,00 | 758,6254 | AR |
| VD-385 | | 32,00 | 38,30 | 0,50 | 24,70 | 39,60 | 50,00 | 1,97 | 120,186 | 3,50 | 37,71 | 12,29 | 0,00 | 1477,281 | 161,00 | 39,24 | 4,31 | 1293,197 | 158,00 | 136,2429 | AF |
| VD-386 | | | | | | | 75,00 | 1,34 | 76,482 | 5,50 | 52,06 | 22,94 | 0,00 | 1754,800 | 149,00 | 54,47 | 4,78 | 1570,170 | 146,00 | 185,7858 | AF |
| VD-386A | | | | | | | 85,00 | 1,70 | 56,087 | 7,50 | 66,40 | 18,60 | 0,00 | 1043,010 | 129,00 | 69,68 | 12,96 | 859,247 | 126,00 | 235,3287 | AJ |
| VD-387 | | | | | | | 110,00 | 1,88 | 49,488 | 8,50 | 73,58 | 36,42 | 0,00 | 1802,489 | 140,00 | 77,60 | 6,85 | 1603,417 | 136,00 | 260,1001 | AK |
| VD-388 | | | | | | | 155,00 | 2,61 | 33,652 | 12,50 | 102,27 | 52,73 | 0,00 | 1774,379 | 133,00 | 107,73 | 10,52 | 1590,728 | 129,00 | 359,1859 | AL |
| VD-389 | | | | | | | 225,00 | 3,69 | 22,738 | 18,50 | 145,32 | 79,68 | 165,20 | 1811,851 | 129,00 | 154,50 | 14,67 | 1603,015 | 126,00 | 507,8145 | AN |
| VD-389A | | | | | | | 225,00 | 4,41 | 18,696 | 22,50 | 174,01 | 50,99 | 165,20 | 953,272 | 112,00 | 183,84 | 38,90 | 769,508 | 109,50 | 606,9003 | AO |
| VD-389A-20 | | 31,50 | 37,80 | 0,40 | 24,10 | 39,10 | 85,00 | 1,50 | 67,846 | 6,50 | 59,18 | 25,82 | 0,00 | 1751,745 | 149,00 | 62,00 | 5,67 | 1560,462 | 145,00 | 207,2673 | AN |
| VD-389A-21 | | | | | | | 150,00 | 2,57 | 35,280 | 12,50 | 102,18 | 47,82 | 0,00 | 1687,156 | 135,00 | 107,60 | 11,92 | 1495,872 | 131,00 | 353,5736 | AO |
| VD-389AA | 6,50 | 23,50 | 30,00 | 0,90 | 16,40 | 31,20 | 150,00 | 7,50 | 83,002 | 14,50 | 118,52 | 31,48 | 96,90 | 2612,669 | 290,80 | 124,16 | 5,42 | 2144,778 | 249,70 | 319,5205 | AK |
| VD-389A-02 | 6,70 | 32,30 | 39,00 | 0,50 | 24,60 | 40,20 | 51,00 | 0,97 | 149,497 | 3,50 | 40,01 | 10,99 | 0,00 | 1642,595 | 197,00 | 41,59 | 4,14 | 1406,764 | 193,00 | 155,5375 | AK |
| VD-389A-03 | | | | | | | 64,00 | 1,01 | 139,530 | 3,75 | 46,20 | 17,80 | 0,00 | 2483,639 | 212,00 | 50,70 | 2,75 | 1855,753 | 160,00 | 162,6073 | AK |
| VD-389A-04 | | | | | | | 76,00 | 1,34 | 95,134 | 5,50 | 55,22 | 20,78 | 0,00 | 1976,924 | 182,00 | 57,70 | 4,93 | 1740,957 | 178,00 | 212,0965 | AL |
| VD-389A-05 | | | | | | | 89,00 | 1,70 | 69,765 | 7,50 | 70,43 | 18,57 | 0,00 | 1295,762 | 160,00 | 73,82 | 11,27 | 1059,035 | 156,00 | 268,6556 | AL |
| VD-389A-06 | | | | | | | 102,00 | 1,88 | 61,557 | 8,50 | 78,03 | 23,97 | 0,00 | 1475,510 | 160,00 | 81,87 | 11,37 | 1239,152 | 156,00 | 296,9352 | AN |
| VD-389A-07 | | | | | | | 115,00 | 2,06 | 55,078 | 9,50 | 85,63 | 29,37 | 0,00 | 1617,416 | 160,00 | 89,92 | 11,47 | 1381,350 | 156,00 | 325,2147 | AQ |
| VD-389A-08 | | | | | | | 127,00 | 2,24 | 49,832 | 10,50 | 93,24 | 33,76 | 0,00 | 1682,460 | 159,00 | 97,99 | 12,06 | 1445,633 | 155,00 | 353,4942 | AQ |
| VD-389A-09 | | | | | | | 152,00 | 2,70 | 40,249 | 13,00 | 112,25 | 39,75 | 0,00 | 1600,046 | 156,00 | 118,12 | 15,90 | 1363,640 | 152,00 | 424,1931 | AR |
| VD-389A-10 | | | | | | | 178,00 | 3,06 | 34,883 | 15,00 | 127,45 | 50,55 | 74,90 | 1763,189 | 156,00 | 134,23 | 16,11 | 1526,810 | 154,00 | 480,7522 | AR |
| VD-389A-11 | | | | | | | 203,00 | 3,51 | 29,899 | 17,50 | 146,46 | 56,54 | 130,80 | 1690,434 | 151,00 | 154,37 | 19,96 | 1454,005 | 147,00 | 551,4510 | AT |
| VD-389A-12 | | | | | | | 254,00 | 4,27 | 24,057 | 21,75 | 178,78 | 75,22 | 202,40 | 1809,619 | 152,00 | 188,60 | 22,43 | 1573,324 | 147,00 | 671,6391 | AT |
| VD-389B | 7,00 | 113,00 | 120,00 | 2,20 | 103,00 | 126,00 | 216,00 | 9,33 | 4,160 | 3,50 | 50,53 | 165,47 | 0,00 | 688,374 | 57,20 | 56,55 | 46,37 | 663,317 | 56,70 | 593,9603 | AU |
| VD-389C | | | | | | | 331,00 | 12,88 | 2,647 | 5,50 | 71,40 | 259,60 | 0,00 | 687,240 | 51,69 | 80,85 | 73,06 | 662,221 | 51,20 | 809,9459 | AY |
| VD-389D | | | | | | | 562,00 | 19,87 | 1,533 | 9,50 | 113,14 | 448,86 | 0,00 | 687,936 | 47,40 | 129,46 | 125,93 | 662,930 | 47,00 | 1241,9170 | BE |
| VD-389E | | | | | | | 908,00 | 30,32 | 0,939 | 15,50 | 175,76 | 732,24 | 732,50 | 687,838 | 45,10 | 202,39 | 205,70 | 662,824 | 44,70 | 1889,8737 | BG |
| VD-389E-10 | | 98,00 | 105,00 | 1,50 | 89,30 | 108,30 | 145,00 | 7,30 | 6,378 | 3,50 | 48,20 | 96,80 | 0,00 | 617,347 | 56,10 | 53,50 | 45,20 | 583,546 | 60,70 | 515,1160 | AU |
| VD-389E-12 | | | | | | | 230,00 | 10,00 | 4,058 | 5,50 | 67,70 | 162,30 | 0,00 | 658,685 | 51,02 | 75,70 | 66,20 | 626,218 | 55,10 | 702,4309 | AY |
| VD-389E-14 | | | | | | | 350,00 | 14,00 | 2,626 | 8,50 | 97,00 | 253,00 | 0,00 | 664,391 | 47,45 | 110,00 | 101,50 | 630,252 | 51,20 | 983,4033 | BE |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|----------|----------|----------|----------|----------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | |
| D-382A | 6,30 | 40,00 | 46,30 | 0,50 | 32,70 | 47,50 | 152,00 | 3,44 | 18,574 | 13,50 | 111,30 | 40,70 | 0,00 | 756,020 | 75,30 | 118,13 | 33,87 | 629,117 | 73,40 | 479,9467 | AG | | | | | |
| D-383 | | | | | | | 195,00 | 3,22 | 20,060 | 12,50 | 103,99 | 91,01 | 0,00 | 1825,760 | 91,90 | 116,00 | 30,25 | 1584,772 | 90,00 | 448,9824 | AJ | | | | | |
| D-383A | | | | | | | 195,00 | 4,56 | 13,554 | 18,50 | 147,85 | 47,15 | 0,00 | 639,051 | 71,38 | 157,20 | 37,80 | 512,354 | 69,40 | 634,7682 | AK | | | | | |
| D-384 | | | | | | | 280,00 | 4,56 | 13,554 | 18,50 | 147,85 | 132,15 | 204,80 | 1791,169 | 88,60 | 163,50 | 45,08 | 1579,080 | 86,70 | 634,7682 | AM | | | | | |
| D-384A | | | | | | | 280,00 | 5,45 | 11,145 | 22,50 | 177,10 | 102,90 | 204,80 | 1146,827 | 77,90 | 188,48 | 74,04 | 1019,960 | 76,00 | 758,6254 | AN | | | | | |
| D-385 | | 32,00 | 38,30 | 0,50 | 24,70 | 39,60 | 50,00 | 1,97 | 139,930 | 3,50 | 37,71 | 12,29 | 0,00 | 1719,977 | 161,00 | 39,24 | 6,19 | 1505,650 | 158,00 | 136,2429 | AC | | | | | |
| D-386 | | | | | | | 75,00 | 1,34 | 89,047 | 5,50 | 52,06 | 22,94 | 0,00 | 2043,089 | 149,00 | 54,47 | 8,34 | 1828,126 | 146,00 | 185,7858 | AC | | | | | |
| D-386A | | | | | | | 85,00 | 1,70 | 65,301 | 7,50 | 66,40 | 18,60 | 0,00 | 1214,362 | 129,00 | 69,68 | 15,32 | 1000,409 | 126,00 | 235,3287 | AF | | | | | |
| D-387 | | | | | | | 110,00 | 1,88 | 57,618 | 8,50 | 73,58 | 36,42 | 0,00 | 2098,612 | 140,00 | 77,50 | 12,59 | 1872,597 | 136,00 | 260,1001 | AG | | | | | |
| D-388 | | | | | | | 155,00 | 2,61 | 39,180 | 12,50 | 102,27 | 52,73 | 0,00 | 2065,885 | 133,00 | 107,73 | 18,71 | 1852,062 | 129,00 | 359,1859 | AH | | | | | |
| D-389 | | | | | | | 225,00 | 3,69 | 26,473 | 18,50 | 145,32 | 79,68 | 165,20 | 2109,513 | 129,00 | 155,00 | 27,68 | 1853,131 | 126,00 | 507,8145 | AK | | | | | |
| D-389A | | | | | | | 225,00 | 4,41 | 21,767 | 22,50 | 174,01 | 50,99 | 165,20 | 1109,881 | 112,00 | 183,84 | 41,16 | 895,927 | 109,50 | 606,9003 | AL | | | | | |
| D-389A-20 | 31,50 | | | | | | 37,80 | 0,40 | 24,10 | 39,10 | 85,00 | 1,50 | 78,992 | 6,50 | 59,18 | 25,82 | 0,00 | 2039,532 | 149,00 | 62,00 | 6,97 | 1816,823 | 145,00 | 207,2673 | AK | |
| D-389A-21 | | | | | | | | | | | 150,00 | 2,57 | 41,076 | 12,50 | 102,18 | 47,82 | 0,00 | 1964,331 | 135,00 | 107,60 | 19,29 | 1741,622 | 131,00 | 353,5736 | AL | |
| D-389AA | 6,50 | | | | | | 23,50 | 30,00 | 0,90 | 16,40 | 31,20 | 150,00 | 7,50 | 96,638 | 14,50 | 118,52 | 31,48 | 99,00 | 3041,893 | 290,80 | 124,65 | 9,98 | 2449,782 | 249,70 | 319,5205 | AG |
| D-389A-02 | 6,70 | | | | | | 32,30 | 39,00 | 0,50 | 24,60 | 40,20 | 51,00 | 0,97 | 174,057 | 3,50 | 40,01 | 10,99 | 0,00 | 1912,450 | 197,00 | 41,59 | 5,94 | 1637,875 | 193,00 | 155,5375 | AG |
| D-389A-03 | | | | | | | | | | | | 64,00 | 1,01 | 162,453 | 3,75 | 46,70 | 17,30 | 0,00 | 2810,439 | 212,00 | 50,80 | 5,02 | 2144,381 | 160,00 | 162,6073 | AG |
| D-389A-04 | | 76,00 | 1,34 | 110,763 | 5,50 | 55,22 | | | | | | 20,78 | 0,00 | 2301,704 | 182,00 | 57,70 | 7,82 | 2026,972 | 178,00 | 212,0965 | AH | | | | | |
| D-389A-05 | | 89,00 | 1,70 | 81,227 | 7,50 | 70,43 | | | | | | 18,57 | 0,00 | 1508,638 | 160,00 | 73,82 | 14,86 | 1233,019 | 156,00 | 268,6556 | AH | | | | | |
| D-389A-06 | | 102,00 | 1,88 | 71,670 | 8,50 | 78,03 | | | | | | 23,97 | 0,00 | 1717,915 | 160,00 | 81,87 | 15,59 | 1442,727 | 156,00 | 296,9352 | AK | | | | | |
| D-389A-07 | | 115,00 | 2,06 | 64,126 | 9,50 | 85,63 | | | | | | 29,37 | 0,00 | 1883,135 | 160,00 | 89,92 | 16,31 | 1608,286 | 156,00 | 325,2147 | AM | | | | | |
| D-389A-08 | | 127,00 | 2,24 | 58,019 | 10,50 | 93,24 | | | | | | 33,76 | 0,00 | 1958,865 | 159,00 | 97,99 | 17,47 | 1683,130 | 155,00 | 353,4942 | AM | | | | | |
| D-389A-09 | | 152,00 | 2,70 | 46,861 | 13,00 | 112,25 | | | | | | 39,75 | 0,00 | 1862,910 | 156,00 | 118,12 | 22,51 | 1587,667 | 152,00 | 424,1931 | AN | | | | | |
| D-389A-10 | | 178,00 | 3,06 | 40,613 | 15,00 | 127,45 | | | | | | 50,55 | 82,70 | 2052,855 | 156,00 | 134,23 | 23,96 | 1777,643 | 154,00 | 480,7522 | AN | | | | | |
| D-389A-11 | | 203,00 | 3,51 | 34,811 | 17,50 | 146,46 | | | | | | 56,54 | 130,80 | 1968,148 | 151,00 | 154,37 | 29,00 | 1692,877 | 147,00 | 551,4510 | AP | | | | | |
| D-389A-12 | | 254,00 | 4,27 | 28,009 | 21,75 | 178,78 | | | | | | 75,22 | 202,40 | 2106,913 | 152,00 | 188,60 | 33,91 | 1831,799 | 147,00 | 671,6391 | AP | | | | | |
| D-389B | | 7,00 | 113,00 | 120,00 | 2,20 | 103,00 | | | | | | 126,00 | 216,00 | 9,33 | 4,843 | 3,50 | 50,53 | 165,47 | 0,00 | 801,464 | 57,20 | 56,55 | 73,16 | 772,291 | 56,70 | 593,9603 |
| D-389C | 331,00 | | | | | | 12,88 | 3,082 | 5,50 | 71,40 | 259,60 | | 0,00 | 800,143 | 51,69 | 80,85 | 115,13 | 771,014 | 51,20 | 809,9459 | AU | | | | | |
| D-389D | 562,00 | | | | | | 19,87 | 1,784 | 9,50 | 113,14 | 448,86 | | 0,00 | 800,955 | 47,40 | 129,46 | 198,70 | 771,840 | 47,00 | 1241,9170 | BB | | | | | |
| D-389E | 908,00 | | | | | | 30,32 | 1,094 | 15,50 | 175,76 | 732,24 | | 732,50 | 800,839 | 45,10 | 202,39 | 324,09 | 771,716 | 44,70 | 1889,8737 | BF | | | | | |
| D-389E-10 | 98,00 | | | | | | 105,00 | 1,50 | 89,30 | 108,30 | 145,00 | | 6,30 | 7,425 | 3,50 | 48,15 | 96,85 | 0,00 | 719,139 | 57,60 | 53,00 | 65,00 | 683,127 | 57,10 | 515,1160 | AR |
| D-389E-12 | | | | | | | | | | | 230,00 | | 8,70 | 4,725 | 5,50 | 67,67 | 162,33 | 0,00 | 767,039 | 52,60 | 75,30 | 98,10 | 730,986 | 52,10 | 702,4309 | AU |
| D-389E-14 | | | | | | | | | | | 350,00 | | 12,20 | 3,057 | 8,50 | 96,94 | 253,06 | 0,00 | 773,724 | 49,10 | 108,70 | 150,50 | 737,768 | 48,50 | 983,4033 | BB |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-389E-16 | 7,00 | 98,00 | 105,00 | 1,50 | 89,30 | 108,30 | 500,00 | 16,90 | 2,079 | 12,50 | 135,98 | 364,02 | 0,00 | 756,827 | 46,60 | 153,30 | 225,20 | 720,818 | 46,10 | 1358,0331 | BF |
| D-389E-20 | | 82,00 | 89,00 | 1,50 | 73,30 | 92,60 | 115,00 | 3,80 | 12,675 | 3,50 | 45,99 | 69,01 | 0,00 | 874,706 | 62,50 | 49,80 | 44,00 | 826,414 | 61,80 | 431,0154 | AL |
| D-389E-22 | | | | | | | 190,00 | 5,30 | 8,066 | 5,50 | 64,27 | 125,73 | 0,00 | 1014,132 | 58,60 | 70,20 | 62,00 | 966,301 | 57,80 | 587,7483 | AM |
| D-389E-24 | | | | | | | 280,00 | 7,50 | 5,219 | 8,50 | 91,70 | 188,30 | 0,00 | 982,765 | 54,00 | 100,90 | 99,00 | 934,749 | 53,30 | 822,8476 | AR |
| D-389E-26 | | | | | | | 390,00 | 10,40 | 3,549 | 12,50 | 128,26 | 261,74 | 0,00 | 928,920 | 51,10 | 141,70 | 150,70 | 881,221 | 50,40 | 1136,3134 | AX |
| D-389F | | 68,00 | 75,00 | 1,20 | 59,00 | 77,50 | 102,00 | 2,50 | 22,226 | 3,50 | 44,42 | 57,58 | 0,00 | 1279,828 | 74,60 | 47,38 | 25,21 | 1213,994 | 73,60 | 357,4274 | AL |
| D-389G | | | | | | | 153,00 | 3,45 | 14,144 | 5,50 | 61,80 | 91,20 | 0,00 | 1289,931 | 68,00 | 66,45 | 39,32 | 1224,158 | 67,00 | 487,4010 | AM |
| D-389H | | | | | | | 254,00 | 5,32 | 8,189 | 9,50 | 96,56 | 157,44 | 0,00 | 1289,187 | 62,80 | 104,59 | 67,87 | 1223,458 | 61,90 | 747,3483 | AR |
| D-389J | | | | | | | 405,00 | 8,11 | 5,019 | 15,50 | 148,71 | 256,29 | 237,13 | 1286,281 | 60,00 | 161,81 | 111,09 | 1220,526 | 59,00 | 1137,2691 | AX |
| D-389K | | 43,00 | 50,00 | 0,60 | 34,80 | 51,40 | 62,30 | 1,24 | 87,899 | 3,50 | 42,34 | 19,96 | 0,00 | 1754,760 | 135,00 | 44,26 | 10,21 | 1585,707 | 133,00 | 226,0203 | AH |
| D-389L | | | | | | | 89,00 | 1,72 | 55,936 | 5,50 | 58,53 | 30,47 | 0,00 | 1704,417 | 121,00 | 61,55 | 16,41 | 1535,444 | 119,00 | 308,2095 | AK |
| D-389M | | | | | | | 145,00 | 2,65 | 32,384 | 9,50 | 90,91 | 54,09 | 0,00 | 1751,521 | 112,00 | 96,12 | 27,74 | 1582,931 | 109,00 | 472,5879 | AM |
| D-389N | | | | | | | 228,00 | 4,04 | 19,848 | 15,50 | 139,49 | 88,51 | 83,20 | 1756,744 | 106,00 | 147,99 | 45,15 | 1588,060 | 104,00 | 719,1555 | AP |
| D-389NA | | | | | | | 265,00 | 4,51 | 17,580 | 17,50 | 155,68 | 109,32 | 165,56 | 1921,769 | 107,00 | 165,27 | 47,14 | 1753,243 | 105,00 | 801,3447 | AR |
| D-389N-01 | | 39,00 | 46,00 | 0,50 | 31,00 | 47,40 | 68,00 | 1,24 | 103,087 | 4,00 | 46,10 | 21,90 | 0,00 | 2257,233 | 167,00 | 48,16 | 8,06 | 2045,256 | 164,00 | 223,6311 | AH |
| D-389N-02 | | | | | | | 110,00 | 1,88 | 58,907 | 7,00 | 70,18 | 39,82 | 0,00 | 2345,594 | 149,00 | 74,20 | 13,66 | 2108,876 | 146,00 | 335,4466 | AL |
| D-389N-03 | | | | | | | 152,00 | 2,52 | 41,235 | 10,00 | 94,26 | 57,74 | 0,00 | 2380,938 | 141,00 | 101,00 | 19,58 | 2102,985 | 138,00 | 447,2621 | AM |
| D-389N-04 | | | | | | | 194,00 | 3,15 | 31,719 | 13,00 | 118,34 | 75,66 | 0,00 | 2399,970 | 137,00 | 127,80 | 25,49 | 2099,813 | 134,00 | 559,0777 | AO |
| D-389N-05 | | | | | | | 236,00 | 3,79 | 25,772 | 16,00 | 142,41 | 93,59 | 142,67 | 2411,864 | 135,00 | 154,80 | 31,59 | 2092,676 | 131,00 | 670,8932 | AQ |
| D-389O | | 27,00 | 34,00 | 1,00 | 19,00 | 35,20 | 48,30 | 2,41 | 355,059 | 3,50 | 41,50 | 6,80 | 0,00 | 2415,555 | 362,10 | 43,00 | 3,92 | 1881,812 | 282,15 | 141,9197 | AG |
| D-389P | | | | | | | 68,00 | 3,40 | 225,947 | 5,50 | 57,21 | 10,79 | 0,00 | 2438,149 | 365,55 | 59,57 | 5,66 | 1904,730 | 286,05 | 193,5269 | AG |
| D-389Q | | | | | | | 107,00 | 5,35 | 130,811 | 9,50 | 88,63 | 18,37 | 0,00 | 2402,474 | 360,45 | 92,70 | 10,68 | 1870,600 | 280,50 | 296,7412 | AL |
| D-389R | | | | | | | 166,00 | 8,30 | 80,175 | 15,50 | 135,77 | 30,23 | 103,50 | 2423,572 | 363,45 | 142,41 | 17,32 | 1891,319 | 283,65 | 451,5627 | AM |
| D-389RG | | 21,00 | 28,00 | 0,84 | 13,00 | 29,30 | 510,00 | 25,50 | 50,309 | 52,50 | 423,21 | 86,79 | 500,36 | 4366,224 | 654,90 | 448,00 | 24,47 | 3119,136 | 497,40 | 1093,7853 | BB |
| D-389R-01 | | 20,80 | 27,80 | 0,83 | 12,80 | 29,00 | 70,00 | 3,50 | 453,021 | 6,00 | 60,76 | 9,24 | 0,00 | 4187,614 | 865,65 | 63,13 | 2,75 | 3112,256 | 703,95 | 159,0265 | AG |
| D-389S | 8,00 | 100,00 | 108,00 | 1,50 | 89,00 | 111,00 | 115,00 | 6,05 | 9,273 | 4,50 | 64,04 | 50,96 | 0,00 | 472,570 | 63,10 | 70,06 | 44,94 | 416,724 | 62,30 | 811,3599 | AP |
| D-390 | | | | | | | 170,00 | 5,08 | 11,922 | 3,50 | 53,36 | 116,64 | 0,00 | 1390,586 | 81,40 | 58,04 | 44,42 | 1334,819 | 80,50 | 686,5353 | AO |
| D-391 | | | | | | | 260,00 | 7,01 | 7,587 | 5,50 | 74,71 | 185,29 | 0,00 | 1405,759 | 74,20 | 82,07 | 69,00 | 1349,939 | 73,40 | 936,1845 | AR |
| D-392 | | | | | | | 390,00 | 9,87 | 4,909 | 8,50 | 106,74 | 283,26 | 0,00 | 1390,586 | 69,30 | 118,11 | 107,89 | 1334,756 | 68,40 | 1310,6583 | AU |
| D-393 | | | | | | | 570,00 | 13,67 | 3,338 | 12,50 | 149,44 | 420,56 | 298,53 | 1403,939 | 66,60 | 166,16 | 157,00 | 1348,115 | 65,80 | 1809,9567 | BB |
| D-393A | | | | | | | 630,00 | 14,62 | 3,091 | 13,50 | 160,11 | 469,89 | 407,66 | 1452,405 | 66,90 | 192,50 | 169,50 | 1352,296 | 66,10 | 1934,7813 | BE |
| D-394 | | | | | | | 835,00 | 19,35 | 2,256 | 18,50 | 213,49 | 621,51 | 687,22 | 1401,863 | 64,60 | 238,24 | 232,72 | 1346,033 | 63,80 | 2558,9042 | BF |
| D-394A | | 90,00 | 98,00 | 1,50 | 80,30 | 101,40 | 125,00 | 3,80 | 16,354 | 3,50 | 52,15 | 72,85 | 0,00 | 1191,400 | 82,30 | 56,20 | 43,80 | 1125,176 | 80,00 | 617,8818 | AM |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-389E-16 | 7,00 | 98,00 | 105,00 | 1,50 | 89,30 | 108,30 | 500,00 | 19,00 | 1,786 | 12,50 | 136,20 | 363,80 | 0,00 | 649,643 | 45,03 | 155,00 | 152,60 | 616,071 | 48,70 | 1358,0331 | BG |
| VD-389E-20 | | 82,00 | 89,00 | 1,50 | 73,30 | 92,60 | 115,00 | 4,50 | 10,887 | 3,50 | 46,05 | 68,95 | 0,00 | 750,628 | 60,67 | 50,10 | 30,30 | 706,538 | 68,20 | 431,0154 | AO |
| VD-389E-22 | | | | | | | 190,00 | 6,20 | 6,928 | 5,50 | 64,30 | 125,70 | 0,00 | 870,826 | 56,46 | 70,80 | 39,50 | 825,795 | 55,80 | 587,7483 | AQ |
| VD-389E-24 | | | | | | | 280,00 | 8,80 | 4,483 | 8,50 | 91,75 | 188,25 | 0,00 | 843,868 | 52,20 | 102,00 | 63,70 | 797,921 | 51,60 | 822,8476 | AY |
| VD-389E-26 | | | | | | | 390,00 | 12,20 | 3,048 | 12,50 | 128,35 | 261,65 | 0,00 | 797,571 | 49,19 | 145,00 | 101,50 | 746,818 | 48,50 | 1136,3134 | BE |
| VD-389F | | 68,00 | 75,00 | 1,20 | 59,00 | 77,50 | 102,00 | 2,50 | 19,090 | 3,50 | 44,42 | 57,58 | 0,00 | 1099,239 | 74,60 | 47,38 | 16,01 | 1042,695 | 73,60 | 357,4274 | AO |
| VD-389G | | | | | | | 153,00 | 3,45 | 12,148 | 5,50 | 61,80 | 91,20 | 0,00 | 1107,916 | 68,00 | 66,45 | 24,85 | 1051,424 | 67,00 | 487,4010 | AQ |
| VD-389H | | | | | | | 254,00 | 6,19 | 7,033 | 9,50 | 96,56 | 157,44 | 0,00 | 1107,277 | 60,10 | 104,60 | 43,96 | 1050,753 | 59,30 | 747,3483 | AY |
| VD-389J | | | | | | | 405,00 | 8,11 | 4,311 | 15,50 | 148,71 | 256,29 | 237,13 | 1104,781 | 60,00 | 161,81 | 70,32 | 1048,305 | 59,00 | 1137,2691 | BA |
| VD-389K | | 43,00 | 50,00 | 0,60 | 34,80 | 51,40 | 62,30 | 1,24 | 75,496 | 3,50 | 42,34 | 19,96 | 0,00 | 1507,155 | 135,00 | 44,26 | 6,84 | 1361,957 | 133,00 | 226,0203 | AL |
| VD-389L | | | | | | | 89,00 | 1,72 | 48,043 | 5,50 | 58,53 | 30,47 | 0,00 | 1463,917 | 121,00 | 61,55 | 11,14 | 1318,787 | 119,00 | 308,2095 | AN |
| VD-389M | | | | | | | 145,00 | 2,65 | 27,814 | 9,50 | 90,91 | 54,09 | 0,00 | 1504,374 | 112,00 | 96,12 | 18,61 | 1359,573 | 109,00 | 472,5879 | AQ |
| VD-389N | | | | | | | 228,00 | 4,04 | 17,048 | 15,50 | 139,49 | 88,51 | 56,50 | 1508,860 | 106,00 | 147,99 | 30,26 | 1363,978 | 104,00 | 719,1555 | AT |
| VD-389NA | | | | | | | 265,00 | 4,51 | 15,099 | 17,50 | 155,68 | 109,32 | 165,56 | 1650,599 | 107,00 | 165,27 | 30,15 | 1505,853 | 105,00 | 801,3447 | AU |
| VD-389N-01 | | 39,00 | 46,00 | 0,50 | 31,00 | 47,40 | 68,00 | 1,24 | 88,541 | 4,00 | 46,10 | 21,90 | 0,00 | 1938,728 | 167,00 | 48,16 | 4,94 | 1756,661 | 164,00 | 223,6311 | AL |
| VD-389N-02 | | | | | | | 110,00 | 1,88 | 50,595 | 7,00 | 70,18 | 39,82 | 0,00 | 2014,620 | 149,00 | 73,77 | 7,94 | 1833,060 | 146,00 | 335,4466 | AO |
| VD-389N-03 | | | | | | | 152,00 | 2,52 | 35,417 | 10,00 | 94,26 | 57,74 | 0,00 | 2044,978 | 141,00 | 99,80 | 10,98 | 1848,745 | 138,00 | 447,2621 | AQ |
| VD-389N-04 | | | | | | | 194,00 | 3,15 | 27,244 | 13,00 | 118,34 | 75,66 | 0,00 | 2061,324 | 137,00 | 126,00 | 14,44 | 1852,559 | 134,00 | 559,0777 | AS |
| VD-389N-05 | | | | | | | 236,00 | 3,79 | 22,135 | 16,00 | 142,41 | 93,59 | 142,67 | 2071,540 | 135,00 | 152,80 | 17,65 | 1841,661 | 131,00 | 670,8932 | AT |
| VD-389O | | 27,00 | 34,00 | 1,02 | 19,00 | 35,20 | 48,30 | 2,41 | 304,959 | 3,50 | 41,50 | 6,80 | 0,00 | 2074,710 | 311,05 | 43,00 | 2,77 | 1616,281 | 300,00 | 141,9197 | AK |
| VD-389P | | | | | | | 68,00 | 3,40 | 194,065 | 5,50 | 57,21 | 10,79 | 0,00 | 2094,116 | 314,09 | 59,57 | 4,32 | 1635,964 | 283,00 | 193,5269 | AK |
| VD-389Q | | | | | | | 107,00 | 5,35 | 112,353 | 9,50 | 88,63 | 18,37 | 0,00 | 2063,474 | 309,58 | 92,70 | 7,57 | 1606,650 | 255,00 | 296,7412 | AO |
| VD-389R | | | | | | | 166,00 | 8,30 | 68,862 | 15,50 | 135,77 | 30,23 | 100,50 | 2081,596 | 312,25 | 142,41 | 12,24 | 1624,446 | 243,66 | 451,5627 | AQ |
| VD-389RG | | 21,00 | 28,00 | 0,84 | 13,00 | 29,30 | 510,00 | 25,50 | 43,210 | 52,50 | 423,21 | 86,79 | 500,36 | 3750,131 | 562,52 | 445,80 | 13,69 | 2774,074 | 427,32 | 1093,7853 | BE |
| VD-389R-01 | | 20,80 | 27,80 | 0,83 | 12,80 | 29,00 | 70,00 | 3,50 | 389,098 | 6,00 | 60,76 | 9,24 | 0,00 | 3596,724 | 743,56 | 63,13 | 1,67 | 2673,103 | 604,65 | 159,0265 | AK |
| VD-389S | 8,00 | 100,00 | 108,00 | 1,50 | 89,00 | 111,00 | 115,00 | 6,05 | 7,964 | 4,50 | 64,04 | 50,96 | 0,00 | 405,888 | 63,10 | 70,06 | 44,90 | 357,922 | 62,30 | 811,3599 | AT |
| VD-390 | | | | | | | 170,00 | 5,08 | 10,240 | 3,50 | 53,36 | 116,64 | 0,00 | 1194,368 | 81,40 | 58,04 | 22,80 | 1146,470 | 80,50 | 686,5353 | AS |
| VD-391 | | | | | | | 260,00 | 7,01 | 6,516 | 5,50 | 74,71 | 185,29 | 0,00 | 1207,401 | 74,20 | 82,07 | 35,05 | 1159,457 | 73,40 | 936,1845 | AU |
| VD-392 | | | | | | | 390,00 | 9,87 | 4,216 | 8,50 | 106,74 | 283,26 | 0,00 | 1194,368 | 69,30 | 118,11 | 55,59 | 1146,416 | 68,40 | 1310,6583 | AY |
| VD-393 | | | | | | | 570,00 | 13,67 | 2,867 | 12,50 | 149,44 | 420,56 | 298,53 | 1205,837 | 66,60 | 166,16 | 79,92 | 1157,890 | 65,80 | 1809,9567 | BE |
| VD-393A | | | | | | | 630,00 | 14,62 | 2,655 | 13,50 | 160,11 | 469,89 | 407,66 | 1247,464 | 66,90 | 185,00 | 82,24 | 1181,393 | 66,10 | 1934,7813 | BG |
| VD-394 | | | | | | | 835,00 | 19,35 | 1,937 | 18,50 | 213,49 | 621,51 | 687,22 | 1204,054 | 64,60 | 238,24 | 118,73 | 1156,102 | 63,80 | 2558,9042 | BG |
| VD-394A | | 90,00 | 98,00 | 1,50 | 80,30 | 101,40 | 125,00 | 4,50 | 14,047 | 3,50 | 52,15 | 72,85 | 0,00 | 1023,298 | 78,49 | 56,20 | 27,40 | 966,409 | 77,70 | 617,8818 | AS |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|--------------------|-------------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|---------------------------|-----------------------|-------------------|-----------------------------|---------------------------------|-----------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| VD-394B | 8,00 | 90,00 | 98,00 | 1,50 | 80,30 | 101,40 | 185,00 | 6,00 | 8,939 | 5,50 | 72,80 | 112,20 | 0,00 | 1002,930 | 70,50 | 79,20 | 43,90 | 945,722 | 69,70 | 842,5660 | AU |
| VD-394C | | | | | | | 285,00 | 8,80 | 5,784 | 8,50 | 106,90 | 178,10 | 0,00 | 1030,100 | 65,14 | 113,60 | 70,90 | 991,300 | 65,40 | 1180,0000 | AY |
| VD-394D | | | | | | | 400,00 | 12,00 | 3,933 | 12,50 | 145,00 | 255,00 | 0,00 | 1002,930 | 62,61 | 159,50 | 99,20 | 945,901 | 61,80 | 1628,9610 | BE |
| VD-395 | | 80,00 | 88,00 | 1,20 | 70,00 | 90,80 | 125,00 | 2,92 | 20,000 | 3,50 | 51,00 | 74,00 | 0,00 | 1480,000 | 93,80 | 54,50 | 13,97 | 1410,000 | 92,60 | 549,2282 | AQ |
| VD-396 | | | | | | | 180,00 | 4,03 | 12,727 | 5,50 | 71,00 | 109,00 | 0,00 | 1387,273 | 83,90 | 76,50 | 25,29 | 1317,273 | 82,70 | 748,9476 | AT |
| VD-397 | | | | | | | 285,00 | 5,67 | 8,235 | 8,50 | 101,00 | 184,00 | 0,00 | 1515,294 | 80,80 | 110,50 | 32,44 | 1437,059 | 79,60 | 1048,5266 | AW |
| VD-398 | | | | | | | 410,00 | 7,86 | 5,600 | 12,50 | 141,00 | 269,00 | 0,00 | 1506,400 | 77,50 | 153,50 | 47,75 | 1436,400 | 76,30 | 1447,9653 | BA |
| VD-399 | | | | | | | 600,00 | 11,12 | 3,784 | 18,50 | 201,00 | 399,00 | 463,76 | 1509,730 | 75,30 | 219,50 | 70,26 | 1439,730 | 74,10 | 2047,1234 | BF |
| VD-399A | | 73,00 | 81,00 | 1,20 | 63,20 | 83,40 | 98,00 | 2,41 | 26,323 | 3,50 | 50,30 | 47,70 | 0,00 | 1255,670 | 95,80 | 53,45 | 17,63 | 1172,679 | 94,30 | 501,1708 | AO |
| VD-399B | | | | | | | 147,00 | 3,33 | 16,751 | 5,50 | 69,90 | 77,10 | 0,00 | 1291,565 | 87,40 | 74,85 | 26,72 | 1208,573 | 86,00 | 683,4147 | AR |
| VD-399C | | | | | | | 220,00 | 4,69 | 10,839 | 8,50 | 99,29 | 120,71 | 0,00 | 1308,316 | 81,90 | 106,94 | 40,58 | 1225,433 | 80,50 | 956,7805 | AJ |
| VD-399D | | | | | | | 345,00 | 6,94 | 6,824 | 13,50 | 148,29 | 196,71 | 0,00 | 1342,438 | 78,50 | 160,44 | 62,18 | 1259,515 | 77,10 | 1412,3903 | AX |
| VD-400 | | 63,00 | 71,00 | 0,80 | 53,60 | 73,10 | 95,00 | 1,86 | 40,952 | 3,50 | 49,40 | 45,60 | 0,00 | 1867,234 | 121,00 | 52,10 | 8,06 | 1756,854 | 119,00 | 432,5172 | AN |
| VD-401 | | | | | | | 140,00 | 2,57 | 26,061 | 5,50 | 68,49 | 71,51 | 0,00 | 1863,511 | 110,00 | 72,74 | 12,73 | 1752,833 | 108,00 | 589,7962 | AQ |
| VD-402 | | | | | | | 205,00 | 3,62 | 16,863 | 8,50 | 97,13 | 107,87 | 0,00 | 1819,055 | 102,00 | 103,70 | 20,89 | 1708,193 | 100,00 | 825,7147 | AT |
| VD-403 | | | | | | | 300,00 | 5,02 | 11,467 | 12,50 | 135,30 | 164,70 | 0,00 | 1888,529 | 99,90 | 146,00 | 28,42 | 1765,863 | 98,00 | 1140,2727 | AX |
| VD-404 | | | | | | | 435,00 | 7,10 | 7,748 | 18,50 | 192,57 | 242,43 | 314,17 | 1878,302 | 96,80 | 207,30 | 42,16 | 1764,159 | 94,90 | 1612,1097 | BB |
| VD-404A | | 50,00 | 58,00 | 0,60 | 40,80 | 59,50 | 68,00 | 1,39 | 81,920 | 3,50 | 48,44 | 19,56 | 0,00 | 1602,304 | 160,00 | 50,66 | 8,76 | 1420,493 | 157,00 | 343,2676 | AL |
| VD-405 | | | | | | | 75,00 | 1,39 | 81,920 | 3,50 | 48,44 | 26,56 | 0,00 | 2175,744 | 170,00 | 50,66 | 5,57 | 1993,933 | 167,00 | 343,2676 | AQ |
| VD-405A | | | | | | | 98,00 | 1,92 | 52,131 | 5,50 | 66,98 | 31,02 | 0,00 | 1617,199 | 144,00 | 70,47 | 13,64 | 1435,164 | 141,00 | 468,0922 | AN |
| VD-406 | | | | | | | 110,00 | 1,92 | 52,131 | 5,50 | 66,98 | 43,02 | 0,00 | 2242,769 | 155,00 | 70,47 | 8,16 | 2060,735 | 152,00 | 468,0922 | AO |
| VD-406A | | | | | | | 147,00 | 2,70 | 33,732 | 8,50 | 94,78 | 52,22 | 0,00 | 1761,325 | 136,00 | 100,17 | 19,13 | 1579,659 | 133,00 | 655,3291 | AQ |
| VD-407 | | | | | | | 160,00 | 2,70 | 33,732 | 8,50 | 94,78 | 65,22 | 0,00 | 2199,838 | 144,00 | 100,17 | 13,19 | 2018,171 | 141,00 | 655,3291 | AS |
| VD-408 | | | | | | | 230,00 | 3,74 | 22,938 | 12,50 | 131,86 | 98,14 | 0,00 | 2251,110 | 139,00 | 139,79 | 18,38 | 2069,201 | 136,00 | 904,9783 | AU |
| VD-409 | | | | | | | 340,00 | 5,30 | 15,498 | 18,50 | 187,47 | 152,53 | 241,85 | 2363,939 | 136,00 | 202,50 | 25,61 | 2131,027 | 133,00 | 1279,4521 | AY |
| VD-409AA | | 48,00 | 56,00 | 0,60 | 38,40 | 57,40 | 50,00 | 1,07 | 129,630 | 2,50 | 39,08 | 10,92 | 0,00 | 1415,556 | 186,00 | 40,62 | 6,60 | 1215,926 | 183,00 | 269,6211 | AL |
| VD-409AD | | | | | | | 510,00 | 5,08 | 17,518 | 18,50 | 353,00 | 157,00 | 456,87 | 2750,250 | 155,00 | 384,80 | 23,37 | 2193,193 | 124,00 | 1228,2740 | AZ |
| VD-409A | | 45,50 | 53,50 | 0,60 | 36,30 | 55,00 | 82,00 | 1,51 | 84,551 | 4,50 | 57,35 | 24,65 | 0,00 | 2084,467 | 184,00 | 60,03 | 7,36 | 1857,596 | 181,00 | 369,1687 | AN |
| VD-409B | | 42,00 | 50,00 | 0,60 | 32,80 | 51,50 | 110,00 | 1,85 | 74,423 | 6,50 | 75,35 | 34,65 | 0,00 | 2578,764 | 205,00 | 79,03 | 6,85 | 2304,878 | 200,00 | 445,6238 | AQ |
| VD-410 | | 40,00 | 48,00 | 0,50 | 30,80 | 49,30 | 65,00 | 1,13 | 160,000 | 3,50 | 47,85 | 17,15 | 0,00 | 2744,000 | 258,00 | 49,78 | 3,14 | 2435,200 | 253,00 | 274,6141 | AL |
| VD-411 | | | | | | | 90,00 | 1,56 | 101,818 | 5,50 | 66,05 | 23,95 | 0,00 | 2438,545 | 227,00 | 69,08 | 6,36 | 2130,036 | 222,00 | 374,4738 | AN |
| VD-412 | | | | | | | 135,00 | 2,20 | 65,882 | 8,50 | 93,35 | 41,65 | 0,00 | 2744,000 | 216,00 | 98,03 | 7,70 | 2435,671 | 211,00 | 524,2633 | AQ |
| VD-413 | | | | | | | 190,00 | 3,04 | 44,800 | 12,50 | 129,75 | 60,25 | 0,00 | 2699,200 | 205,00 | 136,63 | 11,78 | 2390,976 | 200,00 | 723,9827 | AT |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-394B | 8,00 | 90,00 | 98,00 | 1,50 | 80,30 | 101,40 | 185,00 | 5,30 | 10,407 | 5,50 | 72,80 | 112,20 | 0,00 | 1167,700 | 74,20 | 79,20 | 70,00 | 1101,091 | 71,90 | 842,5660 | AP |
| D-394C | | | | | | | 285,00 | 7,70 | 6,734 | 8,50 | 106,90 | 178,10 | 0,00 | 1199,300 | 68,90 | 113,56 | 107,00 | 1154,480 | 67,00 | 1213,2951 | AS |
| D-394D | | | | | | | 400,00 | 10,30 | 4,579 | 12,50 | 145,00 | 255,00 | 0,00 | 1167,000 | 66,30 | 159,50 | 159,20 | 1101,000 | 64,10 | 1628,9610 | AX |
| D-395 | 80,00 | 88,00 | 1,20 | 70,00 | 90,80 | 125,00 | 2,92 | 23,286 | 3,50 | 51,00 | 74,00 | 0,00 | 1723,143 | 93,80 | 54,50 | 27,44 | 1641,643 | 92,60 | 549,2282 | AM | |
| D-396 | | | | | | 180,00 | 4,03 | 14,818 | 5,50 | 71,00 | 109,00 | 0,00 | 1615,182 | 83,90 | 76,50 | 46,08 | 1533,682 | 82,70 | 748,9476 | AP | |
| D-397 | | | | | | 285,00 | 5,67 | 9,588 | 8,50 | 101,00 | 184,00 | 0,00 | 1764,235 | 80,80 | 112,50 | 66,12 | 1653,971 | 79,60 | 1048,5266 | AS | |
| D-398 | | | | | | 410,00 | 7,86 | 6,520 | 12,50 | 141,00 | 269,00 | 0,00 | 1753,880 | 77,50 | 157,50 | 97,72 | 1646,300 | 76,30 | 1447,9653 | AX | |
| D-399 | 73,00 | 81,00 | 1,20 | 63,20 | 83,40 | 600,00 | 11,12 | 4,405 | 18,50 | 201,00 | 399,00 | 463,76 | 1757,757 | 75,30 | 224,50 | 143,91 | 1654,230 | 74,10 | 2047,1234 | BC | |
| D-399A | | | | | | 98,00 | 2,41 | 30,647 | 3,50 | 50,30 | 47,70 | 0,00 | 1461,959 | 95,80 | 53,45 | 28,02 | 1365,333 | 94,30 | 501,1708 | AL | |
| D-399B | | | | | | 147,00 | 3,33 | 19,503 | 5,50 | 69,90 | 77,10 | 0,00 | 1503,751 | 87,40 | 74,85 | 43,17 | 1407,125 | 86,00 | 683,4147 | AN | |
| D-399C | | | | | | 220,00 | 4,69 | 12,619 | 8,50 | 99,29 | 120,71 | 0,00 | 1523,253 | 81,90 | 106,94 | 66,08 | 1426,754 | 80,50 | 956,7805 | AF | |
| D-399D | 63,00 | 71,00 | 0,80 | 53,60 | 73,10 | 345,00 | 6,94 | 7,946 | 13,50 | 148,29 | 196,71 | 0,00 | 1562,981 | 78,50 | 160,44 | 83,40 | 1466,435 | 77,10 | 1412,3903 | AT | |
| D-400 | | | | | | 95,00 | 1,86 | 47,680 | 3,50 | 49,40 | 45,60 | 0,00 | 2173,994 | 121,00 | 52,40 | 16,28 | 2031,176 | 119,00 | 432,5172 | AK | |
| D-401 | | | | | | 140,00 | 2,57 | 30,342 | 5,50 | 68,49 | 71,51 | 0,00 | 2169,660 | 110,00 | 73,50 | 25,76 | 2017,738 | 108,00 | 589,7962 | AM | |
| D-402 | | | | | | 205,00 | 3,62 | 19,633 | 8,50 | 97,13 | 107,87 | 0,00 | 2117,900 | 102,00 | 103,70 | 40,42 | 1988,824 | 100,00 | 825,7147 | AQ | |
| D-403 | 50,00 | 58,00 | 0,60 | 40,80 | 59,50 | 300,00 | 5,02 | 13,350 | 12,50 | 135,30 | 164,70 | 0,00 | 2198,788 | 99,90 | 148,00 | 58,21 | 2029,268 | 98,00 | 1140,2727 | AT | |
| D-404 | | | | | | 435,00 | 7,10 | 9,021 | 18,50 | 192,57 | 242,43 | 314,17 | 2186,881 | 96,80 | 210,00 | 86,12 | 2029,629 | 94,90 | 1612,1097 | AY | |
| D-404A | | | | | | 68,00 | 1,39 | 95,378 | 3,50 | 48,44 | 19,56 | 0,00 | 1865,540 | 160,00 | 50,66 | 13,22 | 1653,859 | 157,00 | 343,2676 | AH | |
| D-405 | | | | | | 75,00 | 1,39 | 95,378 | 3,50 | 48,44 | 26,56 | 0,00 | 2533,188 | 170,00 | 50,66 | 10,37 | 2321,507 | 167,00 | 343,2676 | AH | |
| D-405A | 48,00 | 56,00 | 0,60 | 38,40 | 57,40 | 98,00 | 1,92 | 60,695 | 5,50 | 66,98 | 31,02 | 0,00 | 1882,881 | 144,00 | 70,47 | 20,66 | 1670,941 | 141,00 | 468,0922 | AK | |
| D-406 | | | | | | 110,00 | 1,92 | 60,695 | 5,50 | 66,98 | 43,02 | 0,00 | 2611,224 | 155,00 | 70,47 | 15,78 | 2399,284 | 152,00 | 468,0922 | AL | |
| D-406A | | | | | | 147,00 | 2,70 | 39,273 | 8,50 | 94,78 | 52,22 | 0,00 | 2050,686 | 136,00 | 100,17 | 30,18 | 1839,174 | 133,00 | 655,3291 | AM | |
| D-407 | | | | | | 160,00 | 2,70 | 39,273 | 8,50 | 94,78 | 65,22 | 0,00 | 2561,240 | 144,00 | 100,17 | 24,90 | 2349,728 | 141,00 | 655,3291 | AO | |
| D-408 | 45,50 | 53,50 | 0,60 | 36,30 | 55,00 | 230,00 | 3,74 | 26,706 | 12,50 | 131,86 | 98,14 | 0,00 | 2620,936 | 139,00 | 139,79 | 35,72 | 2409,141 | 136,00 | 904,9783 | AR | |
| D-409 | | | | | | 340,00 | 5,30 | 18,045 | 18,50 | 187,47 | 152,53 | 241,85 | 2752,300 | 136,00 | 204,00 | 51,85 | 2454,058 | 133,00 | 1279,4521 | AU | |
| D-409AA | | | | | | 50,00 | 1,07 | 150,926 | 2,50 | 39,08 | 10,92 | 0,00 | 1648,111 | 186,00 | 40,62 | 9,38 | 1415,685 | 183,00 | 269,6211 | AH | |
| D-409AD | | | | | | 510,00 | 5,08 | 20,395 | 18,50 | 356,00 | 154,00 | 456,87 | 3140,891 | 155,00 | 387,00 | 47,88 | 2508,634 | 124,00 | 1228,2740 | AW | |
| D-409A | 42,00 | 50,00 | 0,60 | 32,80 | 51,50 | 82,00 | 1,51 | 98,442 | 4,50 | 57,35 | 24,65 | 0,00 | 2426,915 | 184,00 | 60,03 | 12,20 | 2162,773 | 181,00 | 369,1687 | AK | |
| D-409B | | | | | | 110,00 | 1,85 | 86,650 | 6,50 | 75,35 | 34,65 | 0,00 | 3002,418 | 205,00 | 79,03 | 12,92 | 2683,537 | 200,00 | 445,6238 | AM | |
| D-410 | | | | | | 65,00 | 1,13 | 186,286 | 3,50 | 47,85 | 17,15 | 0,00 | 3194,800 | 258,00 | 49,78 | 6,12 | 2835,269 | 253,00 | 274,6141 | AH | |
| D-411 | | | | | | 90,00 | 1,56 | 118,545 | 5,50 | 66,05 | 23,95 | 0,00 | 2839,164 | 227,00 | 69,08 | 10,83 | 2479,971 | 222,00 | 374,4738 | AK | |
| D-412 | 40,00 | 48,00 | 0,50 | 30,80 | 49,30 | 135,00 | 2,20 | 76,706 | 8,50 | 93,35 | 41,65 | 0,00 | 3194,800 | 216,00 | 98,03 | 14,85 | 2835,816 | 211,00 | 524,2633 | AM | |
| D-413 | | | | | | 190,00 | 3,04 | 52,160 | 12,50 | 129,75 | 60,25 | 0,00 | 3142,640 | 205,00 | 136,63 | 22,24 | 2783,779 | 200,00 | 723,9827 | AP | |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-413A | 8,00 | 40,00 | 48,00 | 0,50 | 30,80 | 49,30 | 248,00 | 4,31 | 35,243 | 18,50 | 184,35 | 63,65 | 156,80 | 2243,232 | 185,00 | 194,53 | 43,24 | 1884,456 | 180,00 | 1023,5617 | AR |
| D-414 | | | | | | | 275,00 | 4,31 | 35,243 | 18,50 | 184,35 | 90,65 | 197,78 | 3194,800 | 199,00 | 194,53 | 32,31 | 2836,024 | 194,00 | 1023,5617 | AS |
| D-414AA | | 34,00 | 42,00 | 0,50 | 25,00 | 43,20 | 53,00 | 0,99 | 303,335 | 3,50 | 47,56 | 5,44 | 0,00 | 1650,560 | 324,00 | 49,34 | 3,66 | 1110,207 | 316,00 | 233,4220 | AG |
| D-414AB | | | | | | | 76,00 | 1,36 | 193,031 | 5,50 | 65,59 | 10,41 | 0,00 | 2009,047 | 293,00 | 68,39 | 7,61 | 1468,970 | 285,00 | 318,3027 | AH |
| D-414AC | | | | | | | 110,00 | 1,82 | 124,903 | 8,50 | 92,64 | 17,36 | 0,00 | 2168,015 | 272,00 | 96,96 | 13,04 | 1628,731 | 264,00 | 445,6238 | AK |
| D-414AF | | | | | | | 130,00 | 1,92 | 124,903 | 8,50 | 94,50 | 35,50 | 0,00 | 4434,047 | 309,00 | 104,00 | 10,01 | 3247,471 | 294,00 | 445,6238 | AL |
| D-414AD | | | | | | | 168,00 | 2,84 | 78,642 | 13,50 | 137,73 | 30,27 | 0,00 | 2380,812 | 259,00 | 144,60 | 23,17 | 1840,233 | 251,00 | 657,8256 | AN |
| D-414AE | | | | | | | 200,00 | 2,94 | 75,834 | 14,00 | 142,23 | 57,77 | 114,20 | 4380,577 | 292,00 | 157,00 | 16,42 | 3260,853 | 280,00 | 679,0458 | AR |
| D-414A | 9,00 | 141,00 | 150,00 | 2,70 | 128,00 | 156,20 | 254,00 | 10,26 | 6,813 | 3,50 | 64,25 | 189,75 | 0,00 | 1292,708 | 89,20 | 71,63 | 83,17 | 1242,412 | 88,50 | 1225,1437 | AW |
| D-414B | | | | | | | 389,00 | 14,16 | 4,335 | 5,50 | 90,67 | 298,33 | 0,00 | 1293,327 | 80,70 | 102,26 | 120,11 | 1243,100 | 80,00 | 1670,6505 | BA |
| D-414C | | | | | | | 658,00 | 21,85 | 2,510 | 9,50 | 143,53 | 514,47 | 0,00 | 1291,274 | 74,20 | 163,55 | 207,47 | 1241,021 | 73,40 | 2561,6640 | BE |
| D-414D | | | | | | | 1060,00 | 33,33 | 1,538 | 15,50 | 222,81 | 837,19 | 820,65 | 1287,873 | 70,60 | 255,47 | 338,51 | 1237,630 | 69,80 | 3898,1844 | BG |
| D-414D-10 | | 126,00 | 135,00 | 2,30 | 114,50 | 138,70 | 185,00 | 7,50 | 9,547 | 3,50 | 61,91 | 123,09 | 0,00 | 1175,116 | 89,40 | 68,20 | 75,50 | 1115,067 | 88,50 | 1094,8092 | AW |
| D-414D-12 | | | | | | | 280,00 | 10,30 | 6,075 | 5,50 | 87,00 | 193,00 | 0,00 | 1172,521 | 80,60 | 96,80 | 119,20 | 1112,984 | 79,60 | 1492,9217 | BA |
| D-414D-14 | | | | | | | 425,00 | 14,60 | 3,931 | 8,50 | 124,64 | 300,36 | 0,00 | 1180,726 | 75,10 | 139,80 | 183,60 | 1121,132 | 74,20 | 2090,0904 | BE |
| D-414D-16 | | | | | | | 515,00 | 17,40 | 3,182 | 10,50 | 149,73 | 365,27 | 0,00 | 1162,387 | 72,90 | 168,40 | 228,80 | 1102,974 | 72,00 | 2488,2028 | BE |
| D-414D-20 | | 111,00 | 120,00 | 1,90 | 99,90 | 123,40 | 170,00 | 5,30 | 13,964 | 3,50 | 59,84 | 110,16 | 0,00 | 1538,242 | 97,30 | 65,10 | 52,30 | 1464,793 | 96,20 | 964,4748 | AG |
| D-414D-22 | | | | | | | 255,00 | 7,30 | 8,886 | 5,50 | 83,74 | 171,26 | 0,00 | 1521,815 | 88,10 | 91,90 | 83,10 | 1449,306 | 87,00 | 1315,1929 | AN |
| D-414D-24 | | | | | | | 390,00 | 10,30 | 5,750 | 8,50 | 119,60 | 270,40 | 0,00 | 1554,735 | 82,70 | 132,20 | 126,20 | 1482,288 | 81,70 | 1841,2701 | BA |
| D-414D-26 | | | | | | | 460,00 | 12,30 | 4,655 | 10,50 | 143,51 | 316,49 | 0,00 | 1473,124 | 79,50 | 159,10 | 162,50 | 1400,560 | 78,40 | 2191,9882 | BA |
| D-414E | | 91,00 | 100,00 | 1,50 | 80,00 | 103,00 | 134,00 | 3,25 | 25,342 | 3,50 | 57,48 | 76,52 | 0,00 | 1939,175 | 111,00 | 61,47 | 33,16 | 1838,075 | 109,00 | 790,6956 | AG |
| D-414F | | | | | | | 200,00 | 4,49 | 16,127 | 5,50 | 80,04 | 119,96 | 0,00 | 1934,568 | 101,00 | 86,31 | 52,20 | 1833,467 | 99,80 | 1078,2212 | AN |
| D-414G | | | | | | | 332,00 | 6,92 | 9,337 | 9,50 | 125,16 | 206,84 | 0,00 | 1931,173 | 93,60 | 135,99 | 90,32 | 1830,072 | 92,10 | 1653,2725 | BA |
| D-414H | | | | | | | 531,00 | 10,56 | 5,722 | 15,50 | 192,84 | 338,16 | 296,62 | 1935,088 | 89,40 | 210,51 | 147,13 | 1833,987 | 87,90 | 2515,8495 | BE |
| D-414J | 54,00 | 63,00 | 0,80 | 43,00 | 65,00 | 77,30 | 1,45 | 121,280 | 3,50 | 54,35 | 22,95 | 0,00 | 2783,249 | 217,00 | 56,78 | 11,74 | 2488,661 | 213,00 | 469,2040 | AL | |
| D-414K | | | | | | 111,00 | 2,00 | 77,178 | 5,50 | 75,12 | 35,88 | 0,00 | 2768,916 | 195,00 | 78,93 | 18,52 | 2475,099 | 191,00 | 639,8236 | AP | |
| D-414L | | | | | | 179,00 | 3,09 | 44,682 | 9,50 | 116,67 | 62,33 | 0,00 | 2785,164 | 179,00 | 123,26 | 31,86 | 2490,576 | 175,00 | 981,0628 | AS | |
| D-414M | | | | | | 281,00 | 4,71 | 27,386 | 15,50 | 178,98 | 102,02 | 79,51 | 2793,812 | 170,00 | 189,72 | 51,86 | 2499,772 | 166,00 | 1492,9217 | AY | |
| D-414M-01 | 48,00 | 57,00 | 0,60 | 37,80 | 58,40 | 91,00 | 1,67 | 120,877 | 5,00 | 69,42 | 21,58 | 0,00 | 2608,527 | 249,00 | 72,63 | 14,43 | 2220,512 | 243,00 | 530,8166 | AM | |
| D-414M-02 | | | | | | 138,00 | 2,40 | 75,548 | 8,00 | 100,27 | 37,73 | 0,00 | 2850,281 | 229,00 | 105,41 | 21,91 | 2462,115 | 223,00 | 758,3094 | AR | |
| D-414M-03 | | | | | | 184,00 | 3,13 | 54,944 | 11,00 | 131,12 | 52,88 | 0,00 | 2905,226 | 219,00 | 138,18 | 29,75 | 2517,540 | 213,00 | 985,8023 | AS | |
| D-414M-04 | | | | | | 230,00 | 3,86 | 43,170 | 14,00 | 161,98 | 68,02 | 0,00 | 2936,622 | 213,00 | 170,96 | 37,60 | 2548,779 | 207,00 | 1213,2951 | AT | |
| D-414M-05 | | | | | | 276,00 | 4,58 | 35,552 | 17,00 | 192,83 | 83,17 | 148,70 | 2956,938 | 209,00 | 203,74 | 45,45 | 2568,993 | 203,00 | 1440,7879 | AY | |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance LO | R spring rate N/mm | n active coils | static | | | | dynamic | | | | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn |
| VD-413A | 8,00 | 40,00 | 48,00 | 0,50 | 30,80 | 49,30 | 248,00 | 4,31 | 30,270 | 18,50 | 184,35 | 63,65 | 152,50 | 1926,703 | 185,00 | 194,53 | 29,10 | 1618,551 | 180,00 | 1023,5617 | AU |
| VD-414 | | | | | | | 275,00 | 4,31 | 30,270 | 18,50 | 184,35 | 90,65 | 197,78 | 2744,000 | 199,00 | 194,53 | 16,76 | 2435,849 | 194,00 | 1023,5617 | AW |
| VD-414AA | | 34,00 | 42,00 | 0,50 | 25,00 | 43,20 | 53,00 | 0,99 | 260,533 | 3,50 | 47,56 | 5,44 | 0,00 | 1417,659 | 324,00 | 49,34 | 3,66 | 953,552 | 316,00 | 233,4220 | AK |
| VD-414AB | | | | | | | 76,00 | 1,36 | 165,794 | 5,50 | 65,59 | 10,41 | 0,00 | 1725,562 | 293,00 | 68,39 | 7,50 | 1261,692 | 285,00 | 318,3027 | AL |
| VD-414AC | | | | | | | 110,00 | 1,82 | 107,278 | 8,50 | 92,64 | 17,36 | 0,00 | 1862,098 | 272,00 | 96,96 | 10,98 | 1398,910 | 264,00 | 445,6238 | AN |
| VD-414AF | | | | | | | 130,00 | 1,92 | 107,278 | 8,50 | 93,80 | 36,20 | 0,00 | 3883,478 | 309,00 | 103,70 | 5,02 | 2821,422 | 294,00 | 445,6238 | AO |
| VD-414AD | | | | | | | 168,00 | 2,84 | 67,546 | 13,50 | 137,73 | 30,27 | 0,00 | 2044,869 | 259,00 | 144,60 | 16,22 | 1580,569 | 251,00 | 657,8256 | AR |
| VD-414AE | | | | | | | 200,00 | 2,94 | 65,133 | 14,00 | 142,23 | 57,77 | 109,50 | 3762,459 | 292,00 | 156,50 | 8,17 | 2833,299 | 280,00 | 679,0458 | AU |
| VD-414A | 9,00 | 141,00 | 150,00 | 2,70 | 128,00 | 156,20 | 254,00 | 10,26 | 5,851 | 3,50 | 64,25 | 189,75 | 0,00 | 1110,301 | 89,20 | 71,63 | 40,70 | 1067,102 | 88,50 | 1225,1437 | AZ |
| VD-414B | | | | | | | 389,00 | 14,16 | 3,724 | 5,50 | 90,67 | 298,33 | 0,00 | 1110,833 | 80,70 | 102,26 | 68,30 | 1067,693 | 80,00 | 1670,6505 | BD |
| VD-414C | | | | | | | 658,00 | 21,85 | 2,156 | 9,50 | 143,53 | 514,47 | 0,00 | 1109,069 | 74,20 | 163,55 | 118,50 | 1065,908 | 73,40 | 2561,6640 | BG |
| VD-414D | | | | | | | 1060,00 | 33,33 | 1,321 | 15,50 | 222,81 | 837,19 | 820,65 | 1106,149 | 70,60 | 255,47 | 181,88 | 1062,995 | 69,80 | 3898,1844 | BG |
| VD-414D-10 | | 126,00 | 135,00 | 2,30 | 114,50 | 138,70 | 185,00 | 8,80 | 8,200 | 3,50 | 61,95 | 123,05 | 0,00 | 1008,974 | 86,94 | 68,20 | 45,40 | 957,726 | 86,10 | 1094,8092 | AZ |
| VD-414D-12 | | | | | | | 280,00 | 12,10 | 5,218 | 5,50 | 87,10 | 192,90 | 0,00 | 1006,551 | 78,17 | 96,80 | 71,50 | 955,937 | 77,40 | 1492,9217 | BD |
| VD-414D-14 | | | | | | | 425,00 | 17,00 | 3,376 | 8,50 | 124,70 | 300,30 | 0,00 | 1013,918 | 72,67 | 140,00 | 109,50 | 962,260 | 71,90 | 2090,0904 | BG |
| VD-414D-16 | | | | | | | 515,00 | 20,00 | 2,733 | 10,50 | 149,80 | 365,20 | 0,00 | 998,178 | 70,44 | 169,00 | 138,50 | 945,700 | 69,60 | 2488,2028 | BG |
| VD-414D-20 | | 111,00 | 120,00 | 1,90 | 99,90 | 123,40 | 170,00 | 6,20 | 11,993 | 3,50 | 59,90 | 110,10 | 0,00 | 1320,470 | 94,12 | 65,10 | 26,30 | 1258,104 | 93,10 | 964,4748 | AK |
| VD-414D-22 | | | | | | | 255,00 | 8,50 | 7,632 | 5,50 | 87,80 | 167,20 | 0,00 | 1276,094 | 84,41 | 91,90 | 42,30 | 1244,802 | 83,90 | 1315,1929 | AR |
| VD-414D-24 | | | | | | | 390,00 | 12,00 | 4,938 | 8,50 | 119,70 | 270,30 | 0,00 | 1334,862 | 79,49 | 132,30 | 62,20 | 1272,637 | 78,50 | 1841,2701 | BD |
| VD-414D-26 | | | | | | | 460,00 | 14,20 | 3,998 | 10,50 | 143,60 | 316,40 | 0,00 | 1264,900 | 76,38 | 159,10 | 86,50 | 1202,935 | 75,40 | 2191,9882 | BD |
| VD-414E | | 91,00 | 100,00 | 1,50 | 80,00 | 103,00 | 134,00 | 3,25 | 21,766 | 3,50 | 57,48 | 76,52 | 0,00 | 1665,549 | 111,00 | 61,47 | 16,26 | 1578,714 | 109,00 | 790,6956 | AK |
| VD-414F | | | | | | | 200,00 | 4,49 | 13,851 | 5,50 | 80,04 | 119,96 | 0,00 | 1661,592 | 101,00 | 86,31 | 25,69 | 1574,757 | 99,80 | 1078,2212 | AR |
| VD-414G | | | | | | | 332,00 | 6,92 | 8,019 | 9,50 | 125,16 | 206,84 | 0,00 | 1658,676 | 93,60 | 135,99 | 44,57 | 1571,841 | 92,10 | 1653,2725 | BD |
| VD-414H | | | | | | | 531,00 | 10,56 | 4,915 | 15,50 | 192,84 | 338,16 | 296,62 | 1662,039 | 89,40 | 210,51 | 56,36 | 1575,204 | 87,90 | 2515,8495 | BG |
| VD-414J | | 54,00 | 63,00 | 0,80 | 43,00 | 65,00 | 77,30 | 1,45 | 104,167 | 3,50 | 54,35 | 22,95 | 0,00 | 2390,521 | 217,00 | 56,78 | 6,71 | 2137,500 | 213,00 | 469,2040 | AO |
| VD-414K | | | | | | | 111,00 | 2,00 | 66,288 | 5,50 | 75,12 | 35,88 | 0,00 | 2378,210 | 195,00 | 78,93 | 10,64 | 2125,852 | 191,00 | 639,8236 | AT |
| VD-414L | 179,00 | | | | | | 3,09 | 38,377 | 9,50 | 116,67 | 62,33 | 0,00 | 2392,166 | 179,00 | 123,26 | 18,19 | 2139,145 | 175,00 | 981,0628 | AW | |
| VD-414M | 281,00 | | | | | | 4,71 | 23,522 | 15,50 | 178,98 | 102,02 | 0,00 | 2399,593 | 170,00 | 189,72 | 29,51 | 2147,043 | 166,00 | 1492,9217 | BB | |
| VD-414M-01 | 48,00 | 57,00 | 0,60 | 37,80 | 58,40 | 91,00 | 1,67 | 103,821 | 5,00 | 69,42 | 21,58 | 0,00 | 2240,453 | 249,00 | 72,63 | 9,51 | 1907,188 | 243,00 | 530,8166 | AQ | |
| VD-414M-02 | | | | | | 138,00 | 2,40 | 64,888 | 8,00 | 100,27 | 37,73 | 0,00 | 2448,094 | 229,00 | 105,41 | 13,57 | 2114,700 | 223,00 | 758,3094 | AU | |
| VD-414M-03 | | | | | | 184,00 | 3,13 | 47,191 | 11,00 | 131,12 | 52,88 | 0,00 | 2495,286 | 219,00 | 138,19 | 18,14 | 2161,832 | 213,00 | 985,8023 | AW | |
| VD-414M-04 | | | | | | 230,00 | 3,86 | 37,079 | 14,00 | 161,98 | 68,02 | 0,00 | 2522,252 | 213,00 | 170,96 | 22,81 | 2189,136 | 207,00 | 1213,2951 | AX | |
| VD-414M-05 | | | | | | 276,00 | 4,58 | 30,536 | 17,00 | 192,83 | 83,17 | 141,00 | 2539,701 | 209,00 | 203,74 | 27,29 | 2206,497 | 203,00 | 1440,7879 | BB | |

Compression springs

Stainless steel X10CrNi188
no. 1.4310 (A301, BS 301S21)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | static | | | | | | | | dynamic | | | | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|-------------|----------------------------|
| | | | | | | | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | | | Fndtol +/- tolerance Fndyn |
| VD-415 | 10,00 | 125,00 | 135,00 | 1,90 | 112,00 | 140,00 | 205,00 | 5,94 | 12,800 | 3,50 | 66,70 | 138,30 | 0,00 | 1770,200 | 119,00 | 72,55 | 19,79 | 1695,360 | 118,00 | 1340,8892 | AZ |
| VD-416 | | | | | | | 315,00 | 8,20 | 8,145 | 5,50 | 93,39 | 221,61 | 0,00 | 1805,109 | 109,00 | 102,59 | 28,65 | 1730,176 | 107,00 | 1828,4853 | BC |
| VD-417 | | | | | | | 475,00 | 11,54 | 5,271 | 8,50 | 133,42 | 341,58 | 0,00 | 1800,318 | 102,00 | 147,63 | 44,76 | 1725,432 | 100,00 | 2559,8794 | BF |
| VD-418 | | | | | | | 690,00 | 15,98 | 3,584 | 12,50 | 186,80 | 503,20 | 321,55 | 1803,480 | 98,10 | 207,70 | 65,35 | 1728,563 | 96,80 | 3535,0716 | BG |
| VD-419 | | | | | | | 1015,00 | 22,62 | 2,422 | 18,50 | 266,86 | 748,14 | 823,53 | 1811,714 | 95,40 | 297,79 | 95,85 | 1736,811 | 94,10 | 4997,8598 | BG |
| VD-420 | | 100,00 | 110,00 | 1,50 | 88,00 | 114,00 | 150,00 | 3,41 | 25,000 | 3,50 | 63,75 | 86,25 | 0,00 | 2156,250 | 137,00 | 68,13 | 12,78 | 2046,750 | 135,00 | 1072,7114 | AW |
| VD-421 | | | | | | | 230,00 | 4,71 | 15,909 | 5,50 | 88,75 | 141,25 | 0,00 | 2247,159 | 126,00 | 95,63 | 17,15 | 2137,705 | 124,00 | 1462,7882 | BA |
| VD-422 | | | | | | | 345,00 | 6,63 | 10,294 | 8,50 | 126,25 | 218,75 | 0,00 | 2251,838 | 118,00 | 136,88 | 26,20 | 2142,412 | 116,00 | 2047,9035 | BD |
| VD-423 | | | | | | | 500,00 | 9,18 | 7,000 | 12,50 | 176,25 | 323,75 | 0,00 | 2266,250 | 114,00 | 191,88 | 37,10 | 2156,840 | 112,00 | 2828,0573 | BF |
| VD-424 | | | | | | | 730,00 | 13,00 | 4,730 | 18,50 | 251,25 | 478,75 | 553,15 | 2264,358 | 111,00 | 274,38 | 55,20 | 2154,959 | 109,00 | 3998,2879 | BG |
| VD-425 | | 80,00 | 90,00 | 1,00 | 68,00 | 93,00 | 115,00 | 2,23 | 48,828 | 3,50 | 61,86 | 53,14 | 0,00 | 2594,727 | 172,00 | 65,29 | 8,50 | 2427,246 | 169,00 | 858,1691 | AU |
| VD-426 | | | | | | | 175,00 | 3,08 | 31,072 | 5,50 | 85,78 | 89,22 | 0,00 | 2772,283 | 159,00 | 91,17 | 10,25 | 2604,803 | 157,00 | 1170,2306 | AY |
| VD-426A | | | | | | | 230,00 | 4,76 | 17,989 | 9,50 | 133,62 | 96,38 | 0,00 | 1733,810 | 129,00 | 142,93 | 58,10 | 1566,329 | 127,00 | 1794,3536 | BC |
| VD-427 | | | | | | | 255,00 | 4,34 | 20,106 | 8,50 | 121,66 | 133,34 | 0,00 | 2680,894 | 148,00 | 129,99 | 18,19 | 2513,413 | 145,00 | 1638,3228 | BB |
| VD-428 | | | | | | | 370,00 | 6,01 | 13,672 | 12,50 | 169,50 | 200,50 | 0,00 | 2741,211 | 143,00 | 181,75 | 24,89 | 2573,730 | 140,00 | 2262,4458 | BE |
| VD-429 | | | | | | | 540,00 | 8,51 | 9,238 | 18,50 | 241,26 | 298,74 | 381,16 | 2759,686 | 139,00 | 259,39 | 35,40 | 2592,206 | 136,00 | 3198,6303 | BG |
| VD-429A | | 74,00 | 84,00 | 1,00 | 62,00 | 86,80 | 200,00 | 2,75 | 39,260 | 5,50 | 114,80 | 85,20 | 0,00 | 3344,951 | 188,00 | 129,00 | 8,50 | 2787,459 | 178,00 | 1082,4633 | BC |
| VD-430 | | 63,00 | 73,00 | 0,80 | 51,00 | 75,00 | 96,00 | 1,64 | 99,981 | 3,50 | 60,58 | 35,42 | 0,00 | 3540,962 | 252,00 | 64,30 | 3,80 | 3169,404 | 247,00 | 675,8082 | AS |
| VD-431 | | | | | | | 135,00 | 2,26 | 63,624 | 5,50 | 83,77 | 51,23 | 0,00 | 3259,197 | 224,00 | 88,16 | 7,65 | 2980,167 | 219,00 | 921,5566 | AT |
| VD-432 | | | | | | | 200,00 | 3,19 | 41,169 | 8,50 | 118,56 | 81,44 | 0,00 | 3352,762 | 211,00 | 125,34 | 10,52 | 3073,657 | 206,00 | 1290,1792 | AZ |
| VD-433 | | | | | | | 285,00 | 4,41 | 27,995 | 12,50 | 164,94 | 120,06 | 0,00 | 3360,996 | 202,00 | 174,91 | 15,30 | 3081,941 | 197,00 | 1781,6761 | BC |
| VD-434 | | | | | | | 410,00 | 6,25 | 18,915 | 18,50 | 234,51 | 175,49 | 277,41 | 3319,382 | 195,00 | 249,27 | 23,91 | 3040,266 | 190,00 | 2518,9214 | BF |
| VD-435 | | 50,00 | 60,00 | 0,60 | 38,00 | 62,00 | 75,00 | 1,32 | 233,333 | 3,00 | 54,13 | 20,88 | 0,00 | 4870,833 | 360,00 | 62,22 | 3,90 | 2982,000 | 352,00 | 487,5961 | AO |
| VD-436 | | | | | | | 110,00 | 1,82 | 127,273 | 5,50 | 82,56 | 27,44 | 0,00 | 3492,045 | 331,00 | 86,34 | 7,02 | 3011,273 | 322,00 | 731,3941 | AT |
| VD-437 | | | | | | | 165,00 | 2,57 | 82,353 | 8,50 | 116,69 | 48,31 | 0,00 | 3978,676 | 315,00 | 122,53 | 7,45 | 3497,529 | 307,00 | 1023,9518 | AW |
| VD-438 | | | | | | | 230,00 | 3,56 | 56,000 | 12,50 | 162,19 | 67,81 | 0,00 | 3797,500 | 298,00 | 170,79 | 12,83 | 3315,760 | 289,00 | 1414,0286 | BA |
| VD-439 | | | | | | | 335,00 | 5,03 | 37,838 | 18,50 | 230,44 | 104,56 | 234,56 | 3956,419 | 290,00 | 243,16 | 16,56 | 3475,027 | 282,00 | 1999,1439 | BD |
| VD-445 | | 45,00 | 55,00 | 0,60 | 33,50 | 57,60 | 140,00 | 2,24 | 120,027 | 8,00 | 110,43 | 29,57 | 0,00 | 3549,211 | 385,00 | 115,65 | 9,58 | 2922,668 | 374,00 | 877,6729 | AW |
| VD-445D | | | | | | | 238,00 | 2,13 | 128,029 | 7,50 | 195,10 | 42,90 | 0,00 | 5492,455 | 420,00 | 206,50 | 4,10 | 4032,922 | 394,00 | 833,7893 | AX |
| VD-447 | | 40,00 | 50,00 | 0,70 | 28,30 | 51,90 | 239,00 | 3,57 | 88,206 | 15,50 | 194,22 | 44,78 | 139,10 | 3949,849 | 435,00 | 203,83 | 14,54 | 3102,193 | 420,00 | 1365,2690 | AX |
| VD-450 | | 36,00 | 46,00 | 1,30 | 24,00 | 48,00 | 67,00 | 3,35 | 750,171 | 2,50 | 57,90 | 9,10 | 0,00 | 6826,560 | 860,20 | 60,75 | 0,79 | 4688,572 | 599,70 | 315,9623 | AO |

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-415 | 10,00 | 125,00 | 135,00 | 1,90 | 112,00 | 140,00 | 205,00 | 5,94 | 14,903 | 3,50 | 66,70 | 138,30 | 0,00 | 2061,019 | 119,00 | 72,55 | 53,48 | 1973,883 | 118,00 | 1340,8892 | AW |
| D-416 | | | | | | | 315,00 | 8,20 | 9,484 | 5,50 | 93,39 | 221,61 | 0,00 | 2101,663 | 109,00 | 102,59 | 82,41 | 2014,419 | 107,00 | 1828,4853 | AZ |
| D-417 | | | | | | | 475,00 | 11,54 | 6,136 | 8,50 | 133,42 | 341,58 | 0,00 | 2096,084 | 102,00 | 147,63 | 127,75 | 2008,896 | 100,00 | 2559,8794 | BC |
| D-418 | | | | | | | 690,00 | 15,98 | 4,173 | 12,50 | 186,80 | 503,20 | 321,55 | 2099,766 | 98,10 | 207,70 | 187,46 | 2012,541 | 96,80 | 3535,0716 | BE |
| D-419 | | | | | | | 1015,00 | 22,62 | 2,819 | 18,50 | 266,86 | 748,14 | 823,53 | 2109,352 | 95,40 | 304,50 | 278,76 | 2003,226 | 94,10 | 4997,8598 | BG |
| D-420 | | 100,00 | 110,00 | 1,50 | 88,00 | 114,00 | 150,00 | 3,41 | 29,107 | 3,50 | 63,75 | 86,25 | 0,00 | 2510,491 | 137,00 | 68,13 | 33,64 | 2383,002 | 135,00 | 1072,7114 | AS |
| D-421 | | | | | | | 230,00 | 4,71 | 18,523 | 5,50 | 88,75 | 141,25 | 0,00 | 2616,335 | 126,00 | 97,50 | 51,41 | 2454,261 | 124,00 | 1462,7882 | AX |
| D-422 | | | | | | | 345,00 | 6,63 | 11,985 | 8,50 | 126,25 | 218,75 | 0,00 | 2621,783 | 118,00 | 141,00 | 79,74 | 2445,000 | 116,00 | 2047,9035 | BA |
| D-423 | | | | | | | 500,00 | 9,18 | 8,150 | 12,50 | 176,25 | 323,75 | 0,00 | 2638,563 | 114,00 | 201,00 | 117,65 | 2436,850 | 112,00 | 2828,0573 | BC |
| D-424 | | | | | | | 730,00 | 13,00 | 5,507 | 18,50 | 251,25 | 478,75 | 553,15 | 2636,360 | 111,00 | 288,00 | 174,31 | 2433,986 | 109,00 | 3998,2879 | BF |
| D-425 | | 80,00 | 90,00 | 1,00 | 68,00 | 93,00 | 115,00 | 2,23 | 56,850 | 3,50 | 61,86 | 53,14 | 0,00 | 3021,003 | 172,00 | 65,29 | 21,23 | 2826,008 | 169,00 | 858,1691 | AR |
| D-426 | | | | | | | 175,00 | 3,08 | 36,177 | 5,50 | 85,78 | 89,22 | 0,00 | 3227,730 | 159,00 | 93,50 | 32,08 | 2948,442 | 157,00 | 1170,2306 | AU |
| D-426A | | | | | | | 230,00 | 4,76 | 20,945 | 9,50 | 133,62 | 96,38 | 0,00 | 2018,650 | 129,00 | 142,93 | 75,78 | 1823,655 | 127,00 | 1794,3536 | AZ |
| D-427 | | | | | | | 255,00 | 4,34 | 23,409 | 8,50 | 121,66 | 133,34 | 0,00 | 3121,326 | 148,00 | 129,99 | 49,94 | 2926,331 | 145,00 | 1638,3228 | AY |
| D-428 | | | | | | | 370,00 | 6,01 | 15,918 | 12,50 | 169,50 | 200,50 | 0,00 | 3191,553 | 143,00 | 184,50 | 72,81 | 2952,783 | 140,00 | 2262,4458 | BB |
| D-429 | | | | | | | 540,00 | 8,51 | 10,755 | 18,50 | 241,26 | 298,74 | 381,16 | 3213,064 | 139,00 | 266,00 | 107,97 | 2946,975 | 136,00 | 3198,6303 | BE |
| D-429A | | 74,00 | 84,00 | 1,00 | 62,00 | 86,80 | 200,00 | 2,75 | 45,710 | 5,50 | 118,20 | 81,80 | 0,00 | 3739,066 | 188,00 | 131,00 | 21,02 | 3153,979 | 178,00 | 1082,4633 | AZ |
| D-430 | | 63,00 | 73,00 | 0,80 | 51,00 | 75,00 | 96,00 | 1,64 | 116,407 | 3,50 | 60,58 | 35,42 | 0,00 | 4122,691 | 252,00 | 65,30 | 12,15 | 3573,685 | 247,00 | 675,8082 | AO |
| D-431 | | | | | | | 135,00 | 2,26 | 74,077 | 5,50 | 83,77 | 51,23 | 0,00 | 3794,636 | 224,00 | 88,16 | 19,62 | 3469,766 | 219,00 | 921,5566 | AQ |
| D-432 | | | | | | | 200,00 | 3,19 | 47,932 | 8,50 | 118,56 | 81,44 | 0,00 | 3903,573 | 211,00 | 125,34 | 29,46 | 3578,615 | 206,00 | 1290,1792 | AW |
| D-433 | | | | | | | 285,00 | 4,41 | 32,594 | 12,50 | 164,94 | 120,06 | 0,00 | 3913,159 | 202,00 | 174,91 | 43,21 | 3588,259 | 197,00 | 1781,6761 | AZ |
| D-434 | | | | | | | 410,00 | 6,25 | 22,023 | 18,50 | 234,51 | 175,49 | 277,41 | 3864,709 | 195,00 | 249,27 | 64,78 | 3539,739 | 190,00 | 2518,9214 | BC |
| D-435 | | 50,00 | 60,00 | 0,60 | 38,00 | 62,00 | 75,00 | 1,32 | 232,857 | 3,50 | 59,81 | 15,19 | 0,00 | 3536,518 | 360,00 | 62,22 | 9,34 | 2975,914 | 352,00 | 536,3557 | AL |
| D-436 | | | | | | | 110,00 | 1,82 | 148,182 | 5,50 | 82,56 | 27,44 | 0,00 | 4065,739 | 331,00 | 86,34 | 13,32 | 3505,982 | 322,00 | 731,3941 | AP |
| D-437 | | | | | | | 165,00 | 2,57 | 95,882 | 8,50 | 116,69 | 48,31 | 0,00 | 4632,316 | 315,00 | 122,53 | 18,35 | 4072,124 | 307,00 | 1023,9518 | AS |
| D-438 | | | | | | | 230,00 | 3,56 | 65,200 | 12,50 | 162,19 | 67,81 | 0,00 | 4421,375 | 298,00 | 170,79 | 28,21 | 3860,492 | 289,00 | 1414,0286 | AX |
| D-439 | | | | | | | 335,00 | 5,03 | 44,054 | 18,50 | 230,44 | 104,56 | 234,56 | 4606,402 | 290,00 | 243,16 | 40,15 | 4045,924 | 282,00 | 1999,1439 | BA |
| D-445 | | 45,00 | 55,00 | 0,60 | 33,50 | 57,60 | 140,00 | 2,24 | 139,746 | 8,00 | 110,43 | 29,57 | 0,00 | 4132,296 | 385,00 | 115,65 | 16,16 | 3402,821 | 374,00 | 877,6729 | AS |
| D-445D | | | | | | | 238,00 | 2,13 | 149,063 | 7,50 | 197,00 | 41,00 | 84,80 | 6111,568 | 420,00 | 206,90 | 12,10 | 4635,848 | 394,00 | 833,7893 | AT |
| D-447 | | 40,00 | 50,00 | 0,60 | 28,30 | 51,90 | 239,00 | 3,57 | 102,697 | 15,50 | 194,22 | 44,78 | 141,20 | 4598,753 | 435,00 | 203,83 | 24,24 | 3611,838 | 420,00 | 1365,2690 | AT |
| D-450 | | 36,00 | 46,00 | 1,38 | 24,00 | 48,00 | 67,00 | 3,35 | 873,414 | 2,50 | 58,20 | 8,80 | 0,00 | 7686,043 | 860,20 | 60,90 | 2,41 | 5327,825 | 599,70 | 315,9623 | AL |

Compression springs

Music wire EN 10270-1-SH (ASTM 228, BS 5216)

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | |
| D-460 | 11,00 | 139,00 | 150,00 | 2,30 | | | 210,00 | 6,54 | 15,868 | 3,50 | 73,57 | 136,43 | 0,00 | 2164,868 | 136,00 | | | | | 1804,1933 | BE |
| D-462 | | | | | | | 330,00 | 9,00 | 10,098 | 5,50 | 103,04 | 226,96 | 0,00 | 2291,813 | 125,00 | | | | | 2460,2636 | BE |
| D-464 | | | | | | | 504,00 | 12,70 | 6,534 | 8,50 | 147,24 | 356,76 | 0,00 | 2331,017 | 117,00 | | | | | 3444,3690 | BF |
| D-466 | | | | | | | 730,00 | 17,50 | 4,443 | 12,50 | 206,18 | 523,82 | 238,00 | 2327,358 | 113,00 | | | | | 4756,5095 | BF |
| D-468 | | | | | | | 1100,00 | 24,90 | 3,002 | 18,50 | 294,59 | 805,41 | 850,00 | 2417,900 | 111,00 | | | | | 6724,7204 | BG |
| D-470 | | 114,00 | 125,00 | 1,90 | | | 160,00 | 3,96 | 28,764 | 3,50 | 70,55 | 89,45 | 0,00 | 2572,902 | 152,00 | | | | | 1479,6981 | BE |
| D-472 | | | | | | | 250,00 | 5,46 | 18,305 | 5,50 | 98,30 | 151,70 | 0,00 | 2776,868 | 141,00 | | | | | 2017,7701 | BE |
| D-474 | | | | | | | 375,00 | 7,69 | 11,844 | 8,50 | 139,91 | 235,09 | 0,00 | 2784,406 | 132,00 | | | | | 2824,8782 | BF |
| D-476 | | | | | | | 550,00 | 10,65 | 8,054 | 12,50 | 195,40 | 354,60 | 0,00 | 2855,944 | 128,00 | | | | | 3901,0222 | BF |
| D-478 | | | | | | | 800,00 | 15,07 | 5,442 | 18,50 | 278,64 | 521,36 | 586,00 | 2837,224 | 124,00 | | | | | 5515,2383 | BG |
| D-480 | | 89,00 | 100,00 | 1,50 | | | 135,00 | 2,43 | 60,451 | 3,50 | 68,13 | 66,87 | 0,00 | 4042,300 | 207,00 | | | | | 1155,2029 | BE |
| D-482 | | | | | | | 200,00 | 3,36 | 38,469 | 5,50 | 95,00 | 105,00 | 0,00 | 4039,196 | 189,00 | | | | | 1575,2767 | BE |
| D-484 | | | | | | | 290,00 | 4,73 | 24,891 | 8,50 | 134,03 | 155,97 | 0,00 | 3882,284 | 185,00 | | | | | 2205,3873 | BE |
| D-486 | | | | | | | 420,00 | 6,54 | 16,926 | 12,50 | 186,75 | 233,25 | 0,00 | 3947,997 | 169,00 | | | | | 3045,5349 | BF |
| D-488 | | | | | | | 620,00 | 9,26 | 11,437 | 18,50 | 265,83 | 354,17 | 451,00 | 4050,469 | 166,00 | | | | | 4305,7562 | BF |
| D-490 | | 64,00 | 75,00 | 1,00 | | | 100,00 | 1,62 | 162,566 | 3,50 | 66,30 | 33,70 | 0,00 | 5477,685 | 345,00 | | | | | 830,7077 | BE |
| D-492 | | | | | | | 140,00 | 2,23 | 103,451 | 5,50 | 91,62 | 48,38 | 0,00 | 5004,765 | 306,00 | | | | | 1132,7832 | BE |
| D-494 | | | | | | | 210,00 | 3,13 | 66,939 | 8,50 | 129,60 | 80,40 | 0,00 | 5382,057 | 291,00 | | | | | 1585,8965 | BE |
| D-496 | | | | | | | 300,00 | 4,35 | 45,519 | 12,50 | 180,23 | 119,77 | 0,00 | 5451,674 | 279,00 | | | | | 2190,0476 | BE |
| D-498 | | | | | | | 440,00 | 6,16 | 30,756 | 18,50 | 257,00 | 183,00 | 317,00 | 5628,307 | 274,00 | | | | | 3096,2741 | BF |
| D-500 | | 49,00 | 60,00 | 0,60 | | | 85,00 | 1,28 | 362,228 | 3,50 | 65,50 | 19,50 | 0,00 | 7064,921 | 570,00 | | | | | 636,0106 | BE |
| D-502 | | | | | | | 120,00 | 1,77 | 230,509 | 5,50 | 90,35 | 29,65 | 0,00 | 6834,412 | 510,00 | | | | | 867,2872 | BE |
| D-504 | | | | | | | 175,00 | 2,49 | 149,153 | 8,50 | 128,00 | 47,00 | 0,00 | 7010,178 | 477,00 | | | | | 1214,2020 | BE |
| D-506 | | | | | | | 250,00 | 3,45 | 101,424 | 12,50 | 178,00 | 72,00 | 0,00 | 7302,517 | 460,00 | | | | | 1676,7552 | BE |
| D-508 | | | | | | | 360,00 | 4,89 | 68,530 | 18,50 | 252,00 | 108,00 | 275,00 | 7401,200 | 466,00 | | | | | 2370,5849 | BF |
| D-510 | 12,00 | 153,00 | 165,00 | 2,30 | | | 230,00 | 7,12 | 16,852 | 3,50 | 80,44 | 149,56 | 0,00 | 2520,354 | 157,00 | | | | | 2363,3977 | BF |
| D-512 | | | | | | | 350,00 | 9,82 | 10,724 | 5,50 | 112,69 | 237,31 | 0,00 | 2544,866 | 143,00 | | | | | 3222,8151 | BF |
| D-514 | | | | | | | 550,00 | 13,83 | 6,939 | 8,50 | 161,07 | 388,93 | 0,00 | 2698,786 | 136,00 | | | | | 4511,9411 | BG |
| D-516 | | | | | | | 800,00 | 19,15 | 4,719 | 12,50 | 225,00 | 575,00 | 245,00 | 2713,165 | 131,00 | | | | | 6230,7758 | BG |
| D-517 | | | | | | | 1160,00 | 27,11 | 3,188 | 18,50 | 322,33 | 837,67 | 904,00 | 2670,655 | 126,00 | | | | | 8809,0278 | BG |
| D-518 | | 123,00 | 135,00 | 1,90 | | | 180,00 | 4,10 | 32,435 | 3,50 | 76,82 | 103,18 | 0,00 | 3346,642 | 183,00 | | | | | 1899,9864 | BF |
| D-520 | | | | | | | 280,00 | 5,66 | 20,640 | 5,50 | 107,00 | 173,00 | 0,00 | 3570,736 | 170,00 | | | | | 2590,8905 | BF |
| D-522 | | | | | | | 420,00 | 7,97 | 13,355 | 8,50 | 152,27 | 267,73 | 0,00 | 3575,592 | 160,00 | | | | | 3627,2468 | BF |

Compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | Detol +/- tolerance De | Dd mandrel diameter up to | Dh bush diameter from | L0 free length | L0tol +/- tolerance L0 | R spring rate N/mm | n active coils | static | | | | | dynamic | | | | weigh one spring in gram | price group | | | | | | | | |
|----------------|-----------------|----------------------|------------------------|------------------------|---------------------------|-----------------------|----------------|------------------------|--------------------|----------------|--------------------------|------------------------------|--------------------|------------------------|------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------|-------------|-----------|-----------|-----------|-----------|----|-----------|-----------|-----------|
| | | | | | | | | | | | Ln minimum spring length | sn maximum spring deflection | Lk buckling length | Fn maximum force at Ln | Fntol +/- tolerance Fn | Lndyn minimum length dynamic | shdyn maximum stroke dynamic | Fndyn maximum force dynamic | Fndtol +/- tolerance Fndyn | | | | | | | | | | |
| D-524 | 12,00 | 123,00 | 135,00 | 1,90 | | | 620,00 | 11,03 | 9,082 | 12,50 | 212,64 | 407,36 | 0,00 | 3699,531 | 155,00 | | | | | 5009,0551 | BG | | | | | | | | |
| D-526 | | | | | | | 900,00 | 15,62 | 6,136 | 18,50 | 303,19 | 596,81 | 684,00 | 3662,222 | 150,00 | | | | | | | | 7081,7675 | BG | | | | | |
| D-528 | | | | | | | 98,00 | 110,00 | 1,50 | | | 145,00 | 2,62 | 64,128 | 3,50 | 74,40 | 70,60 | 0,00 | 4527,310 | 236,00 | | | | | 1513,8103 | BF | | | |
| D-530 | | | | | | | | | | | | 215,00 | 3,62 | 40,809 | 5,50 | 103,20 | 111,80 | 0,00 | 4562,289 | 216,00 | | | | | | | 2064,2868 | BF | |
| D-532 | | | | | | | | | | | | 300,00 | 5,10 | 26,406 | 8,50 | 146,40 | 153,60 | 0,00 | 4055,782 | 195,00 | | | | | | | | 2890,0015 | BF |
| D-534 | | | | | | | | | | | | 460,00 | 7,06 | 17,956 | 12,50 | 204,01 | 255,99 | 0,00 | 4596,568 | 195,00 | | | | | | | | | 3990,9544 |
| D-536 | | 670,00 | 9,99 | 12,132 | 18,50 | 290,41 | | | | | | 379,59 | 480,00 | 4605,304 | 190,00 | | | | | | | | | 5642,3839 | BG | | | | |
| D-538 | | 68,00 | 80,00 | 1,00 | | | | | | | | 105,00 | 1,68 | 191,954 | 3,50 | 72,22 | 32,78 | 0,00 | 6291,686 | 416,00 | | | | | 1050,3990 | BE | | | |
| D-540 | | | | | | | 150,00 | 2,32 | 122,153 | 5,50 | 99,78 | 50,22 | 0,00 | 6134,632 | 374,00 | | | | | | | | 1432,3623 | BE | | | | | |
| D-542 | | | | | | | 220,00 | 3,26 | 79,040 | 8,50 | 141,11 | 78,89 | 0,00 | 6235,229 | 351,00 | | | | | | | | | 2005,3072 | BF | | | | |
| D-544 | | | | | | | 320,00 | 4,51 | 53,747 | 12,50 | 196,23 | 123,78 | 0,00 | 6652,560 | 342,00 | | | | | | | | | 2769,2337 | BF | | | | |
| D-546 | | | | | | | 460,00 | 6,39 | 36,316 | 18,50 | 278,89 | 181,11 | 326,00 | 6577,023 | 330,00 | | | | | | | | | 3915,1235 | BF | | | | |
| D-548 | 63,00 | | | | | | 75,00 | 0,80 | | | 100,00 | 1,57 | 241,381 | 3,50 | 71,94 | 28,06 | 0,00 | 6774,008 | 479,00 | | | | | 973,1638 | BE | | | | |
| D-550 | | 140,00 | 2,16 | 153,606 | 5,50 | 99,33 | | | | | 40,67 | 0,00 | 6247,359 | 425,00 | | | | | | | | 1327,0415 | BE | | | | | | |
| D-552 | | 200,00 | 3,04 | 99,392 | 8,50 | 140,42 | | | | | 59,58 | 0,00 | 5922,076 | 391,00 | | | | | | | | | 1857,8581 | BE | | | | | |
| D-554 | | 295,00 | 4,21 | 67,587 | 12,50 | 195,20 | | | | | 99,80 | 0,00 | 6745,042 | 385,00 | | | | | | | | | 2565,6136 | BF | | | | | |
| D-556 | | 425,00 | 5,97 | 45,667 | 18,50 | 277,38 | | | | | 147,62 | 300,00 | 6741,389 | 373,00 | | | | | | | | | 3627,2468 | BF | | | | | |

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Endless compression springs

Material

Patented drawn spring steel wire in compliance with EN 10270 part 1 type DH for all wire diameters up to 1.9 mm. For diameters between 2.0 and 12.0 mm type SH will be used (A228 / BS 5216). Our stainless steel springs are manufactured using spring steel wire material no. 1.4310 in compliance with EN 10270 part 3 (A301 / BS 301S21). The tolerances of the wire diameters comply with EN 10270.

Design

The springs are right-hand coiled (clockwise). The

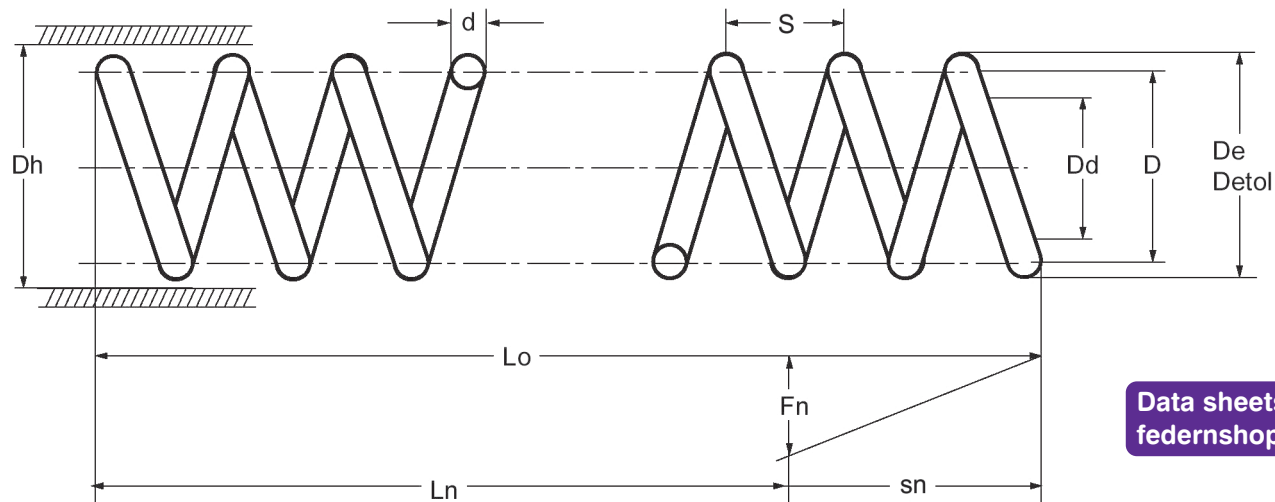
length of each spring is 1000 mm, and the end coils are closed but not ground.

Thermal treatment

Endless compression springs are not thermally treated. This allows a slight bending of the end coils. The endless compression springs should ultimately be thermally treated in order to obtain fully operational compression springs from them. **Thermal coating 30 minutes at 300° C. Cool down by air.**

Loads

The maximum indicated load (F_n) is the load which each particular spring of this size can withstand, regardless of the number of coils. The stated values for the deflection (sn_1) and the spring rate (R_1) are the theoretical values for a spring of the particular size which has 1 active coil only. These values are for a spring in a relaxed, horizontal position, and can therefore be used to calculate the values for other springs. For springs with a different number of coils R_1 should be divided by the number of active coils [$R = R_1 / n$] in order to obtain the correct spring rate. The possible deflection can be determined by dividing the maximum load by the spring rate [$sn = F_n / R$].



Data sheets at federnshop.com

| formula | unit | technical term | inquiry | formula | unit | technical term | inquiry |
|---------|------|--------------------------|---------|---------|------|--|---------|
| d | mm | wire diameter | | sn_1 | mm | maximum spring deflection of one coil | |
| D | mm | mean coil diameter | | R_1 | N/mm | spring rate of one coil | |
| D_e | mm | outer coil diameter | | S | mm | pitch of spring, distance mid-wire to mid-wire | |
| F_n | N | maximum force | | n | pc. | number of active coils | |
| L_0 | mm | unstressed spring length | | | | | |

Endless compression springs

Music wire EN 10270-1-DH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-2100 | 0,12 | 1,08 | 1,20 | 0,60 | 1,680 | 0,45 | 0,761 | 0,5200 | AQ | |
| KM-2105 | | 0,98 | 1,10 | 0,50 | 2,240 | 0,35 | 0,801 | 0,5640 | AQ | |
| KM-2110 | | 0,88 | 1,00 | 0,40 | 3,100 | 0,25 | 0,801 | 0,6290 | AQ | |
| KM-2115 | | 0,68 | 0,80 | 0,30 | 6,720 | 0,16 | 1,091 | 0,6470 | AQ | |
| KM-2120 | 0,16 | 1,84 | 2,00 | 1,20 | 1,070 | 0,99 | 1,061 | 0,7994 | AQ | |
| KM-2125 | | 1,64 | 1,80 | 0,90 | 1,514 | 0,69 | 1,061 | 0,9369 | AQ | |
| KM-2130 | | 1,44 | 1,60 | 0,70 | 2,236 | 0,50 | 1,131 | 1,0490 | AQ | |
| KM-2135 | | 1,24 | 1,40 | 0,60 | 3,502 | 0,40 | 1,431 | 1,0530 | AQ | |
| KM-2140 | | 1,14 | 1,30 | 0,50 | 4,506 | 0,31 | 1,401 | 1,1570 | AQ | |
| KM-2145 | | 1,04 | 1,20 | 0,40 | 5,935 | 0,21 | 1,271 | 1,3120 | AQ | |
| KM-2150 | | 0,84 | 1,00 | 0,30 | 11,264 | 0,12 | 1,321 | 1,4100 | AQ | |
| KM-3000 | | 0,20 | 2,90 | 3,10 | 1,50 | 0,668 | 1,21 | 0,811 | 1,5450 | AP |
| KM-3005 | 2,50 | | 2,70 | 1,20 | 1,043 | 0,93 | 0,971 | 1,6590 | AP | |
| KM-3008 | 2,30 | | 2,50 | 1,10 | 1,340 | 0,84 | 1,131 | 1,6650 | AP | |
| KM-3010 | 2,00 | | 2,20 | 1,00 | 2,037 | 0,74 | 1,531 | 1,5970 | AP | |
| KM-3011 | 1,80 | | 2,00 | 0,80 | 2,794 | 0,55 | 1,551 | 1,7850 | AP | |
| KM-3012 | 1,60 | | 1,80 | 0,70 | 3,979 | 0,43 | 1,211 | 2,0970 | AP | |
| KM-3013 | 1,30 | | 1,50 | 0,50 | 7,419 | 0,27 | 1,981 | 2,0510 | AP | |
| KM-3014 | 1,00 | | 1,20 | 0,40 | 16,300 | 0,17 | 2,811 | 1,9750 | AP | |
| KM-2155 | 0,25 | | 4,25 | 4,50 | 3,20 | 0,518 | 2,81 | 1,461 | 1,7170 | AM |
| KM-2160 | | | 3,75 | 4,00 | 2,80 | 0,755 | 2,44 | 1,841 | 1,7290 | AM |
| KM-2165 | | 3,55 | 3,80 | 2,50 | 0,889 | 2,14 | 1,911 | 1,9140 | AM | |
| KM-3015 | | 3,25 | 3,50 | 2,10 | 1,159 | 1,76 | 2,041 | 1,9680 | AM | |
| KM-3016 | | 2,95 | 3,20 | 1,80 | 1,550 | 1,47 | 2,291 | 2,0720 | AM | |
| KM-3017 | | 2,75 | 3,00 | 1,60 | 1,914 | 1,27 | 2,451 | 2,1660 | AM | |
| KM-3020 | | 2,55 | 2,80 | 1,40 | 2,400 | 1,08 | 2,611 | 2,2850 | AM | |
| KM-3022 | | 2,25 | 2,50 | 1,10 | 3,484 | 0,79 | 2,781 | 2,5480 | AM | |
| KM-3025 | | 2,05 | 2,30 | 1,00 | 4,619 | 0,69 | 3,231 | 2,5540 | AM | |
| KM-3026 | | 1,75 | 2,00 | 0,80 | 7,425 | 0,50 | 3,761 | 2,7160 | AM | |
| KM-3027 | 0,30 | 3,70 | 4,00 | 2,40 | 1,629 | 2,00 | 3,271 | 2,8210 | AM | |
| KM-3028 | | 3,30 | 3,60 | 2,00 | 2,296 | 1,61 | 3,711 | 3,0050 | AM | |
| KM-3029 | | 2,90 | 3,20 | 1,60 | 3,383 | 1,22 | 4,151 | 3,2770 | AM | |
| KM-2170 | | 2,70 | 3,00 | 1,40 | 4,192 | 1,03 | 4,331 | 3,4710 | AM | |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-12100 | 0,12 | 1,08 | 1,20 | 0,60 | 1,440 | 0,45 | 0,761 | 0,5290 | AT |
| VKM-12105 | | 0,98 | 1,10 | 0,50 | 1,928 | 0,36 | 0,691 | 0,5678 | AT |
| VKM-12110 | | 0,88 | 1,00 | 0,40 | 2,662 | 0,26 | 0,691 | 0,6333 | AT |
| VKM-12115 | | 0,68 | 0,80 | 0,30 | 5,770 | 0,16 | 0,941 | 0,6515 | AT |
| VKM-12120 | 0,16 | 1,84 | 2,00 | 1,20 | 0,921 | 0,99 | 0,911 | 0,8045 | AT |
| VKM-12125 | | 1,64 | 1,80 | 0,90 | 1,300 | 0,79 | 0,911 | 0,9428 | AT |
| VKM-12130 | | 1,44 | 1,60 | 0,70 | 1,920 | 0,51 | 0,981 | 1,0500 | AT |
| VKM-12135 | | 1,24 | 1,40 | 0,60 | 3,008 | 0,41 | 1,231 | 1,0600 | AT |
| VKM-12140 | | 1,14 | 1,30 | 0,50 | 2,871 | 0,31 | 1,211 | 1,1640 | AT |
| VKM-12145 | | 1,04 | 1,20 | 0,40 | 5,098 | 0,21 | 1,091 | 1,3210 | AT |
| VKM-12150 | | 0,84 | 1,00 | 0,30 | 9,675 | 0,12 | 1,141 | 1,4190 | AT |
| VKM-13000 | | 0,20 | 2,90 | 3,10 | 1,50 | 0,574 | 1,22 | 0,701 | 1,5550 |
| VKM-13005 | 2,50 | | 2,70 | 1,20 | 0,896 | 0,93 | 0,840 | 1,6690 | AS |
| VKM-13008 | 2,30 | | 2,50 | 1,10 | 1,151 | 0,84 | 0,971 | 1,6760 | AS |
| VKM-13010 | 2,00 | | 2,20 | 1,00 | 1,750 | 0,74 | 1,311 | 1,6070 | AS |
| VKM-13011 | 1,80 | | 2,00 | 0,80 | 2,401 | 0,56 | 1,331 | 1,7970 | AS |
| VKM-13012 | 1,60 | | 1,80 | 0,70 | 3,418 | 0,46 | 1,581 | 1,8230 | AS |
| VKM-13013 | 1,30 | | 1,50 | 0,50 | 6,372 | 0,27 | 1,701 | 2,0640 | AS |
| VKM-13014 | 1,00 | | 1,20 | 0,40 | 14,000 | 0,17 | 2,411 | 1,9870 | AS |
| VKM-12155 | 0,25 | 4,25 | 4,50 | 3,20 | 0,445 | 2,82 | 1,261 | 1,7260 | AP |
| VKM-12160 | | 3,75 | 4,00 | 2,80 | 0,648 | 2,44 | 1,581 | 1,7410 | AP |
| VKM-12165 | | 3,55 | 3,80 | 2,50 | 0,764 | 2,15 | 1,641 | 1,8340 | AP |
| VKM-13015 | | 3,25 | 3,50 | 2,10 | 0,996 | 1,76 | 1,751 | 1,9800 | AP |
| VKM-13016 | | 2,95 | 3,20 | 1,80 | 1,331 | 1,47 | 1,961 | 2,0850 | AP |
| VKM-13017 | | 2,75 | 3,00 | 1,60 | 1,644 | 1,28 | 2,101 | 2,1800 | AP |
| VKM-13020 | | 2,55 | 2,80 | 1,40 | 2,061 | 1,09 | 2,241 | 2,3000 | AP |
| VKM-13022 | | 2,25 | 2,50 | 1,10 | 3,001 | 0,79 | 2,381 | 2,5650 | AP |
| VKM-13025 | | 2,05 | 2,30 | 1,00 | 3,967 | 0,69 | 2,781 | 2,5700 | AP |
| VKM-13026 | | 1,75 | 2,00 | 0,80 | 6,378 | 0,51 | 3,231 | 2,7330 | AP |
| VKM-13027 | 0,30 | 3,70 | 4,00 | 2,40 | 1,399 | 2,00 | 2,801 | 2,8390 | AP |
| VKM-13028 | | 3,30 | 3,60 | 2,00 | 1,972 | 1,61 | 3,191 | 3,0240 | AP |
| VKM-13029 | | 2,90 | 3,20 | 1,60 | 2,906 | 1,23 | 3,571 | 3,2980 | AP |
| VKM-12170 | | 2,70 | 3,00 | 1,40 | 3,601 | 1,03 | 3,721 | 3,4930 | AP |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-12175 | 0,30 | 2,20 | 2,50 | 1,00 | 6,656 | 0,64 | 4,301 | 3,9570 | AP | |
| VKM-13030 | | 1,90 | 2,20 | 0,80 | 10,333 | 0,45 | 5,431 | 4,2300 | AP | |
| VKM-13032 | 0,32 | 4,18 | 4,50 | 2,70 | 1,256 | 2,26 | 2,851 | 3,2230 | AP | |
| VKM-13035 | | 3,98 | 4,30 | 2,20 | 1,455 | 1,77 | 2,581 | 3,7180 | AP | |
| VKM-13036 | | 3,68 | 4,00 | 2,10 | 1,841 | 1,68 | 3,101 | 3,6120 | AP | |
| VKM-13037 | | 3,48 | 3,80 | 2,00 | 2,177 | 1,59 | 3,461 | 3,5900 | AP | |
| VKM-13040 | | 3,18 | 3,50 | 1,80 | 2,853 | 1,40 | 4,001 | 3,6380 | AP | |
| VKM-13041 | | 2,88 | 3,20 | 1,50 | 3,841 | 1,11 | 4,261 | 3,9310 | AP | |
| VKM-13042 | | 2,68 | 3,00 | 1,30 | 4,767 | 0,91 | 4,361 | 4,2060 | AP | |
| VKM-13045 | | 2,50 | 2,82 | 1,00 | 5,872 | 0,61 | 3,631 | 5,0560 | AP | |
| VKM-12180 | | 2,18 | 2,50 | 0,90 | 8,859 | 0,52 | 4,651 | 4,9050 | AP | |
| VKM-13046 | | 2,00 | 2,32 | 0,80 | 11,469 | 0,42 | 4,921 | 5,0880 | AP | |
| VKM-13047 | | 1,68 | 2,00 | 0,70 | 19,350 | 0,33 | 6,481 | 4,8910 | AP | |
| VKM-13048 | | 1,48 | 1,80 | 0,60 | 28,302 | 0,23 | 6,731 | 5,0210 | AP | |
| VKM-13049 | | 0,40 | 6,60 | 7,00 | 3,50 | 0,779 | 2,90 | 2,261 | 6,0700 | AP |
| VKM-12185 | | | 6,10 | 6,85 | 3,20 | 0,987 | 2,62 | 2,591 | 6,1370 | AP |
| VKM-13600 | 5,60 | | 6,00 | 3,00 | 1,276 | 2,44 | 3,121 | 6,0210 | AP | |
| VKM-13050 | 5,00 | | 5,40 | 2,30 | 1,792 | 1,53 | 3,171 | 6,9450 | AP | |
| VKM-13052 | 4,60 | | 5,00 | 2,00 | 2,301 | 1,47 | 3,411 | 7,3400 | AP | |
| VKM-13053 | 4,40 | | 4,80 | 1,90 | 2,630 | 1,38 | 3,651 | 7,3840 | AP | |
| VKM-13055 | 4,00 | | 4,40 | 1,50 | 3,500 | 1,00 | 3,501 | 8,4530 | AP | |
| VKM-13056 | 3,60 | | 4,00 | 1,30 | 4,801 | 0,81 | 3,901 | 8,7730 | AP | |
| VKM-13060 | 3,20 | | 3,60 | 1,10 | 6,836 | 0,62 | 4,251 | 9,2040 | AP | |
| VKM-13062 | 2,80 | | 3,20 | 1,10 | 10,204 | 0,63 | 6,431 | 8,0890 | AP | |
| VKM-13065 | 2,70 | | 3,10 | 1,10 | 11,380 | 0,63 | 7,201 | 7,8110 | AP | |
| VKM-13067 | 2,60 | | 3,00 | 1,10 | 12,745 | 0,63 | 8,081 | 7,5340 | AP | |
| VKM-13070 | 2,50 | | 2,90 | 1,00 | 14,336 | 0,53 | 7,691 | 7,9510 | AP | |
| VKM-12190 | 2,20 | | 2,60 | 0,90 | 21,037 | 0,44 | 9,291 | 7,7800 | AP | |
| VKM-13071 | 2,00 | | 2,40 | 0,80 | 28,000 | 0,34 | 9,651 | 7,9510 | AP | |
| VKM-13075 | 1,80 | | 2,20 | 0,70 | 38,409 | 0,24 | 9,671 | 8,1220 | AP | |
| VKM-13076 | 1,60 | | 2,00 | 0,65 | 54,688 | 0,20 | 11,140 | 7,7920 | AP | |
| VKM-13077 | 1,40 | | 1,80 | 0,60 | 81,633 | 0,15 | 12,460 | 7,4390 | AP | |
| VKM-13078 | 0,50 | 11,00 | 11,50 | 10,00 | 0,411 | 9,08 | 3,731 | 5,8870 | AP | |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-2175 | 0,30 | 2,20 | 2,50 | 1,00 | 7,750 | 0,64 | 5,001 | 3,9320 | AM | |
| KM-3030 | | 1,90 | 2,20 | 0,80 | 12,031 | 0,45 | 5,431 | 4,2300 | AM | |
| KM-3032 | 0,32 | 4,18 | 4,50 | 2,70 | 1,463 | 2,26 | 3,321 | 3,2230 | AM | |
| KM-3035 | | 3,98 | 4,30 | 2,20 | 1,694 | 1,77 | 3,011 | 3,7180 | AM | |
| KM-3036 | | 3,68 | 4,00 | 2,10 | 2,144 | 1,68 | 3,611 | 3,6120 | AM | |
| KM-3037 | | 3,48 | 3,80 | 2,00 | 2,535 | 1,59 | 4,031 | 3,5900 | AM | |
| KM-3040 | | 3,18 | 3,50 | 1,80 | 3,322 | 1,40 | 4,661 | 3,6380 | AM | |
| KM-3041 | | 2,88 | 3,20 | 1,50 | 4,472 | 1,11 | 4,961 | 3,9310 | AM | |
| KM-3042 | | 2,68 | 3,00 | 1,30 | 5,550 | 0,91 | 5,071 | 4,2060 | AM | |
| KM-3045 | | 2,50 | 2,82 | 1,00 | 6,837 | 0,61 | 4,231 | 5,0560 | AM | |
| KM-2180 | | 2,18 | 2,50 | 0,90 | 10,311 | 0,52 | 5,210 | 4,9050 | AM | |
| KM-3046 | | 2,00 | 2,32 | 0,80 | 13,353 | 0,42 | 5,731 | 5,0560 | AM | |
| KM-3047 | | 1,68 | 2,00 | 0,70 | 22,529 | 0,33 | 7,541 | 4,8600 | AM | |
| KM-3048 | | 1,48 | 1,80 | 0,60 | 32,952 | 0,23 | 7,841 | 4,9890 | AM | |
| KM-3049 | | 0,40 | 6,60 | 7,00 | 3,50 | 0,907 | 2,90 | 2,631 | 6,0310 | AM |
| KM-2185 | | | 6,10 | 6,85 | 3,20 | 1,149 | 2,62 | 3,021 | 6,0980 | AM |
| KM-3600 | 5,60 | | 6,00 | 3,00 | 1,485 | 2,44 | 3,631 | 5,9830 | AM | |
| KM-3050 | 5,00 | | 5,40 | 2,30 | 2,086 | 1,53 | 3,691 | 6,9010 | AM | |
| KM-3052 | 4,60 | | 5,00 | 2,00 | 2,679 | 1,47 | 3,971 | 7,2940 | AM | |
| KM-3053 | 4,40 | | 4,80 | 1,90 | 3,062 | 1,38 | 4,251 | 7,3370 | AM | |
| KM-3055 | 4,00 | | 4,40 | 1,50 | 4,075 | 1,00 | 4,081 | 8,3990 | AM | |
| KM-3056 | 3,60 | | 4,00 | 1,30 | 5,590 | 0,81 | 4,531 | 8,7180 | AM | |
| KM-3060 | 3,20 | | 3,60 | 1,10 | 7,959 | 0,62 | 4,941 | 9,1460 | AM | |
| KM-3062 | 2,80 | | 3,20 | 1,10 | 11,880 | 0,63 | 7,491 | 8,0380 | AM | |
| KM-3065 | 2,70 | | 3,10 | 1,10 | 13,250 | 0,63 | 8,381 | 7,7620 | AM | |
| KM-3067 | 2,60 | | 3,00 | 1,10 | 14,838 | 0,63 | 9,411 | 7,4860 | AM | |
| KM-3070 | 2,50 | | 2,90 | 1,00 | 16,691 | 0,53 | 8,951 | 7,9010 | AM | |
| KM-2190 | 2,20 | | 2,60 | 0,90 | 24,493 | 0,44 | 10,820 | 7,7310 | AM | |
| KM-3071 | 2,00 | | 2,40 | 0,80 | 32,600 | 0,34 | 11,240 | 7,9010 | AM | |
| KM-3075 | 1,80 | | 2,20 | 0,70 | 44,719 | 0,24 | 11,080 | 8,1150 | AM | |
| KM-3076 | 1,60 | | 2,00 | 0,65 | 63,672 | 0,20 | 12,760 | 7,7810 | AM | |
| KM-3077 | 1,40 | | 1,80 | 0,60 | 95,044 | 0,15 | 14,510 | 7,3920 | AM | |
| KM-3078 | 0,50 | 11,00 | 11,50 | 10,00 | 0,478 | 9,08 | 4,341 | 5,8500 | AM | |

Endless compression springs

Music wire EN 10270-1-DH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-2195 | 0,50 | 10,50 | 11,00 | 9,00 | 0,550 | 8,12 | 4,471 | 6,1400 | AM | |
| KM-2200 | | 9,50 | 10,00 | 8,00 | 0,743 | 7,17 | 5,331 | 6,2380 | AM | |
| KM-2205 | | 8,50 | 9,00 | 7,00 | 1,037 | 6,27 | 6,501 | 6,3250 | AM | |
| KM-3079 | | 8,00 | 8,50 | 3,40 | 1,244 | 2,65 | 3,311 | 11,6400 | AM | |
| KM-3601 | | 7,50 | 8,00 | 3,00 | 1,509 | 2,28 | 3,451 | 12,3300 | AM | |
| KM-3602 | | 7,10 | 7,60 | 2,80 | 1,779 | 2,09 | 3,731 | 12,5100 | AM | |
| KM-2210 | | 6,80 | 7,30 | 4,50 | 2,025 | 3,81 | 7,721 | 7,7000 | AM | |
| KM-3603 | | 6,50 | 7,00 | 2,80 | 2,319 | 2,12 | 4,921 | 11,4900 | AM | |
| KM-3080 | | 6,30 | 6,80 | 2,80 | 2,546 | 2,12 | 5,431 | 11,1500 | AM | |
| KM-3081 | | 6,00 | 6,50 | 3,60 | 2,948 | 2,94 | 8,701 | 8,4030 | AM | |
| KM-2215 | | 5,80 | 6,30 | 3,13 | 3,263 | 2,64 | 8,641 | 8,8470 | AM | |
| KM-3082 | | 5,50 | 6,00 | 2,80 | 3,827 | 2,17 | 8,261 | 9,8110 | AM | |
| KM-3083 | | 5,30 | 5,80 | 2,80 | 4,277 | 2,16 | 9,261 | 9,4760 | AM | |
| KM-3085 | | 5,10 | 5,60 | 2,80 | 4,800 | 2,17 | 10,420 | 9,1420 | AM | |
| KM-3090 | | 5,00 | 5,50 | 2,00 | 5,094 | 1,37 | 7,001 | 12,3400 | AM | |
| KM-3095 | | 4,80 | 5,30 | 2,00 | 5,757 | 1,37 | 7,941 | 11,8700 | AM | |
| KM-3097 | | 4,50 | 5,00 | 1,80 | 6,987 | 1,18 | 8,321 | 12,3300 | AM | |
| KM-3100 | | 4,00 | 4,50 | 1,60 | 9,949 | 1,00 | 9,961 | 12,3400 | AM | |
| KM-3102 | | 3,50 | 4,00 | 1,50 | 14,851 | 0,91 | 13,570 | 11,5400 | AM | |
| KM-3105 | | 3,30 | 3,80 | 1,30 | 17,718 | 0,71 | 12,700 | 12,5200 | AM | |
| KM-3106 | | 3,00 | 3,50 | 1,20 | 23,582 | 0,62 | 14,690 | 12,3400 | AM | |
| KM-3108 | | 2,70 | 3,20 | 1,10 | 32,349 | 0,52 | 17,070 | 12,1200 | AM | |
| KM-3110 | | 2,50 | 3,00 | 1,00 | 40,750 | 0,43 | 17,550 | 12,3400 | AM | |
| KM-3604 | | 2,30 | 2,80 | 0,90 | 52,332 | 0,33 | 17,470 | 12,6000 | AM | |
| KM-3111 | | 2,00 | 2,50 | 0,82 | 79,590 | 0,25 | 20,530 | 12,0500 | AM | |
| KM-3112 | | 0,55 | 8,45 | 9,00 | 4,50 | 1,545 | 3,69 | 5,721 | 11,3700 | AM |
| KM-2220 | | | 7,95 | 8,50 | 5,80 | 1,855 | 5,02 | 9,341 | 8,5300 | AM |
| KM-3605 | | | 7,45 | 8,00 | 4,00 | 2,254 | 3,24 | 7,311 | 11,2900 | AM |
| KM-2225 | 6,95 | | 7,50 | 4,40 | 2,777 | 3,66 | 10,180 | 9,6960 | AM | |
| KM-3606 | 6,45 | | 7,00 | 3,50 | 3,474 | 2,78 | 9,691 | 11,1600 | AM | |
| KM-2230 | 5,95 | | 6,50 | 3,40 | 4,426 | 2,69 | 11,940 | 10,6500 | AM | |
| KM-3113 | 5,45 | | 6,00 | 3,00 | 5,759 | 2,31 | 13,330 | 11,0200 | AM | |
| KM-2235 | 4,95 | | 5,50 | 2,50 | 7,686 | 1,82 | 14,040 | 11,9600 | AM | |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-12195 | 0,50 | 10,50 | 11,00 | 9,00 | 0,472 | 8,12 | 3,841 | 6,1790 | AP |
| VKM-12200 | | 9,50 | 10,00 | 8,00 | 0,638 | 7,17 | 4,581 | 6,2790 | AP |
| VKM-12205 | | 8,50 | 9,00 | 7,00 | 0,890 | 6,27 | 5,591 | 6,3660 | AP |
| VKM-13079 | | 8,00 | 8,50 | 3,40 | 1,068 | 2,65 | 2,841 | 11,7100 | AP |
| VKM-13601 | | 7,50 | 8,00 | 3,00 | 1,296 | 2,28 | 2,961 | 12,4100 | AP |
| VKM-13602 | | 7,10 | 7,60 | 2,80 | 1,528 | 2,09 | 3,211 | 12,5800 | AP |
| VKM-12210 | | 6,80 | 7,30 | 4,50 | 1,739 | 3,81 | 6,631 | 7,7490 | AP |
| VKM-13603 | | 6,50 | 7,00 | 2,80 | 1,991 | 2,12 | 4,231 | 11,5600 | AP |
| VKM-13080 | | 6,30 | 6,80 | 2,80 | 2,187 | 2,12 | 4,661 | 11,2200 | AP |
| VKM-13081 | | 6,00 | 6,50 | 3,60 | 2,532 | 2,94 | 7,531 | 8,4590 | AP |
| VKM-12215 | | 5,80 | 6,30 | 3,13 | 2,803 | 2,64 | 7,421 | 8,9030 | AP |
| VKM-13082 | | 5,50 | 6,00 | 2,80 | 3,287 | 2,17 | 7,101 | 9,8730 | AP |
| VKM-13083 | | 5,30 | 5,80 | 2,80 | 3,637 | 2,16 | 7,951 | 9,5360 | AP |
| VKM-13085 | | 5,10 | 5,60 | 2,80 | 4,123 | 2,17 | 8,951 | 9,2000 | AP |
| VKM-13090 | | 5,00 | 5,50 | 2,00 | 4,735 | 1,37 | 6,011 | 12,4200 | AP |
| VKM-13095 | | 4,80 | 5,30 | 2,00 | 4,945 | 1,37 | 6,281 | 11,9400 | AP |
| VKM-13097 | | 4,50 | 5,00 | 1,80 | 6,001 | 1,18 | 7,141 | 12,4100 | AP |
| VKM-13100 | | 4,00 | 4,50 | 1,60 | 8,545 | 1,00 | 8,561 | 12,4200 | AP |
| VKM-13102 | | 3,50 | 4,00 | 1,50 | 12,755 | 0,91 | 11,660 | 11,6100 | AP |
| VKM-13105 | | 3,30 | 3,80 | 1,30 | 15,218 | 0,71 | 10,910 | 12,6200 | AP |
| VKM-13106 | | 3,00 | 3,50 | 1,20 | 20,255 | 0,62 | 12,620 | 12,4100 | AP |
| VKM-13108 | | 2,70 | 3,20 | 1,10 | 27,784 | 0,52 | 14,660 | 12,2200 | AP |
| VKM-13110 | | 2,50 | 3,00 | 1,00 | 35,000 | 0,43 | 15,080 | 12,4200 | AP |
| VKM-13604 | | 2,30 | 2,80 | 0,90 | 44,947 | 0,33 | 15,000 | 12,6800 | AP |
| VKM-13111 | 2,00 | 2,50 | 0,82 | 68,359 | 0,25 | 17,820 | 12,0800 | AP | |
| VKM-13112 | 0,55 | 8,45 | 9,00 | 4,50 | 1,327 | 3,69 | 4,911 | 11,4400 | AP |
| VKM-12220 | | 7,95 | 8,50 | 5,80 | 1,594 | 5,02 | 8,021 | 8,5480 | AP |
| VKM-13605 | | 7,45 | 8,00 | 4,00 | 1,936 | 3,24 | 7,781 | 10,6600 | AP |
| VKM-12225 | | 6,95 | 7,50 | 4,40 | 2,385 | 3,66 | 8,740 | 9,7580 | AP |
| VKM-13606 | | 6,45 | 7,00 | 3,50 | 2,984 | 2,78 | 8,321 | 11,2300 | AP |
| VKM-12230 | | 5,95 | 6,50 | 3,40 | 3,801 | 2,69 | 10,260 | 10,7200 | AP |
| VKM-13113 | | 5,45 | 6,00 | 3,00 | 4,946 | 2,31 | 11,450 | 11,0900 | AP |
| VKM-12235 | | 4,95 | 5,50 | 2,50 | 6,602 | 1,82 | 12,060 | 12,0400 | AP |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-13607 | 0,55 | 4,45 | 5,00 | 2,10 | 9,086 | 1,43 | 13,090 | 12,8300 | AP | |
| VKM-12240 | | 3,95 | 4,50 | 1,70 | 12,992 | 1,05 | 13,670 | 14,0000 | AP | |
| VKM-12242 | | 3,45 | 4,00 | 1,40 | 19,499 | 0,76 | 14,860 | 14,8200 | AP | |
| VKM-13114 | | 2,95 | 3,50 | 1,20 | 31,188 | 0,57 | 17,810 | 14,7800 | AP | |
| VKM-12244 | | 2,45 | 3,00 | 1,00 | 54,445 | 0,37 | 20,580 | 14,7400 | AP | |
| VKM-12246 | 0,60 | 10,40 | 11,00 | 8,00 | 1,008 | 7,06 | 7,121 | 9,7730 | AP | |
| VKM-12248 | | 9,40 | 10,00 | 7,30 | 1,365 | 6,46 | 8,831 | 9,6310 | AP | |
| VKM-12250 | | 8,40 | 9,00 | 6,00 | 1,913 | 5,18 | 9,921 | 10,3900 | AP | |
| VKM-12252 | | 7,40 | 8,00 | 4,60 | 2,798 | 3,80 | 10,660 | 11,8200 | AP | |
| VKM-12254 | | 6,40 | 7,00 | 3,20 | 4,326 | 2,43 | 10,560 | 14,4400 | AP | |
| VKM-13608 | | 5,40 | 6,00 | 2,40 | 7,202 | 1,66 | 12,020 | 16,1400 | AP | |
| VKM-13115 | | 5,10 | 5,70 | 2,20 | 8,549 | 1,58 | 12,620 | 16,6200 | AP | |
| VKM-13120 | | 4,40 | 5,00 | 1,90 | 13,312 | 1,19 | 15,860 | 16,6100 | AP | |
| VKM-12256 | | 3,40 | 4,00 | 1,40 | 28,852 | 0,71 | 20,510 | 17,3900 | AP | |
| VKM-12258 | | 2,40 | 3,00 | 1,00 | 82,031 | 0,32 | 26,660 | 17,2900 | AP | |
| VKM-12260 | | 0,63 | 11,87 | 12,50 | 9,00 | 0,824 | 7,97 | 6,571 | 10,9300 | AQ |
| VKM-13609 | | | 10,97 | 11,60 | 8,00 | 1,044 | 7,00 | 7,321 | 11,2900 | AQ |
| VKM-13121 | | | 9,87 | 10,50 | 5,50 | 1,434 | 4,59 | 6,591 | 14,3500 | AQ |
| VKM-12262 | 9,37 | | 10,00 | 5,40 | 1,676 | 4,49 | 7,541 | 13,9500 | AQ | |
| VKM-12264 | 8,87 | | 9,50 | 5,20 | 1,975 | 4,32 | 8,541 | 13,7300 | AQ | |
| VKM-13122 | 8,37 | | 9,00 | 4,50 | 2,351 | 3,63 | 8,561 | 14,8800 | AQ | |
| VKM-13125 | 8,00 | | 8,63 | 3,00 | 2,692 | 2,15 | 5,801 | 20,9600 | AQ | |
| VKM-13126 | 7,37 | | 8,00 | 2,80 | 3,443 | 1,97 | 6,811 | 20,7100 | AQ | |
| VKM-13127 | 6,87 | | 7,50 | 2,70 | 4,251 | 1,89 | 8,061 | 20,0400 | AQ | |
| VKM-13130 | 6,30 | | 6,93 | 2,00 | 5,513 | 1,21 | 6,681 | 24,6700 | AQ | |
| VKM-13131 | 5,87 | | 6,50 | 2,00 | 6,815 | 1,22 | 8,341 | 23,0300 | AQ | |
| VKM-13132 | 5,60 | | 6,23 | 2,00 | 7,849 | 1,23 | 9,661 | 22,0000 | AQ | |
| VKM-13135 | 5,40 | | 6,03 | 1,90 | 8,754 | 1,13 | 8,961 | 22,3100 | AQ | |
| VKM-13140 | 5,00 | | 5,63 | 1,50 | 11,027 | 0,74 | 8,251 | 26,0500 | AQ | |
| VKM-13141 | 4,67 | | 5,30 | 1,50 | 13,534 | 0,75 | 10,230 | 24,3700 | AQ | |
| VKM-13142 | 4,37 | | 5,00 | 1,40 | 16,517 | 0,66 | 11,060 | 24,1400 | AQ | |
| VKM-13145 | 4,00 | 4,63 | 1,50 | 21,537 | 0,76 | 16,570 | 20,9600 | AQ | | |
| VKM-13146 | 3,67 | 4,30 | 1,50 | 27,885 | 0,77 | 21,620 | 19,3000 | AQ | | |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3607 | 0,55 | 4,45 | 5,00 | 2,10 | 10,579 | 1,43 | 15,240 | 12,7500 | AM | |
| KM-2240 | | 3,95 | 4,50 | 1,70 | 15,126 | 1,05 | 15,920 | 13,9200 | AM | |
| KM-2242 | | 3,45 | 4,00 | 1,40 | 22,702 | 0,76 | 17,310 | 14,7200 | AM | |
| KM-3114 | | 2,95 | 3,50 | 1,20 | 36,312 | 0,57 | 20,740 | 14,6900 | AM | |
| KM-2244 | | 2,45 | 3,00 | 1,00 | 63,390 | 0,37 | 23,970 | 14,6500 | AM | |
| KM-2246 | 0,60 | 10,40 | 11,00 | 8,00 | 1,174 | 7,06 | 8,291 | 9,7110 | AM | |
| KM-2248 | | 9,40 | 10,00 | 7,30 | 1,590 | 6,46 | 10,280 | 9,5700 | AM | |
| KM-2250 | | 8,40 | 9,00 | 6,00 | 2,228 | 5,18 | 11,550 | 10,3200 | AM | |
| KM-2252 | | 7,40 | 8,00 | 4,60 | 3,258 | 3,80 | 12,410 | 11,7200 | AM | |
| KM-2254 | | 6,40 | 7,00 | 3,20 | 5,037 | 2,43 | 12,290 | 14,3500 | AM | |
| KM-3608 | | 5,40 | 6,00 | 2,40 | 8,385 | 1,66 | 14,000 | 16,0400 | AM | |
| KM-3115 | | 5,10 | 5,70 | 2,20 | 9,953 | 1,58 | 14,690 | 16,5100 | AM | |
| KM-3120 | | 4,40 | 5,00 | 1,90 | 15,499 | 1,19 | 18,470 | 16,5100 | AM | |
| KM-2256 | | 3,40 | 4,00 | 1,40 | 33,592 | 0,71 | 23,880 | 17,2800 | AM | |
| KM-2258 | | 2,40 | 3,00 | 1,00 | 95,508 | 0,32 | 31,040 | 17,0900 | AM | |
| KM-2260 | | 0,63 | 11,87 | 12,50 | 9,00 | 0,960 | 7,97 | 7,651 | 10,8300 | AN |
| KM-3609 | | | 10,97 | 11,60 | 8,00 | 1,216 | 7,00 | 8,531 | 11,2100 | AN |
| KM-3121 | | | 9,87 | 10,50 | 5,50 | 1,669 | 4,59 | 7,671 | 14,2600 | AN |
| KM-2262 | | | 9,37 | 10,00 | 5,40 | 1,951 | 4,49 | 8,781 | 13,8600 | AN |
| KM-2264 | 8,87 | | 9,50 | 5,20 | 2,300 | 4,32 | 9,951 | 13,6400 | AN | |
| KM-3122 | 8,37 | | 9,00 | 4,50 | 2,737 | 3,63 | 9,971 | 4,7900 | AN | |
| KM-3125 | 8,00 | | 8,63 | 3,00 | 3,134 | 2,15 | 6,761 | 20,8300 | AN | |
| KM-3126 | 7,37 | | 8,00 | 2,80 | 4,009 | 1,97 | 7,931 | 20,5800 | AN | |
| KM-3127 | 6,87 | | 7,50 | 2,70 | 4,949 | 1,89 | 9,318 | 19,9100 | AN | |
| KM-3130 | 6,30 | | 6,93 | 2,00 | 6,418 | 1,21 | 7,771 | 24,5100 | AN | |
| KM-3131 | 5,87 | | 6,50 | 2,00 | 7,934 | 1,22 | 9,711 | 22,8800 | AN | |
| KM-3132 | 5,60 | | 6,23 | 2,00 | 9,138 | 1,23 | 11,250 | 21,8600 | AN | |
| KM-3135 | 5,40 | | 6,03 | 1,90 | 10,192 | 1,13 | 11,590 | 22,1200 | AN | |
| KM-3140 | 5,00 | | 5,63 | 1,50 | 12,839 | 0,74 | 9,601 | 25,8800 | AN | |
| KM-3141 | 4,67 | | 5,30 | 1,50 | 15,757 | 0,75 | 11,910 | 24,2100 | AN | |
| KM-3142 | 4,37 | | 5,00 | 1,40 | 19,230 | 0,66 | 12,720 | 24,2900 | AN | |
| KM-3145 | 4,00 | 4,63 | 1,50 | 25,076 | 0,76 | 19,290 | 20,8300 | AN | | |
| KM-3146 | 3,67 | 4,30 | 1,50 | 32,466 | 0,77 | 25,180 | 19,1700 | AN | | |

Endless compression springs

Music wire EN 10270-1-DH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3147 | 0,63 | 3,37 | 4,00 | 1,40 | 41,931 | 0,67 | 28,500 | 18,8900 | AN | |
| KM-3150 | | 3,20 | 3,83 | 1,20 | 48,976 | 0,48 | 23,620 | 20,8400 | AN | |
| KM-2263 | | 2,87 | 3,50 | 1,10 | 67,887 | 0,38 | 26,296 | 20,4200 | AN | |
| KM-2265 | | 2,67 | 3,30 | 1,10 | 84,313 | 0,38 | 32,830 | 19,0400 | AN | |
| KM-3151 | | 2,37 | 3,00 | 1,00 | 120,595 | 0,29 | 35,320 | 18,6200 | AN | |
| KM-3153 | 0,70 | 11,30 | 12,00 | 5,00 | 1,695 | 3,95 | 6,701 | 21,9600 | AO | |
| KM-3610 | | 10,70 | 11,10 | 4,50 | 2,175 | 3,49 | 7,611 | 22,4100 | AO | |
| KM-3611 | | 9,30 | 10,00 | 4,00 | 3,041 | 3,04 | 9,251 | 22,5700 | AN | |
| KM-2266 | | 8,30 | 9,00 | 4,00 | 4,278 | 3,07 | 13,170 | 20,2500 | AN | |
| KM-3665 | | 7,50 | 8,20 | 4,00 | 5,798 | 3,10 | 18,010 | 18,4100 | AN | |
| KM-2268 | | 7,30 | 8,00 | 3,80 | 6,288 | 2,91 | 18,330 | 18,8200 | AN | |
| KM-3154 | | 6,80 | 7,50 | 3,50 | 7,779 | 2,63 | 20,520 | 18,9900 | AN | |
| KM-3612 | | 6,30 | 7,00 | 3,20 | 9,782 | 2,34 | 22,970 | 19,2400 | AN | |
| KM-3155 | | 6,00 | 6,70 | 2,50 | 11,324 | 1,65 | 18,700 | 23,2600 | AN | |
| KM-3156 | | 5,60 | 6,30 | 2,30 | 13,928 | 1,39 | 20,410 | 23,5400 | AN | |
| KM-3157 | | 5,30 | 6,00 | 2,20 | 16,430 | 1,37 | 22,520 | 23,3200 | AN | |
| KM-3160 | | 5,00 | 5,70 | 1,50 | 19,568 | 0,67 | 13,250 | 31,9500 | AN | |
| KM-3669 | | 4,80 | 5,50 | 2,00 | 22,117 | 1,17 | 26,080 | 23,2600 | AN | |
| KM-3161 | | 4,30 | 5,00 | 1,50 | 30,765 | 0,69 | 21,250 | 27,5900 | AN | |
| KM-3162 | | 3,80 | 4,50 | 1,40 | 44,577 | 0,59 | 26,690 | 26,1800 | AN | |
| KM-3613 | | 3,30 | 4,00 | 1,30 | 68,064 | 0,50 | 34,450 | 24,5400 | AN | |
| KM-3163 | | 2,80 | 3,50 | 0,90 | 111,426 | 0,11 | 12,550 | 29,9000 | AN | |
| KM-3164 | | 0,80 | 13,20 | 14,00 | 5,50 | 1,814 | 4,30 | 7,831 | 30,2500 | AP |
| KM-3614 | | | 12,20 | 13,00 | 5,30 | 2,298 | 4,15 | 9,551 | 29,0900 | AO |
| KM-3615 | | | 11,20 | 12,00 | 5,00 | 2,970 | 3,88 | 11,530 | 28,4500 | AO |
| KM-3616 | 10,20 | | 11,00 | 4,80 | 3,932 | 3,72 | 14,660 | 27,0100 | AO | |
| KM-3165 | 10,00 | | 10,80 | 3,50 | 4,173 | 2,43 | 10,180 | 35,8600 | AO | |
| KM-3167 | 9,20 | | 10,00 | 3,30 | 5,359 | 2,25 | 12,110 | 35,1000 | AO | |
| KM-3170 | 8,50 | | 9,30 | 3,00 | 6,795 | 1,98 | 13,490 | 35,6300 | AO | |
| KM-3172 | 8,20 | | 9,00 | 2,80 | 7,568 | 1,79 | 13,570 | 36,8100 | AP | |
| KM-3175 | 8,00 | | 8,80 | 2,50 | 8,158 | 1,49 | 12,210 | 40,1400 | AP | |
| KM-3177 | 7,20 | | 8,00 | 2,50 | 11,180 | 1,52 | 17,000 | 36,2300 | AP | |
| KM-3178 | 6,80 | | 7,50 | 2,40 | 13,874 | 1,43 | 19,950 | 35,1000 | AP | |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-13147 | 0,63 | 3,37 | 4,00 | 1,40 | 36,015 | 0,67 | 24,480 | 19,0100 | AQ | |
| VKM-13150 | | 3,20 | 3,83 | 1,20 | 42,065 | 0,48 | 20,290 | 20,9800 | AQ | |
| VKM-12263 | | 2,87 | 3,50 | 1,10 | 58,308 | 0,38 | 22,550 | 20,5500 | AQ | |
| VKM-12265 | | 2,67 | 3,30 | 1,10 | 72,416 | 0,38 | 28,200 | 19,1700 | AQ | |
| VKM-13151 | | 2,37 | 3,00 | 1,00 | 103,544 | 0,29 | 30,340 | 18,7300 | AQ | |
| VKM-13153 | 0,70 | 11,30 | 12,00 | 5,00 | 1,456 | 3,95 | 5,761 | 22,1000 | AR | |
| VKM-13610 | | 10,70 | 11,10 | 4,50 | 1,868 | 3,49 | 6,541 | 22,5600 | AR | |
| VKM-13611 | | 9,30 | 10,00 | 4,00 | 2,612 | 3,04 | 7,941 | 22,7100 | AR | |
| VKM-12266 | | 8,30 | 9,00 | 4,00 | 3,674 | 3,07 | 11,320 | 20,3800 | AR | |
| VKM-13665 | | 7,50 | 8,20 | 4,00 | 4,980 | 3,10 | 15,470 | 18,5300 | AR | |
| VKM-12268 | | 7,30 | 8,00 | 3,80 | 5,400 | 2,91 | 15,740 | 18,9400 | AR | |
| VKM-13154 | | 6,80 | 7,50 | 3,50 | 6,681 | 2,63 | 17,620 | 19,1100 | AR | |
| VKM-13612 | | 6,30 | 7,00 | 3,20 | 8,402 | 2,34 | 19,730 | 19,3700 | AR | |
| VKM-13155 | | 6,00 | 6,70 | 2,50 | 9,726 | 1,65 | 16,060 | 23,4100 | AR | |
| VKM-13156 | | 5,60 | 6,30 | 2,30 | 11,963 | 1,39 | 17,530 | 23,6900 | AR | |
| VKM-13157 | | 5,30 | 6,00 | 2,20 | 14,111 | 1,37 | 19,350 | 23,4700 | AR | |
| VKM-13160 | | 5,00 | 5,70 | 1,50 | 16,807 | 0,67 | 11,380 | 32,1600 | AR | |
| VKM-13669 | | 4,80 | 5,50 | 2,00 | 18,997 | 1,17 | 22,480 | 23,4100 | AR | |
| VKM-13161 | | 4,30 | 5,00 | 1,50 | 26,424 | 0,69 | 18,250 | 27,7600 | AR | |
| VKM-13162 | | 3,80 | 4,50 | 1,40 | 38,287 | 0,59 | 22,920 | 26,3500 | AR | |
| VKM-13613 | | 3,30 | 4,00 | 1,30 | 58,460 | 0,50 | 29,590 | 24,7000 | AR | |
| VKM-13163 | | 2,80 | 3,50 | 0,90 | 95,703 | 0,11 | 10,780 | 30,0900 | AR | |
| VKM-13164 | | 0,80 | 13,20 | 14,00 | 5,50 | 1,558 | 4,30 | 6,721 | 30,4500 | AS |
| VKM-13614 | | | 12,20 | 13,00 | 5,30 | 1,974 | 4,15 | 8,201 | 29,2800 | AS |
| VKM-13615 | | | 11,20 | 12,00 | 5,00 | 2,551 | 3,88 | 9,901 | 28,6300 | AS |
| VKM-13616 | 10,20 | | 11,00 | 4,80 | 3,377 | 3,72 | 12,590 | 27,1900 | AS | |
| VKM-13165 | 10,00 | | 10,80 | 3,50 | 3,548 | 2,43 | 8,741 | 36,0900 | AS | |
| VKM-13167 | 9,20 | | 10,00 | 3,30 | 4,603 | 2,25 | 10,400 | 35,3300 | AS | |
| VKM-13170 | 8,50 | | 9,30 | 3,00 | 5,836 | 1,98 | 11,590 | 35,8500 | AS | |
| VKM-13172 | 8,20 | | 9,00 | 2,80 | 6,500 | 1,79 | 11,650 | 37,0400 | AS | |
| VKM-13175 | 8,00 | | 8,80 | 2,50 | 7,000 | 1,49 | 10,490 | 40,4000 | AS | |
| VKM-13177 | 7,20 | | 8,00 | 2,50 | 9,602 | 1,52 | 14,600 | 36,4600 | AS | |
| VKM-13178 | 6,80 | | 7,50 | 2,40 | 11,916 | 1,43 | 17,130 | 35,3200 | AS | |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-13180 | 0,80 | 6,30 | 7,10 | 1,80 | 14,333 | 0,84 | 12,410 | 43,6200 | AS | |
| VKM-13181 | | 5,70 | 6,50 | 1,80 | 19,353 | 0,85 | 16,630 | 39,9500 | AS | |
| VKM-13184 | | 5,20 | 6,00 | 1,80 | 25,489 | 0,86 | 22,170 | 36,5300 | AS | |
| VKM-13185 | | 5,00 | 5,80 | 1,80 | 28,672 | 0,87 | 25,040 | 35,1700 | AS | |
| VKM-12270 | | 4,50 | 5,30 | 1,70 | 39,331 | 0,78 | 30,730 | 33,5900 | AS | |
| VKM-13186 | | 4,20 | 5,00 | 1,70 | 48,375 | 0,78 | 38,030 | 31,4300 | AS | |
| VKM-13190 | | 4,00 | 4,80 | 1,50 | 56,000 | 0,59 | 33,060 | 33,8100 | AS | |
| VKM-12272 | | 3,70 | 4,50 | 1,50 | 70,756 | 0,59 | 42,070 | 31,3600 | AS | |
| VKM-13191 | | 3,20 | 4,00 | 1,30 | 109,375 | 0,39 | 43,770 | 31,3200 | AS | |
| VKM-14184 | | 0,90 | 14,10 | 15,00 | 5,50 | 2,048 | 4,19 | 8,601 | 41,0500 | AS |
| VKM-13617 | 13,10 | | 14,00 | 4,50 | 2,554 | 3,22 | 8,231 | 46,5800 | AS | |
| VKM-13618 | 12,10 | | 13,00 | 4,00 | 3,241 | 2,76 | 8,951 | 48,4000 | AS | |
| VKM-13619 | 11,10 | | 12,00 | 3,50 | 4,198 | 2,30 | 9,701 | 50,5600 | AS | |
| VKM-13620 | 10,10 | | 11,00 | 3,00 | 5,572 | 1,83 | 10,250 | 53,6800 | AS | |
| VKM-13195 | 9,40 | | 10,30 | 2,50 | 6,912 | 1,36 | 9,401 | 59,8800 | AS | |
| VKM-12274 | 9,10 | | 10,00 | 2,30 | 7,618 | 1,17 | 8,941 | 62,8500 | AS | |
| VKM-13196 | 8,10 | | 9,00 | 2,20 | 10,802 | 1,10 | 11,900 | 58,5900 | AS | |
| VKM-13197 | 7,10 | | 8,00 | 2,20 | 16,040 | 1,12 | 18,070 | 51,5000 | AS | |
| VKM-13200 | 6,00 | | 6,90 | 2,20 | 26,578 | 0,00 | 30,580 | 43,7200 | AS | |
| VKM-13201 | 5,10 | | 6,00 | 1,80 | 43,278 | 0,76 | 33,470 | 45,2200 | AS | |
| VKM-13205 | 4,50 | | 5,40 | 1,80 | 63,000 | 0,77 | 48,920 | 40,2100 | AS | |
| VKM-12276 | 4,10 | | 5,00 | 1,60 | 83,296 | 30,57 | 48,360 | 41,2200 | AS | |
| VKM-13206 | 36,60 | | 4,50 | 1,50 | 123,047 | 0,48 | 60,110 | 38,6600 | AS | |
| VKM-13207 | 1,00 | | 17,00 | 18,00 | 5,80 | 1,781 | 4,27 | 7,611 | 57,8200 | AS |
| VKM-13209 | | | 16,00 | 17,00 | 5,50 | 2,136 | 4,03 | 8,621 | 57,2800 | AS |
| VKM-13621 | | | 15,00 | 16,00 | 5,00 | 2,593 | 3,56 | 9,221 | 59,2800 | AS |
| VKM-13622 | | | 14,00 | 15,00 | 4,80 | 3,189 | 3,41 | 10,870 | 57,5900 | AS |
| VKM-12278 | | 13,00 | 14,00 | 4,60 | 3,983 | 3,25 | 12,940 | 55,8400 | AS | |
| VKM-13210 | | 12,50 | 13,50 | 4,40 | 4,480 | 3,07 | 13,740 | 56,1600 | AS | |
| VKM-12280 | | 12,00 | 13,00 | 4,00 | 5,064 | 2,68 | 13,570 | 59,2800 | AS | |
| VKM-13211 | | 11,60 | 12,60 | 6,70 | 5,606 | 5,40 | 30,290 | 35,0600 | AS | |
| VKM-13212 | | 11,00 | 12,00 | 4,00 | 6,574 | 2,71 | 17,850 | 54,4800 | AS | |
| VKM-13215 | | 10,00 | 11,00 | 3,00 | 8,750 | 1,75 | 15,310 | 65,6300 | AS | |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3180 | 0,80 | 6,30 | 7,10 | 1,80 | 16,688 | 0,84 | 14,120 | 43,7800 | AP | |
| KM-3181 | | 5,70 | 6,50 | 1,80 | 22,532 | 0,85 | 19,370 | 39,7000 | AP | |
| KM-3184 | | 5,20 | 6,00 | 1,80 | 29,677 | 0,86 | 25,810 | 36,3000 | AP | |
| KM-3185 | | 5,00 | 5,80 | 1,80 | 33,382 | 0,87 | 29,160 | 34,9500 | AP | |
| KM-2270 | | 4,50 | 5,30 | 1,70 | 45,792 | 0,78 | 35,780 | 33,3800 | AP | |
| KM-3186 | | 4,20 | 5,00 | 1,70 | 56,322 | 0,78 | 44,280 | 31,2300 | AP | |
| KM-3190 | | 4,00 | 4,80 | 1,50 | 65,200 | 0,59 | 38,490 | 33,5900 | AP | |
| KM-2272 | | 3,70 | 4,50 | 1,50 | 82,380 | 0,59 | 48,990 | 31,1600 | AP | |
| KM-3191 | | 3,20 | 4,00 | 1,30 | 127,344 | 0,39 | 50,960 | 31,1200 | AP | |
| KM-3484 | 0,90 | 14,10 | 15,00 | 5,50 | 2,384 | 4,19 | 10,010 | 40,7900 | AP | |
| KM-3617 | | 13,10 | 14,00 | 4,50 | 2,973 | 3,22 | 9,591 | 46,2900 | AP | |
| KM-3618 | | 12,10 | 13,00 | 4,00 | 3,773 | 2,76 | 10,420 | 48,1000 | AP | |
| KM-3619 | | 11,10 | 12,00 | 3,50 | 4,887 | 2,30 | 11,290 | 50,2400 | AP | |
| KM-3620 | | 10,10 | 11,00 | 3,00 | 6,487 | 1,83 | 11,940 | 53,3400 | AP | |
| KM-3195 | | 9,40 | 10,30 | 2,50 | 8,047 | 1,36 | 10,950 | 59,5000 | AP | |
| KM-2274 | | 9,10 | 10,00 | 2,30 | 8,870 | 1,17 | 10,410 | 62,4500 | AP | |
| KM-3196 | | 8,10 | 9,00 | 2,20 | 12,577 | 1,10 | 13,850 | 58,2200 | AP | |
| KM-3197 | | 7,10 | 8,00 | 2,20 | 18,675 | 1,12 | 21,040 | 51,1700 | AP | |
| KM-3200 | | 6,00 | 6,90 | 2,20 | 30,945 | 1,14 | 35,610 | 43,4400 | AP | |
| KM-3201 | | 5,10 | 6,00 | 1,80 | 50,388 | 0,76 | 38,640 | 45,0900 | AP | |
| KM-3205 | | 4,50 | 5,40 | 1,80 | 73,350 | 0,77 | 56,950 | 39,9500 | AP | |
| KM-2276 | | 4,10 | 5,00 | 1,60 | 96,981 | 30,57 | 56,300 | 40,9600 | AP | |
| KM-3206 | | 3,60 | 4,50 | 1,50 | 143,262 | 0,48 | 69,990 | 38,4200 | AP | |
| KM-3207 | | 1,00 | 17,00 | 18,00 | 5,80 | 2,074 | 4,27 | 8,861 | 57,4500 | AP |
| KM-3209 | | | 16,00 | 17,00 | 5,50 | 2,487 | 4,03 | 10,040 | 56,9200 | AP |
| KM-3621 | 15,00 | | 16,00 | 5,00 | 3,019 | 3,56 | 10,740 | 58,9000 | AP | |
| KM-3622 | 14,00 | | 15,00 | 4,80 | 3,713 | 3,41 | 12,660 | 57,2200 | AP | |
| KM-2278 | 13,00 | | 14,00 | 4,60 | 4,637 | 3,25 | 15,070 | 55,4900 | AP | |
| KM-3210 | 12,50 | | 13,50 | 4,40 | 5,216 | 3,07 | 15,900 | 55,8000 | AP | |
| KM-2280 | 12,00 | | 13,00 | 4,00 | 5,896 | 2,68 | 15,800 | 58,9000 | AP | |
| KM-3211 | 11,60 | | 12,60 | 6,70 | 6,527 | 5,40 | 35,260 | 34,8400 | AP | |
| KM-3212 | 11,00 | | 12,00 | 4,00 | 7,654 | 2,71 | 20,780 | 54,1300 | AP | |
| KM-3215 | 10,00 | | 11,00 | 3,00 | 10,188 | 1,75 | 17,830 | 65,2200 | AP | |

Endless compression springs

Music wire EN 10270-1-DH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3220 | 1,00 | 9,30 | 10,30 | 3,00 | 12,665 | 1,77 | 22,420 | 60,7500 | AP | |
| KM-3221 | | 9,00 | 10,00 | 3,00 | 13,975 | 1,70 | 24,850 | 58,8400 | AP | |
| KM-3225 | | 8,00 | 9,00 | 2,50 | 19,897 | 1,30 | 25,900 | 62,7300 | AP | |
| KM-3227 | | 7,70 | 8,70 | 2,20 | 22,315 | 1,01 | 22,570 | 68,3900 | AP | |
| KM-3230 | | 7,30 | 8,30 | 2,40 | 26,188 | 1,16 | 30,330 | 58,8200 | AP | |
| KM-3232 | | 7,00 | 8,00 | 2,40 | 29,701 | 1,23 | 36,470 | 57,2200 | AP | |
| KM-3235 | | 6,30 | 7,30 | 2,00 | 40,742 | 0,84 | 34,160 | 61,7700 | AP | |
| KM-3240 | | 6,00 | 7,00 | 2,00 | 47,164 | 0,84 | 39,810 | 58,9000 | AP | |
| KM-3242 | | 5,30 | 6,30 | 1,80 | 68,429 | 0,66 | 45,020 | 57,7900 | AP | |
| KM-3245 | | 5,00 | 6,00 | 1,80 | 81,500 | 0,66 | 53,990 | 54,6100 | AP | |
| KM-3250 | | 4,80 | 5,80 | 1,80 | 92,118 | 0,66 | 61,300 | 52,4900 | AP | |
| KM-3255 | | 4,10 | 5,10 | 1,60 | 147,184 | 0,47 | 69,940 | 50,5600 | AP | |
| KM-3260 | | 4,00 | 5,00 | 1,50 | 159,180 | 0,38 | 59,850 | 52,4900 | AP | |
| KM-3261 | | 1,10 | 17,90 | 19,00 | 8,50 | 2,601 | 7,07 | 17,920 | 50,4600 | AQ |
| KM-2282 | 16,90 | | 18,00 | 8,30 | 3,090 | 6,72 | 20,740 | 48,9400 | AQ | |
| KM-2284 | 15,90 | | 17,00 | 8,00 | 3,711 | 6,43 | 23,880 | 48,0200 | AQ | |
| KM-2286 | 14,90 | | 16,00 | 7,50 | 4,509 | 5,99 | 27,040 | 47,8900 | AQ | |
| KM-2288 | 13,90 | | 15,00 | 7,00 | 5,554 | 5,56 | 30,890 | 47,7100 | AQ | |
| KM-3462 | 13,60 | | 14,70 | 7,50 | 5,930 | 6,05 | 35,860 | 43,9700 | AQ | |
| KM-2290 | 12,90 | | 14,00 | 6,00 | 6,948 | 4,58 | 31,830 | 51,5300 | AQ | |
| KM-2292 | 11,90 | | 13,00 | 5,80 | 8,851 | 4,40 | 38,980 | 49,3700 | AQ | |
| KM-3262 | 10,90 | | 12,00 | 5,40 | 11,518 | 4,03 | 46,390 | 48,6800 | AQ | |
| KM-2294 | 9,90 | | 11,00 | 4,70 | 15,372 | 3,37 | 51,780 | 50,5600 | AQ | |
| KM-2296 | 8,90 | | 10,00 | 4,00 | 21,158 | 2,60 | 56,650 | 53,4400 | AQ | |
| KM-2298 | 7,90 | | 9,00 | 3,30 | 30,252 | 2,00 | 60,550 | 57,3000 | AQ | |
| KM-2300 | 6,90 | | 8,00 | 2,60 | 45,404 | 1,33 | 60,220 | 63,1900 | AQ | |
| KM-3263 | 6,40 | | 7,50 | 2,50 | 56,898 | 1,23 | 70,060 | 61,1200 | AQ | |
| KM-2302 | 5,90 | | 7,00 | 2,30 | 72,624 | 1,04 | 75,830 | 61,1400 | AQ | |
| KM-2304 | 4,90 | | 6,00 | 1,90 | 126,780 | 0,66 | 83,210 | 61,5200 | AQ | |
| KM-3264 | 4,40 | | 5,50 | 1,80 | 175,098 | 0,56 | 98,650 | 58,4100 | AQ | |
| KM-2306 | 3,90 | | 5,00 | 1,60 | 251,446 | 0,37 | 92,410 | 58,3100 | AQ | |
| KM-3623 | 1,25 | | 17,75 | 19,00 | 8,00 | 4,447 | 6,23 | 27,740 | 68,8200 | AQ |
| KM-3624 | | | 16,75 | 18,00 | 7,50 | 5,293 | 5,00 | 30,680 | 69,0900 | AQ |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-13220 | 1,00 | 9,30 | 10,30 | 3,00 | 10,878 | 1,77 | 19,260 | 61,1400 | AS |
| VKM-13221 | | 9,00 | 10,00 | 3,00 | 12,003 | 1,70 | 21,350 | 59,2200 | AS |
| VKM-13225 | | 8,00 | 9,00 | 2,50 | 17,090 | 1,30 | 22,240 | 63,1300 | AS |
| VKM-13227 | | 7,70 | 8,70 | 2,20 | 19,166 | 1,01 | 19,390 | 68,8300 | AS |
| VKM-13230 | | 7,30 | 8,30 | 2,40 | 22,493 | 1,16 | 27,480 | 59,9900 | AS |
| VKM-13232 | | 7,00 | 8,00 | 2,40 | 25,510 | 1,23 | 31,320 | 57,5900 | AS |
| VKM-13235 | | 6,30 | 7,30 | 2,00 | 34,993 | 0,84 | 29,340 | 62,1600 | AS |
| VKM-13240 | | 6,00 | 7,00 | 2,00 | 40,509 | 0,84 | 34,190 | 59,2800 | AS |
| VKM-13242 | | 5,30 | 6,30 | 1,80 | 58,773 | 0,66 | 38,670 | 58,1500 | AS |
| VKM-13245 | | 5,00 | 6,00 | 1,80 | 70,000 | 0,66 | 46,380 | 54,9600 | AS |
| VKM-13250 | | 4,80 | 5,80 | 1,80 | 79,120 | 0,66 | 52,650 | 52,8300 | AS |
| VKM-13255 | | 4,10 | 5,10 | 1,60 | 126,957 | 0,47 | 60,070 | 50,8900 | AS |
| VKM-13260 | | 4,00 | 5,00 | 1,50 | 136,719 | 0,38 | 51,410 | 52,8300 | AS |
| VKM-13261 | | 1,10 | 17,90 | 19,00 | 8,50 | 2,234 | 7,07 | 15,390 | 50,7800 |
| VKM-12282 | 16,90 | | 18,00 | 8,30 | 2,654 | 6,72 | 17,850 | 49,2600 | AT |
| VKM-12284 | 15,90 | | 17,00 | 8,00 | 3,187 | 6,43 | 20,510 | 48,3300 | AT |
| VKM-12286 | 14,90 | | 16,00 | 7,50 | 3,873 | 5,99 | 23,230 | 48,2000 | AT |
| VKM-12288 | 13,90 | | 15,00 | 7,00 | 4,770 | 5,56 | 26,530 | 48,0200 | AT |
| VKM-13462 | 13,60 | | 14,70 | 7,50 | 5,093 | 6,05 | 30,800 | 44,2500 | AT |
| VKM-12290 | 12,90 | | 14,00 | 6,00 | 5,968 | 4,58 | 27,340 | 51,8600 | AT |
| VKM-12292 | 11,90 | | 13,00 | 5,80 | 7,602 | 4,40 | 33,480 | 49,6900 | AT |
| VKM-13262 | 10,90 | | 12,00 | 5,40 | 9,892 | 13,23 | 39,840 | 48,9900 | AT |
| VKM-12294 | 9,90 | | 11,00 | 4,70 | 13,203 | 3,37 | 44,470 | 50,8800 | AT |
| VKM-12296 | 8,90 | | 10,00 | 4,00 | 18,172 | 2,60 | 48,660 | 53,7800 | AT |
| VKM-12298 | 7,90 | | 9,00 | 3,30 | 25,983 | 2,00 | 52,010 | 57,6700 | AT |
| VKM-12300 | 6,90 | | 8,00 | 2,60 | 38,997 | 1,33 | 51,720 | 63,5900 | AT |
| VKM-13263 | 6,40 | | 7,50 | 2,50 | 48,870 | 1,23 | 60,180 | 61,5100 | AT |
| VKM-12302 | 5,90 | | 7,00 | 2,30 | 62,377 | 1,04 | 65,130 | 61,5300 | AT |
| VKM-12304 | 4,90 | | 6,00 | 1,90 | 108,891 | 0,66 | 71,470 | 61,9200 | AT |
| VKM-13264 | 4,40 | | 5,50 | 1,80 | 150,391 | 0,56 | 84,730 | 58,7800 | AT |
| VKM-12306 | 3,90 | | 5,00 | 1,60 | 215,966 | 0,37 | 79,370 | 58,6800 | AT |
| VKM-13623 | 1,25 | 17,75 | 19,00 | 8,00 | 3,820 | 6,23 | 23,820 | 69,2600 | AT |
| VKM-13624 | | 16,75 | 18,00 | 7,50 | 4,546 | 5,00 | 26,350 | 69,5300 | AT |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-13265 | 1,25 | 16,00 | 17,25 | 7,50 | 5,215 | 5,03 | 30,390 | 66,5700 | AT |
| VKM-12308 | | 15,75 | 17,00 | 7,30 | 5,468 | 5,67 | 31,010 | 66,9800 | AT |
| VKM-13267 | | 14,75 | 16,00 | 7,00 | 6,657 | 5,39 | 35,930 | 65,5800 | AT |
| VKM-13668 | | 13,95 | 15,20 | 7,20 | 7,869 | 5,62 | 44,290 | 60,5700 | AT |
| VKM-13268 | | 13,75 | 15,00 | 6,50 | 8,218 | 4,92 | 40,480 | 65,8500 | AT |
| VKM-13269 | | 12,75 | 14,00 | 6,00 | 10,307 | 1,45 | 45,830 | 66,2300 | AT |
| VKM-13270 | | 12,50 | 13,75 | 4,80 | 10,938 | 3,24 | 35,430 | 80,6300 | AT |
| VKM-13272 | | 11,75 | 13,00 | 4,50 | 13,168 | 2,92 | 38,950 | 80,8900 | AT |
| VKM-13273 | | 10,75 | 12,00 | 4,30 | 17,196 | 2,79 | 48,000 | 77,4600 | AT |
| VKM-13275 | | 10,00 | 11,25 | 3,80 | 21,362 | 2,30 | 49,190 | 81,5300 | AT |
| VKM-13276 | | 9,75 | 11,00 | 3,60 | 23,048 | 2,12 | 48,780 | 83,6500 | AT |
| VKM-13277 | | 8,75 | 10,00 | 3,50 | 31,888 | 2,04 | 64,970 | 77,4600 | AT |
| VKM-13280 | | 8,00 | 9,25 | 3,20 | 41,723 | 1,75 | 72,990 | 77,5200 | AT |
| VKM-13281 | | 7,75 | 9,00 | 3,00 | 45,893 | 1,55 | 71,230 | 80,0600 | AT |
| VKM-13283 | | 6,75 | 8,00 | 2,60 | 69,460 | 1,17 | 81,350 | 80,3900 | AT |
| VKM-13285 | | 6,30 | 7,55 | 2,40 | 85,433 | 0,98 | 83,570 | 81,2500 | AT |
| VKM-12310 | | 5,75 | 7,00 | 2,20 | 112,369 | 0,78 | 88,230 | 80,9500 | AT |
| VKM-13625 | | 5,55 | 6,80 | 2,20 | 124,959 | 0,79 | 98,450 | 78,2800 | AT |
| VKM-13286 | | 4,75 | 6,00 | 1,90 | 199,328 | 0,50 | 99,000 | 77,6000 | AT |
| VKM-13287 | | 1,30 | 16,70 | 18,00 | 9,00 | 5,366 | 7,24 | 38,880 | 63,2400 |
| VKM-13288 | 14,70 | | 16,00 | 7,50 | 7,867 | 5,83 | 45,860 | 66,4700 | AT |
| VKM-13289 | 12,70 | | 14,00 | 6,00 | 12,200 | 4,40 | 53,680 | 71,3700 | AT |
| VKM-12312 | 10,70 | | 12,00 | 4,50 | 20,400 | 2,93 | 59,910 | 79,9600 | AT |
| VKM-12314 | 8,70 | | 10,00 | 3,60 | 37,951 | 2,14 | 79,250 | 81,0700 | AT |
| VKM-12316 | 6,70 | | 8,00 | 2,50 | 83,092 | 1,07 | 84,330 | 89,8000 | AT |
| VKM-13290 | 6,00 | | 7,30 | 2,30 | 115,698 | 0,83 | 95,980 | 87,3400 | AT |
| VKM-13291 | 4,70 | | 6,00 | 1,90 | 240,707 | 0,44 | 106,600 | 83,0800 | AT |
| VKM-13293 | 1,40 | | 22,60 | 24,00 | 15,00 | 2,912 | 13,03 | 37,980 | 60,0900 |
| VKM-12318 | | 20,60 | 22,00 | 12,00 | 3,845 | 10,04 | 38,590 | 68,0500 | AT |
| VKM-13666 | | 18,90 | 20,30 | 9,00 | 4,979 | 7,07 | 35,220 | 82,3900 | AT |
| VKM-12320 | | 16,60 | 18,00 | 8,00 | 7,348 | 6,15 | 45,220 | 81,5300 | AT |
| VKM-12322 | | 14,60 | 16,00 | 6,00 | 10,801 | 4,25 | 45,870 | 94,5300 | AT |
| VKM-13294 | | 13,60 | 15,00 | 5,50 | 13,363 | 3,77 | 50,500 | 95,9600 | AT |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3265 | 1,25 | 16,00 | 17,25 | 7,50 | 6,072 | 5,03 | 35,380 | 66,1500 | AQ | |
| KM-2308 | | 15,75 | 17,00 | 7,30 | 6,366 | 5,67 | 36,100 | 66,5600 | AQ | |
| KM-3267 | | 14,75 | 16,00 | 7,00 | 7,251 | 5,39 | 41,830 | 65,1600 | AQ | |
| KM-3668 | | 13,95 | 15,20 | 7,20 | 9,162 | 5,62 | 51,570 | 60,1900 | AQ | |
| KM-3268 | | 13,75 | 15,00 | 6,50 | 9,568 | 4,92 | 47,130 | 65,4300 | AQ | |
| KM-3269 | | 12,75 | 14,00 | 6,00 | 12,000 | 4,43 | 53,360 | 65,8100 | AQ | |
| KM-3270 | | 12,50 | 13,75 | 4,80 | 12,734 | 3,24 | 41,250 | 80,1200 | AQ | |
| KM-3272 | | 11,75 | 13,00 | 4,50 | 15,332 | 2,92 | 45,350 | 80,3700 | AQ | |
| KM-3273 | | 10,75 | 12,00 | 4,30 | 20,021 | 2,79 | 55,880 | 76,9700 | AQ | |
| KM-3275 | | 10,00 | 11,25 | 3,80 | 24,872 | 2,30 | 57,270 | 81,0100 | AQ | |
| KM-3276 | | 9,75 | 11,00 | 3,60 | 26,835 | 2,12 | 56,800 | 83,1200 | AQ | |
| KM-3277 | | 8,75 | 10,00 | 3,50 | 37,126 | 2,04 | 75,650 | 76,9700 | AQ | |
| KM-3280 | | 8,00 | 9,25 | 3,20 | 48,578 | 1,75 | 84,980 | 77,0300 | AQ | |
| KM-3281 | | 7,75 | 9,00 | 3,00 | 53,432 | 1,55 | 82,940 | 79,5500 | AQ | |
| KM-3283 | | 6,75 | 8,00 | 2,60 | 80,872 | 1,17 | 94,720 | 79,8800 | AQ | |
| KM-3285 | | 6,30 | 7,55 | 2,40 | 99,469 | 0,98 | 97,300 | 80,7400 | AQ | |
| KM-2310 | | 5,75 | 7,00 | 2,20 | 130,829 | 0,78 | 102,700 | 80,4300 | AQ | |
| KM-3625 | | 5,55 | 6,80 | 2,20 | 145,489 | 0,79 | 114,600 | 77,7400 | AQ | |
| KM-3286 | | 4,75 | 6,00 | 1,90 | 232,074 | 0,50 | 115,200 | 77,1100 | AQ | |
| KM-3287 | | 1,30 | 16,70 | 18,00 | 9,00 | 6,247 | 7,24 | 45,260 | 62,8400 | AQ |
| KM-3288 | 14,70 | | 16,00 | 7,50 | 9,160 | 5,83 | 53,400 | 66,0500 | AQ | |
| KM-3289 | 12,70 | | 14,00 | 6,00 | 14,205 | 4,40 | 62,500 | 70,9100 | AQ | |
| KM-2312 | 10,70 | | 12,00 | 4,50 | 23,751 | 2,93 | 69,750 | 79,4500 | AQ | |
| KM-2314 | 8,70 | | 10,00 | 3,60 | 44,186 | 2,14 | 79,400 | 74,8900 | AQ | |
| KM-2316 | 6,70 | | 8,00 | 2,50 | 80,872 | 1,07 | 86,310 | 83,0900 | AQ | |
| KM-3290 | 6,00 | | 7,30 | 2,30 | 134,706 | 0,83 | 111,700 | 86,7900 | AQ | |
| KM-3291 | 4,70 | | 6,00 | 1,90 | 232,074 | 0,44 | 124,200 | 82,5500 | AQ | |
| KM-3293 | 1,40 | | 22,60 | 24,00 | 15,00 | 3,390 | 13,03 | 44,220 | 59,7100 | AQ |
| KM-2318 | | | 20,60 | 22,00 | 12,00 | 4,477 | 10,04 | 44,930 | 67,6200 | AQ |
| KM-3666 | | 18,90 | 20,30 | 9,00 | 5,797 | 7,07 | 41,010 | 81,8600 | AQ | |
| KM-2320 | | 16,60 | 18,00 | 8,00 | 8,556 | 6,15 | 52,650 | 81,0200 | AQ | |
| KM-2322 | | 14,60 | 16,00 | 6,00 | 12,575 | 4,25 | 53,410 | 93,9400 | AQ | |
| KM-3294 | | 13,60 | 15,00 | 5,50 | 15,558 | 3,77 | 58,790 | 95,3500 | AQ | |

Endless compression springs

Music wire EN 10270-1-DH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| KM-3295 | 1,40 | 12,00 | 13,40 | 4,30 | 22,648 | 2,61 | 59,110 | 107,3000 | AQ |
| KM-3226 | | 9,60 | 11,00 | 3,50 | 44,235 | 1,86 | 82,500 | 105,5000 | AQ |
| KM-3296 | | 8,60 | 10,00 | 3,00 | 61,530 | 1,30 | 84,880 | 110,5000 | AQ |
| KM-3297 | | 7,80 | 9,20 | 3,00 | 82,470 | 1,39 | 114,900 | 100,4000 | AQ |
| KM-3298 | | 6,80 | 8,20 | 2,60 | 124,467 | 1,01 | 125,800 | 100,9000 | AQ |
| KM-3300 | | 5,70 | 7,10 | 2,20 | 211,327 | 0,62 | 132,000 | 100,0000 | AQ |
| KM-2324 | | 4,60 | 6,00 | 2,00 | 402,074 | 0,43 | 174,700 | 89,3500 | AQ |
| KM-2326 | 1,50 | 22,50 | 24,00 | 15,00 | 4,528 | 12,97 | 58,740 | 68,2700 | AR |
| KM-2328 | | 20,50 | 22,00 | 12,00 | 5,986 | 9,95 | 59,620 | 77,2700 | AR |
| KM-3301 | | 18,50 | 20,00 | 10,10 | 8,145 | 8,09 | 65,930 | 82,7300 | AR |
| KM-3302 | | 16,50 | 18,00 | 8,00 | 11,481 | 6,06 | 69,640 | 92,4800 | AR |
| KM-3303 | | 14,50 | 16,00 | 6,00 | 16,917 | 4,15 | 70,290 | 107,1000 | AR |
| KM-3305 | | 12,30 | 13,80 | 3,30 | 27,715 | 1,49 | 41,410 | 163,8000 | AR |
| KM-3306 | | 10,50 | 12,00 | 4,20 | 44,552 | 2,43 | 108,400 | 111,0000 | AR |
| KM-3307 | | 8,50 | 10,00 | 3,20 | 83,980 | 1,48 | 124,100 | 117,6000 | AR |
| KM-2330 | | 6,50 | 8,00 | 2,50 | 187,799 | 0,80 | 150,900 | 115,3000 | AR |
| KM-3308 | | 1,60 | 26,40 | 28,00 | 14,00 | 3,629 | 11,65 | 42,270 | 96,1800 |
| KM-3309 | 24,40 | | 26,00 | 12,00 | 4,596 | 9,70 | 44,630 | 103,4000 | AR |
| KM-2335 | 22,40 | | 24,00 | 10,00 | 5,940 | 7,75 | 46,060 | 113,7000 | AR |
| KM-3310 | 22,00 | | 23,60 | 9,20 | 6,270 | 7,03 | 44,080 | 120,3000 | AR |
| KM-3311 | 20,40 | | 22,00 | 9,10 | 7,864 | 7,01 | 55,120 | 113,0000 | AR |
| KM-3315 | 20,00 | | 21,60 | 9,00 | 8,346 | 6,86 | 57,250 | 112,8000 | AR |
| KM-3317 | 18,20 | | 19,80 | 8,00 | 11,075 | 5,91 | 65,530 | 115,4000 | AR |
| KM-3320 | 16,00 | | 17,60 | 6,50 | 16,300 | 4,52 | 73,770 | 123,8000 | AR |
| KM-3324 | 15,40 | | 17,00 | 7,20 | 18,280 | 5,25 | 96,020 | 108,2000 | AR |
| KM-3663 | 15,10 | | 16,70 | 6,80 | 19,392 | 4,82 | 93,430 | 112,8000 | AR |
| KM-3330 | 12,50 | | 14,10 | 4,20 | 34,184 | 2,29 | 78,230 | 149,5000 | AR |
| KM-3325 | 13,50 | | 15,10 | 4,60 | 27,136 | 2,67 | 72,450 | 147,3000 | AR |
| KM-3331 | 12,20 | | 13,80 | 4,80 | 36,768 | 2,90 | 106,600 | 128,2000 | AR |
| KM-3333 | 11,10 | | 12,70 | 4,00 | 48,818 | 2,12 | 103,400 | 139,5000 | AR |
| KM-3334 | 10,40 | | 12,00 | 3,90 | 59,364 | 2,00 | 121,000 | 134,3000 | AR |
| KM-3335 | 10,00 | | 11,60 | 3,80 | 66,765 | 1,94 | 129,600 | 132,7000 | AR |
| KM-3340 | 9,60 | | 11,20 | 3,60 | 75,463 | 1,75 | 132,600 | 134,1000 | AR |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-13295 | 1,40 | 12,00 | 13,40 | 4,30 | 19,453 | 2,61 | 50,770 | 108,0000 | AT |
| VKM-13226 | | 9,60 | 11,00 | 3,50 | 37,993 | 1,86 | 70,860 | 106,2000 | AT |
| VKM-13296 | | 8,60 | 10,00 | 3,00 | 52,848 | 1,30 | 72,910 | 111,0000 | AT |
| VKM-13297 | | 7,80 | 9,20 | 3,00 | 70,833 | 1,39 | 98,710 | 101,0000 | AT |
| VKM-13298 | | 6,80 | 8,20 | 2,60 | 106,904 | 1,01 | 108,000 | 101,5000 | AT |
| VKM-13300 | | 5,70 | 7,10 | 2,20 | 181,508 | 0,62 | 113,400 | 100,6000 | AT |
| VKM-12324 | | 4,60 | 6,00 | 2,00 | 345,340 | 0,43 | 150,000 | 89,9100 | AT |
| VKM-12326 | | 1,50 | 22,50 | 24,00 | 15,00 | 3,889 | 12,97 | 50,450 | 68,7100 |
| VKM-12328 | 20,50 | | 22,00 | 12,00 | 5,142 | 9,95 | 51,210 | 77,7700 | AU |
| VKM-13301 | 18,50 | | 20,00 | 10,10 | 6,996 | 8,09 | 56,620 | 83,2500 | AU |
| VKM-13302 | 16,50 | | 18,00 | 8,00 | 9,861 | 6,06 | 59,810 | 93,0700 | AU |
| VKM-13303 | 14,50 | | 16,00 | 6,00 | 14,530 | 4,15 | 60,370 | 107,8000 | AU |
| VKM-13305 | 12,30 | | 13,80 | 3,30 | 23,804 | 1,49 | 35,570 | 164,9000 | AU |
| VKM-13306 | 10,50 | | 12,00 | 4,20 | 38,265 | 2,43 | 93,180 | 111,7000 | AU |
| VKM-13307 | 8,50 | | 10,00 | 3,20 | 72,130 | 1,48 | 106,600 | 118,3000 | AU |
| VKM-12330 | 6,50 | | 8,00 | 2,50 | 161,300 | 0,80 | 129,600 | 116,1000 | AU |
| VKM-13308 | 1,60 | | 26,40 | 28,00 | 14,00 | 3,117 | 11,65 | 36,300 | 96,7900 |
| VKM-13309 | | 24,40 | 26,00 | 12,00 | 3,947 | 9,70 | 38,330 | 104,0000 | AU |
| VKM-12335 | | 22,40 | 24,00 | 10,00 | 5,102 | 7,75 | 39,560 | 114,5000 | AU |
| VKM-13310 | | 22,00 | 23,60 | 9,20 | 5,385 | 7,03 | 37,860 | 121,1000 | AU |
| VKM-13311 | | 20,40 | 22,00 | 9,10 | 6,755 | 7,01 | 47,350 | 113,7000 | AU |
| VKM-13315 | | 20,00 | 21,60 | 9,00 | 7,168 | 6,86 | 49,170 | 113,9000 | AU |
| VKM-13317 | | 18,20 | 19,80 | 8,00 | 9,512 | 5,91 | 56,280 | 116,2000 | AU |
| VKM-13320 | | 16,00 | 17,60 | 6,50 | 14,000 | 4,52 | 63,360 | 124,6000 | AU |
| VKM-13324 | | 15,40 | 17,00 | 7,20 | 15,701 | 5,25 | 82,470 | 108,9000 | AU |
| VKM-13663 | | 15,10 | 16,70 | 6,80 | 16,655 | 4,82 | 80,250 | 113,5000 | AU |
| VKM-13330 | | 12,50 | 14,10 | 4,20 | 29,360 | 2,29 | 67,190 | 150,5000 | AU |
| VKM-13325 | | 13,50 | 15,10 | 4,60 | 23,307 | 2,67 | 62,230 | 148,2000 | AU |
| VKM-13331 | | 12,20 | 13,80 | 4,80 | 31,580 | 2,90 | 91,600 | 129,0000 | AU |
| VKM-13333 | | 11,10 | 12,70 | 4,00 | 41,929 | 2,12 | 88,810 | 140,6000 | AU |
| VKM-13334 | | 10,40 | 12,00 | 3,90 | 50,979 | 2,00 | 103,900 | 135,1000 | AU |
| VKM-13335 | | 10,00 | 11,60 | 3,80 | 57,344 | 1,94 | 111,300 | 133,5000 | AU |
| VKM-13340 | | 9,60 | 11,20 | 3,60 | 64,815 | 1,75 | 113,900 | 135,0000 | AU |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-13341 | 1,60 | 8,40 | 10,00 | 3,10 | 96,750 | 1,27 | 123,300 | 137,2000 | AU |
| VKM-13345 | | 8,00 | 9,60 | 3,00 | 112,000 | 1,10 | 131,900 | 135,2000 | AU |
| VKM-13346 | | 7,40 | 9,00 | 2,80 | 141,512 | 0,98 | 189,400 | 134,1000 | AU |
| VKM-13347 | | 6,40 | 8,00 | 2,50 | 218,750 | 0,70 | 152,600 | 130,1000 | AU |
| VKM-13348 | 1,80 | 28,20 | 30,00 | 15,00 | 4,096 | 12,47 | 51,120 | 121,6000 | AU |
| VKM-12336 | | 26,20 | 28,00 | 13,00 | 5,107 | 10,58 | 54,050 | 129,6000 | AU |
| VKM-12338 | | 24,20 | 26,00 | 12,00 | 6,481 | 9,55 | 61,950 | 130,7000 | AU |
| VKM-13671 | | 22,00 | 23,80 | 10,00 | 8,626 | 7,59 | 65,550 | 142,4000 | AU |
| VKM-12340 | | 20,20 | 22,00 | 9,00 | 11,144 | 6,67 | 74,360 | 145,0000 | AU |
| VKM-13349 | | 18,20 | 20,00 | 8,00 | 15,236 | 5,73 | 87,300 | 147,0000 | AU |
| VKM-13664 | | 17,30 | 19,10 | 8,00 | 17,740 | 5,75 | 102,100 | 140,1000 | AU |
| VKM-13350 | | 16,20 | 18,00 | 7,00 | 21,605 | 4,82 | 104,300 | 148,6000 | AU |
| VKM-13353 | | 14,20 | 16,00 | 6,00 | 32,080 | 3,86 | 124,000 | 152,1000 | AU |
| VKM-13354 | | 12,20 | 14,00 | 4,60 | 50,585 | 2,49 | 126,200 | 170,1000 | AU |
| VKM-13355 | | 11,20 | 13,00 | 4,00 | 65,680 | 1,91 | 124,700 | 179,6000 | AU |
| VKM-13360 | | 10,20 | 12,00 | 3,70 | 86,556 | 1,63 | 141,100 | 176,7000 | AU |
| VKM-13627 | | 9,20 | 11,00 | 3,50 | 117,960 | 1,45 | 171,200 | 168,5000 | AU |
| VKM-12342 | | 8,20 | 10,00 | 3,00 | 166,593 | 0,96 | 160,100 | 175,3000 | AU |
| VKM-13361 | | 7,20 | 9,00 | 2,80 | 246,094 | 0,77 | 190,200 | 165,3000 | AU |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| KM-3341 | 1,60 | 8,40 | 10,00 | 3,10 | 112,644 | 1,27 | 143,500 | 136,3000 | AR |
| KM-3345 | | 8,00 | 9,60 | 3,00 | 130,400 | 1,10 | 153,600 | 134,3000 | AR |
| KM-3346 | | 7,40 | 9,00 | 2,80 | 164,760 | 0,98 | 162,300 | 133,3000 | AR |
| KM-3347 | | 6,40 | 8,00 | 2,50 | 254,688 | 0,70 | 177,600 | 129,3000 | AR |
| KM-3348 | 1,80 | 28,20 | 30,00 | 15,00 | 4,769 | 12,47 | 59,520 | 120,9000 | AR |
| KM-2336 | | 26,20 | 28,00 | 13,00 | 5,946 | 10,58 | 62,930 | 128,8000 | AR |
| KM-2338 | | 24,20 | 26,00 | 12,00 | 7,546 | 9,55 | 72,130 | 129,8000 | AR |
| KM-3671 | | 22,00 | 23,80 | 10,00 | 10,044 | 7,59 | 76,320 | 141,5000 | AR |
| KM-2340 | | 20,20 | 22,00 | 9,00 | 12,975 | 6,67 | 86,580 | 144,1000 | AR |
| KM-3349 | | 18,20 | 20,00 | 8,00 | 17,740 | 5,73 | 101,600 | 146,1000 | AR |
| KM-3664 | | 17,30 | 19,10 | 8,00 | 20,655 | 5,75 | 118,800 | 139,2000 | AR |
| KM-3350 | | 16,20 | 18,00 | 7,00 | 25,154 | 4,82 | 121,500 | 147,7000 | AR |
| KM-3353 | | 14,20 | 16,00 | 6,00 | 37,350 | 3,86 | 144,300 | 151,2000 | AR |
| KM-3354 | | 12,20 | 14,00 | 4,60 | 58,895 | 2,49 | 147,000 | 169,0000 | AR |
| KM-3355 | | 11,20 | 13,00 | 4,00 | 76,121 | 1,91 | 145,200 | 178,4000 | AR |
| KM-3360 | | 10,20 | 12,00 | 3,70 | 100,776 | 1,63 | 164,300 | 175,6000 | AR |
| KM-3627 | | 9,20 | 11,00 | 3,50 | 137,339 | 1,45 | 199,400 | 167,5000 | AR |
| KM-2342 | | 8,20 | 10,00 | 3,00 | 193,962 | 0,96 | 186,500 | 174,2000 | AR |
| KM-3361 | | 7,20 | 9,00 | 2,80 | 286,523 | 0,77 | 221,400 | 164,3000 | AR |

Endless compression springs

Music wire EN 10270-1-SH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| KM-3364 | 2,00 | 32,00 | 34,00 | 16,00 | 4,974 | 13,11 | 65,310 | 158,5000 | AR |
| KM-3628 | | 28,00 | 30,00 | 14,00 | 7,425 | 11,27 | 83,670 | 158,8000 | AR |
| KM-3365 | | 25,00 | 27,00 | 10,00 | 10,432 | 7,31 | 76,270 | 197,5000 | AR |
| KM-3367 | | 24,00 | 26,00 | 10,00 | 11,791 | 7,34 | 86,640 | 189,9000 | AR |
| KM-3368 | | 23,00 | 25,00 | 9,00 | 13,397 | 6,39 | 85,660 | 201,5000 | AR |
| KM-3370 | | 20,00 | 22,00 | 8,00 | 20,375 | 5,48 | 111,700 | 197,5000 | AR |
| KM-3372 | | 19,50 | 21,50 | 9,00 | 21,983 | 6,50 | 143,000 | 172,0000 | AR |
| KM-3375 | | 19,00 | 21,00 | 6,00 | 23,764 | 3,54 | 84,160 | 247,4000 | AR |
| KM-3376 | | 18,50 | 20,50 | 6,00 | 25,744 | 3,55 | 91,530 | 241,0000 | AR |
| KM-3379 | | 16,80 | 18,80 | 6,70 | 34,376 | 4,28 | 147,300 | 197,7000 | AR |
| KM-3380 | | 16,00 | 18,00 | 6,00 | 39,795 | 3,61 | 144,000 | 209,3000 | AR |
| KM-3381 | | 14,00 | 16,00 | 5,50 | 59,402 | 3,17 | 188,100 | 200,0000 | AR |
| KM-3382 | | 13,00 | 15,00 | 5,00 | 74,192 | 2,66 | 197,500 | 205,1000 | AR |
| KM-3385 | | 12,50 | 14,50 | 4,80 | 83,456 | 2,48 | 207,000 | 205,1000 | AR |
| KM-3387 | | 12,00 | 14,00 | 4,50 | 94,329 | 2,18 | 206,300 | 209,8000 | AR |
| KM-3390 | | 10,00 | 12,00 | 3,80 | 163,000 | 1,52 | 247,700 | 207,3000 | AR |
| KM-3391 | | 9,00 | 11,00 | 3,40 | 223,594 | 1,13 | 253,500 | 208,6000 | AR |
| KM-3395 | | 8,70 | 10,70 | 3,30 | 247,531 | 1,04 | 256,600 | 207,8000 | AR |
| KM-2344 | | 8,00 | 10,00 | 3,10 | 318,359 | 0,85 | 271,000 | 203,2000 | AR |
| KM-3396 | | 2,20 | 35,80 | 38,00 | 18,00 | 5,201 | 14,84 | 77,230 | 190,4000 |
| KM-2346 | 32,80 | | 35,00 | 16,00 | 6,763 | 12,94 | 87,510 | 196,2000 | AR |
| KM-2348 | 29,80 | | 32,00 | 15,00 | 9,018 | 12,09 | 109,000 | 190,2000 | AR |
| KM-2350 | 27,80 | | 30,00 | 14,00 | 11,108 | 11,10 | 123,300 | 190,8000 | AR |
| KM-3672 | 26,00 | | 28,20 | 12,00 | 13,578 | 9,13 | 124,100 | 207,6000 | AR |
| KM-2352 | 23,80 | | 26,00 | 11,00 | 17,702 | 8,28 | 146,500 | 206,1000 | AR |
| KM-3397 | 21,80 | | 24,00 | 10,00 | 23,305 | 7,23 | 166,600 | 209,6000 | AR |
| KM-3673 | 20,00 | | 22,20 | 8,00 | 29,831 | 5,29 | 157,800 | 238,9000 | AR |
| KM-2354 | 17,80 | | 20,00 | 7,50 | 42,615 | 4,86 | 205,900 | 226,8000 | AR |
| KM-3629 | 16,80 | | 19,00 | 6,80 | 50,330 | 4,17 | 210,100 | 236,1000 | AR |
| KM-3674 | 14,80 | | 17,00 | 5,60 | 73,616 | 3,03 | 223,500 | 251,3000 | AR |
| KM-3398 | 12,80 | | 15,00 | 4,00 | 113,796 | 1,46 | 166,000 | 303,6000 | AR |
| KM-2356 | 10,80 | | 13,00 | 3,80 | 189,447 | 1,29 | 245,200 | 270,3000 | AR |
| KM-3399 | 8,80 | | 11,00 | 3,40 | 350,195 | 0,92 | 322,500 | 247,0000 | AR |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-13364 | 2,00 | 32,00 | 34,00 | 16,00 | 4,272 | 13,11 | 56,090 | 159,5000 | AU |
| VKM-13628 | | 28,00 | 30,00 | 14,00 | 6,378 | 11,27 | 71,860 | 159,8000 | AU |
| VKM-13365 | | 25,00 | 27,00 | 10,00 | 8,960 | 7,31 | 65,510 | 198,7000 | AU |
| VKM-13367 | | 24,00 | 26,00 | 10,00 | 10,127 | 7,34 | 74,420 | 191,1000 | AU |
| VKM-13368 | | 23,00 | 25,00 | 9,00 | 11,507 | 6,39 | 73,580 | 202,8000 | AU |
| VKM-13370 | | 20,00 | 22,00 | 8,00 | 17,500 | 5,48 | 95,970 | 198,7000 | AU |
| VKM-13372 | | 19,50 | 21,50 | 9,00 | 18,881 | 6,50 | 122,800 | 173,1000 | AU |
| VKM-13375 | | 19,00 | 21,00 | 6,00 | 20,411 | 3,54 | 72,280 | 248,9000 | AU |
| VKM-13376 | | 18,50 | 20,50 | 6,00 | 22,111 | 3,55 | 78,610 | 242,5000 | AU |
| VKM-13379 | | 16,80 | 18,80 | 6,70 | 29,526 | 4,28 | 126,500 | 199,0000 | AU |
| VKM-13380 | | 16,00 | 18,00 | 6,00 | 34,180 | 3,61 | 123,700 | 210,7000 | AU |
| VKM-13381 | | 14,00 | 16,00 | 5,50 | 51,020 | 3,17 | 161,500 | 201,3000 | AU |
| VKM-13382 | | 13,00 | 15,00 | 5,00 | 62,723 | 2,66 | 169,700 | 206,4000 | AU |
| VKM-13385 | | 12,50 | 14,50 | 4,80 | 71,680 | 2,48 | 177,800 | 206,4000 | AU |
| VKM-13387 | | 12,00 | 14,00 | 4,50 | 81,019 | 2,18 | 177,200 | 211,3000 | AU |
| VKM-13390 | | 10,00 | 12,00 | 3,80 | 140,000 | 1,52 | 212,700 | 208,7000 | AU |
| VKM-13391 | | 9,00 | 11,00 | 3,40 | 192,044 | 1,13 | 217,700 | 209,9000 | AU |
| VKM-13395 | | 8,70 | 10,70 | 3,30 | 212,603 | 1,04 | 220,400 | 209,1000 | AU |
| VKM-12344 | | 8,00 | 10,00 | 3,10 | 273,438 | 0,85 | 232,800 | 204,5000 | AU |
| VKM-13396 | | 2,20 | 35,80 | 38,00 | 18,00 | 4,467 | 14,84 | 66,330 | 191,6000 |
| VKM-12346 | 32,80 | | 35,00 | 16,00 | 5,809 | 12,94 | 75,160 | 197,5000 | AW |
| VKM-12348 | 29,80 | | 32,00 | 15,00 | 7,746 | 12,09 | 93,660 | 191,4000 | AW |
| VKM-12350 | 27,80 | | 30,00 | 14,00 | 9,540 | 11,10 | 105,900 | 192,0000 | AW |
| VKM-13672 | 26,00 | | 28,20 | 12,00 | 11,662 | 9,13 | 106,600 | 208,9000 | AW |
| VKM-12352 | 23,80 | | 26,00 | 11,00 | 15,204 | 8,28 | 125,900 | 207,4000 | AW |
| VKM-13397 | 21,80 | | 24,00 | 10,00 | 19,785 | 7,23 | 143,100 | 210,9000 | AW |
| VKM-13673 | 20,00 | | 22,20 | 8,00 | 25,622 | 5,29 | 135,500 | 240,5000 | AW |
| VKM-12354 | 17,80 | | 20,00 | 7,50 | 36,345 | 4,86 | 176,800 | 228,2000 | AW |
| VKM-13629 | 16,80 | | 19,00 | 6,80 | 43,229 | 4,17 | 180,400 | 237,6000 | AW |
| VKM-13674 | 14,80 | | 17,00 | 5,60 | 63,229 | 3,03 | 191,900 | 252,9000 | AW |
| VKM-13398 | 12,80 | | 15,00 | 4,00 | 97,739 | 1,46 | 142,600 | 305,5000 | AW |
| VKM-12356 | 10,80 | | 13,00 | 3,80 | 162,715 | 1,29 | 210,600 | 272,0000 | AW |
| VKM-13399 | 8,80 | | 11,00 | 3,40 | 300,781 | 0,92 | 277,000 | 248,5000 | AW |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-13400 | 2,25 | 12,35 | 14,60 | 4,50 | 119,052 | 1,91 | 228,300 | 274,9000 | AW | |
| VKM-13630 | 2,50 | 43,50 | 46,00 | 24,00 | 4,152 | 20,44 | 84,890 | 225,6000 | AW | |
| VKM-12358 | | 42,50 | 45,00 | 24,00 | 4,452 | 20,49 | 91,260 | 220,8000 | AW | |
| VKM-13401 | | 39,50 | 42,00 | 23,00 | 5,546 | 19,51 | 108,200 | 215,6000 | AW | |
| VKM-13402 | | 37,50 | 40,00 | 20,00 | 6,481 | 16,34 | 106,000 | 236,3000 | AW | |
| VKM-13403 | | 35,50 | 38,00 | 15,00 | 7,640 | 11,61 | 88,680 | 291,8000 | AW | |
| VKM-13405 | | 32,00 | 34,50 | 13,00 | 10,431 | 9,75 | 101,800 | 302,4000 | AW | |
| VKM-13407 | | 28,50 | 31,00 | 10,00 | 14,765 | 6,73 | 99,480 | 352,4000 | AW | |
| VKM-13410 | | 25,00 | 27,50 | 9,00 | 21,875 | 5,86 | 128,200 | 343,4000 | AW | |
| VKM-13411 | | 22,50 | 25,00 | 8,00 | 30,007 | 4,92 | 147,800 | 347,9000 | AW | |
| VKM-13415 | | 20,00 | 22,50 | 7,00 | 42,725 | 4,03 | 172,300 | 351,2000 | AW | |
| VKM-13416 | | 19,00 | 21,50 | 6,00 | 49,832 | 3,04 | 151,600 | 389,0000 | AW | |
| VKM-13417 | | 18,00 | 20,50 | 7,00 | 58,607 | 4,08 | 239,100 | 317,2000 | AW | |
| VKM-13418 | | 17,00 | 19,50 | 5,30 | 69,570 | 2,38 | 165,700 | 394,0000 | AW | |
| VKM-13420 | | 16,00 | 18,50 | 6,00 | 83,447 | 3,10 | 259,100 | 329,2000 | AW | |
| VKM-13421 | | 13,50 | 16,00 | 5,00 | 138,921 | 2,13 | 324,500 | 321,5000 | AW | |
| VKM-13425 | | 12,50 | 15,00 | 4,50 | 175,000 | 1,65 | 288,600 | 343,4000 | AW | |
| VKM-13426 | | 11,00 | 13,50 | 4,00 | 256,797 | 1,16 | 299,700 | 340,4000 | AW | |
| VKM-13430 | 2,70 | 20,00 | 22,70 | 6,00 | 58,126 | 2,81 | 163,600 | 477,0000 | AW | |
| VKM-13432 | 2,80 | 45,20 | 48,00 | 26,00 | 5,824 | 22,05 | 128,500 | 273,3000 | AW | |
| VKM-12360 | | 37,20 | 40,00 | 20,00 | 10,447 | 16,12 | 168,400 | 294,2000 | AW | |
| VKM-12362 | | 32,20 | 35,00 | 15,00 | 16,109 | 11,73 | 184,800 | 333,5000 | AW | |
| VKM-13433 | | 27,20 | 30,00 | 10,00 | 26,726 | 6,49 | 173,600 | 422,5000 | AW | |
| VKM-13675 | | 26,00 | 28,80 | 8,00 | 30,600 | 4,53 | 138,700 | 502,4000 | AW | |
| VKM-13676 | | 24,00 | 26,80 | 9,00 | 38,905 | 5,59 | 217,600 | 414,1000 | AW | |
| VKM-13434 | | 17,20 | 20,00 | 6,20 | 105,695 | 2,95 | 312,300 | 429,9000 | AW | |
| VKM-13435 | | 15,20 | 18,00 | 5,50 | 153,147 | 2,30 | 353,100 | 427,2000 | AW | |
| VKM-13440 | | 3,00 | 38,00 | 41,00 | 10,00 | 12,196 | 5,94 | 76,830 | 672,3000 | AW |
| VKM-13445 | | | 37,00 | 40,00 | 9,00 | 13,992 | 4,99 | 69,930 | 725,7000 | AW |
| VKM-13446 | | | 32,00 | 35,00 | 14,80 | 21,629 | 11,06 | 239,400 | 386,1000 | AW |
| VKM-12364 | 27,00 | | 30,00 | 10,00 | 36,008 | 6,30 | 227,000 | 481,6000 | AW | |
| VKM-12366 | 24,00 | | 27,00 | 9,00 | 51,270 | 5,39 | 276,500 | 475,4000 | AW | |
| VKM-13447 | 19,80 | | 22,80 | 7,30 | 91,306 | 3,83 | 350,100 | 480,4000 | AW | |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3400 | 2,25 | 12,35 | 14,60 | 4,50 | 138,611 | 1,91 | 265,800 | 273,2000 | AS | |
| KM-3630 | 2,50 | 43,50 | 46,00 | 24,00 | 4,835 | 20,44 | 98,840 | 224,1000 | AS | |
| KM-2358 | | 42,50 | 45,00 | 24,00 | 5,184 | 20,49 | 106,200 | 219,4000 | AS | |
| KM-3401 | | 39,50 | 42,00 | 23,00 | 6,457 | 19,51 | 125,900 | 214,2000 | AS | |
| KM-3402 | | 37,50 | 40,00 | 20,00 | 7,546 | 16,34 | 123,400 | 234,8000 | AS | |
| KM-3403 | | 35,50 | 38,00 | 15,00 | 8,895 | 11,61 | 103,200 | 289,9000 | AS | |
| KM-3405 | | 32,00 | 34,50 | 13,00 | 12,144 | 9,75 | 118,500 | 300,5000 | AS | |
| KM-3407 | | 28,50 | 31,00 | 10,00 | 17,191 | 6,73 | 115,800 | 350,2000 | AS | |
| KM-3410 | | 25,00 | 27,50 | 9,00 | 25,469 | 5,86 | 149,200 | 341,3000 | AS | |
| KM-3411 | | 22,50 | 25,00 | 8,00 | 34,937 | 4,92 | 172,100 | 345,7000 | AS | |
| KM-3415 | | 20,00 | 22,50 | 7,00 | 49,744 | 4,03 | 200,700 | 349,0000 | AS | |
| KM-3416 | | 19,00 | 21,50 | 6,00 | 58,019 | 3,04 | 176,500 | 386,5000 | AS | |
| KM-3417 | | 18,00 | 20,50 | 7,00 | 68,235 | 4,08 | 278,400 | 315,2000 | AS | |
| KM-3418 | | 17,00 | 19,50 | 5,30 | 80,999 | 2,38 | 192,900 | 391,5000 | AS | |
| KM-3420 | | 16,00 | 18,50 | 6,00 | 97,156 | 3,10 | 301,700 | 327,1000 | AS | |
| KM-3421 | | 13,50 | 16,00 | 5,00 | 161,743 | 2,13 | 344,200 | 332,3000 | AS | |
| KM-3425 | | 12,50 | 15,00 | 4,50 | 203,750 | 1,65 | 336,000 | 341,3000 | AS | |
| KM-3426 | | 11,00 | 13,50 | 4,00 | 298,985 | 1,16 | 349,000 | 368,3000 | AS | |
| KM-3430 | 2,70 | 20,00 | 22,70 | 6,00 | 67,676 | 2,81 | 190,500 | 474,0000 | AS | |
| KM-3432 | 2,80 | 45,20 | 48,00 | 26,00 | 6,781 | 22,05 | 149,600 | 271,5000 | AS | |
| KM-2360 | | 37,20 | 40,00 | 20,00 | 12,164 | 16,12 | 196,100 | 292,4000 | AS | |
| KM-2362 | | 32,20 | 35,00 | 15,00 | 18,756 | 11,73 | 135,900 | 266,5000 | AS | |
| KM-3433 | | 27,20 | 30,00 | 10,00 | 31,117 | 6,49 | 202,100 | 419,9000 | AS | |
| KM-3675 | | 26,00 | 28,80 | 8,00 | 35,627 | 4,53 | 161,500 | 499,3000 | AS | |
| KM-3676 | | 24,00 | 26,80 | 9,00 | 45,297 | 5,59 | 253,400 | 411,5000 | AS | |
| KM-3434 | | 17,20 | 20,00 | 6,20 | 123,059 | 2,95 | 363,600 | 427,2000 | AS | |
| KM-3435 | | 15,20 | 18,00 | 5,50 | 178,307 | 2,30 | 411,100 | 424,5000 | AS | |
| KM-3440 | | 3,00 | 38,00 | 41,00 | 10,00 | 15,038 | 5,94 | 89,450 | 668,1000 | AS |
| KM-3445 | | | 37,00 | 40,00 | 9,00 | 16,291 | 4,99 | 81,410 | 721,1000 | AS |
| KM-3446 | 32,00 | | 35,00 | 14,80 | 25,183 | 11,06 | 278,700 | 383,7000 | AS | |
| KM-2364 | 27,00 | | 30,00 | 10,00 | 41,924 | 6,30 | 264,300 | 478,6000 | AS | |
| KM-2366 | 24,00 | | 27,00 | 9,00 | 59,692 | 5,39 | 321,900 | 472,4000 | AS | |
| KM-3447 | 19,80 | | 22,80 | 7,30 | 106,305 | 3,83 | 407,600 | 477,3000 | AS | |

Endless compression springs

Music wire EN 10270-1-SH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3448 | 3,00 | 17,80 | 20,80 | 6,50 | 146,316 | 3,05 | 447,400 | 482,6000 | AS | |
| KM-3679 | | 16,50 | 19,50 | 6,10 | 183,696 | 2,67 | 492,300 | 476,8000 | AS | |
| KM-3677 | | 15,50 | 18,50 | 5,60 | 221,594 | 2,10 | 483,300 | 488,7000 | AS | |
| KM-3678 | | 14,50 | 17,50 | 5,10 | 270,675 | 1,60 | 455,100 | 502,9000 | AS | |
| KM-2368 | | 12,00 | 15,00 | 4,50 | 477,539 | 1,12 | 534,300 | 472,4000 | AS | |
| KM-3449 | 3,20 | 51,80 | 55,00 | 30,00 | 7,686 | 25,42 | 195,400 | 353,1000 | AU | |
| KM-2370 | | 46,80 | 50,00 | 25,00 | 10,421 | 20,35 | 212,300 | 384,2000 | AU | |
| KM-3631 | | 44,80 | 48,00 | 18,00 | 11,880 | 13,65 | 162,300 | 498,6000 | AU | |
| KM-3450 | | 40,00 | 43,20 | 15,00 | 16,691 | 10,82 | 180,800 | 532,8000 | AU | |
| KM-3455 | | 32,00 | 35,20 | 11,00 | 32,600 | 7,07 | 230,600 | 579,7000 | AU | |
| KM-3632 | | 28,80 | 32,00 | 9,00 | 44,719 | 5,06 | 226,100 | 641,7000 | AU | |
| KM-3460 | | 25,00 | 28,20 | 7,50 | 68,367 | 3,60 | 251,700 | 666,8000 | AU | |
| KM-3465 | | 20,00 | 23,20 | 7,00 | 133,530 | 3,31 | 442,200 | 571,8000 | AU | |
| KM-3467 | | 19,00 | 22,20 | 7,00 | 155,742 | 3,32 | 518,700 | 544,1000 | AU | |
| KM-3470 | | 18,00 | 21,20 | 6,50 | 183,480 | 2,84 | 520,700 | 555,1000 | AU | |
| KM-3475 | | 16,00 | 19,20 | 5,80 | 260,800 | 2,15 | 562,100 | 554,7000 | AU | |
| KM-3477 | | 14,80 | 18,00 | 5,50 | 329,520 | 1,88 | 620,900 | 540,4000 | AU | |
| KM-3500 | | 3,60 | 56,40 | 60,00 | 22,00 | 9,538 | 16,84 | 160,700 | 649,2000 | AY |
| KM-3505 | | | 36,40 | 40,00 | 13,50 | 35,479 | 8,95 | 317,600 | 687,6000 | AY |
| KM-3510 | | | 28,00 | 31,60 | 10,00 | 77,948 | 5,67 | 442,500 | 713,9000 | AY |
| KM-3515 | 25,00 | | 28,60 | 9,30 | 109,511 | 5,08 | 557,600 | 683,0000 | AY | |
| KM-3520 | 21,40 | | 25,00 | 7,80 | 174,597 | 3,63 | 634,400 | 698,8000 | AY | |
| KM-3525 | 14,40 | | 18,00 | 5,50 | 573,000 | 1,46 | 835,800 | 666,1000 | AY | |
| KM-3550 | 4,00 | | 45,00 | 49,00 | 18,20 | 28,620 | 13,28 | 380,200 | 768,7000 | AY |
| KM-3555 | | 40,00 | 44,00 | 16,00 | 40,750 | 11,06 | 450,800 | 783,9000 | AY | |
| KM-3556 | | 36,00 | 40,00 | 14,50 | 55,898 | 9,75 | 545,600 | 774,1000 | AY | |
| KM-3560 | | 32,00 | 36,00 | 12,50 | 79,590 | 7,66 | 610,100 | 808,2000 | AY | |
| KM-3565 | | 30,00 | 34,00 | 11,50 | 96,593 | 6,70 | 648,200 | 823,4000 | AY | |
| KM-3570 | | 26,00 | 30,00 | 9,50 | 148,384 | 4,03 | 717,000 | 860,0000 | AY | |
| KM-3575 | | 21,00 | 25,00 | 7,50 | 281,611 | 2,92 | 823,200 | 879,2000 | AY | |
| KM-3580 | | 17,00 | 21,00 | 6,00 | 530,837 | 1,49 | 791,800 | 888,0000 | AY | |
| KM-3585 | | 16,00 | 20,00 | 5,90 | 636,719 | 1,40 | 889,800 | 852,0000 | AY | |
| KM-3590 | | 14,00 | 18,00 | 5,20 | 950,437 | 0,71 | 678,200 | 847,2000 | AY | |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-13448 | | 17,80 | 20,80 | 6,50 | 125,670 | 3,05 | 384,200 | 485,7000 | AW | |
| VKM-13679 | | 16,50 | 19,50 | 6,10 | 157,776 | 2,67 | 422,900 | 479,8000 | AW | |
| VKM-13677 | | 15,50 | 18,50 | 5,60 | 190,326 | 2,10 | 415,100 | 491,8000 | AW | |
| VKM-13678 | | 14,50 | 17,50 | 5,10 | 232,482 | 1,60 | 390,900 | 506,1000 | AW | |
| VKM-12368 | | 12,00 | 15,00 | 4,50 | 410,156 | 1,12 | 458,900 | 475,4000 | AW | |
| VKM-13449 | 3,20 | 51,80 | 55,00 | 30,00 | 6,601 | 25,42 | 167,800 | 355,4000 | AY | |
| VKM-12370 | | 46,80 | 50,00 | 25,00 | 8,951 | 20,35 | 182,300 | 386,6000 | AY | |
| VKM-13631 | | 44,80 | 48,00 | 18,00 | 10,204 | 13,65 | 139,400 | 501,7000 | AY | |
| VKM-13450 | | 40,00 | 43,20 | 15,00 | 14,336 | 10,82 | 155,300 | 536,2000 | AY | |
| VKM-13455 | | 32,00 | 35,20 | 11,00 | 28,000 | 7,07 | 198,100 | 583,4000 | AY | |
| VKM-13632 | | 28,80 | 32,00 | 9,00 | 38,409 | 5,06 | 194,700 | 645,8000 | AY | |
| VKM-13460 | | 25,00 | 28,20 | 7,50 | 58,720 | 3,60 | 216,200 | 671,0000 | AY | |
| VKM-13465 | | 20,00 | 23,20 | 7,00 | 114,688 | 3,31 | 239,400 | 396,8000 | AY | |
| VKM-13467 | | 19,00 | 22,20 | 7,00 | 133,766 | 3,32 | 445,500 | 547,6000 | AY | |
| VKM-13470 | | 18,00 | 21,20 | 6,50 | 159,974 | 2,84 | 447,200 | 558,6000 | AY | |
| VKM-13475 | | 16,00 | 19,20 | 5,80 | 224,000 | 2,15 | 482,800 | 558,2000 | AY | |
| VKM-13477 | | 14,80 | 18,00 | 5,50 | 283,024 | 1,88 | 533,300 | 543,8000 | AY | |
| VKM-13500 | | 3,60 | 56,40 | 60,00 | 22,00 | 8,180 | 16,84 | 136,000 | 542,2000 | AZ |
| VKM-13505 | | | 36,40 | 40,00 | 13,50 | 30,473 | 8,95 | 272,800 | 692,0000 | AZ |
| VKM-13510 | | | 28,00 | 31,60 | 10,00 | 66,949 | 5,67 | 380,000 | 718,4000 | AZ |
| VKM-13515 | 25,00 | | 28,60 | 9,30 | 94,058 | 5,08 | 478,900 | 687,3000 | AZ | |
| VKM-13520 | 21,40 | | 25,00 | 7,80 | 149,960 | 3,63 | 544,900 | 703,3000 | AZ | |
| VKM-13525 | 14,40 | | 18,00 | 5,50 | 492,187 | 1,46 | 717,800 | 670,3000 | AZ | |
| VKM-13550 | 4,00 | 45,00 | 49,00 | 18,20 | 24,582 | 13,28 | 326,500 | 773,6000 | AZ | |
| VKM-13555 | | 40,00 | 44,00 | 16,00 | 35,000 | 11,06 | 387,200 | 788,9000 | AZ | |
| VKM-13556 | | 36,00 | 40,00 | 14,50 | 48,011 | 9,75 | 458,400 | 790,1000 | AZ | |
| VKM-13560 | | 32,00 | 36,00 | 12,50 | 68,359 | 7,66 | 524,000 | 813,3000 | AZ | |
| VKM-13565 | | 30,00 | 34,00 | 11,50 | 82,963 | 6,70 | 556,700 | 828,6000 | AZ | |
| VKM-13570 | | 26,00 | 30,00 | 9,50 | 127,447 | 4,03 | 507,300 | 865,4000 | AZ | |
| VKM-13575 | | 21,00 | 25,00 | 7,50 | 241,875 | 2,92 | 707,000 | 884,8000 | AZ | |
| VKM-13580 | | 17,00 | 21,00 | 6,00 | 455,933 | 1,49 | 680,000 | 893,7000 | AZ | |
| VKM-13585 | | 16,00 | 20,00 | 5,90 | 546,875 | 1,40 | 764,200 | 857,5000 | AZ | |
| VKM-13590 | | 14,00 | 18,00 | 5,20 | 816,327 | 0,71 | 582,800 | 852,5000 | AZ | |

Endless compression springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| VKM-13592 | 5,00 | 45,00 | 50,00 | 16,00 | 60,014 | 9,94 | 596,500 | 1381,0000 | BD |
| VKM-13720 | | 38,00 | 43,00 | 13,50 | 99,664 | 7,50 | 748,700 | 1391,0000 | BD |
| VKM-13594 | | 35,00 | 40,00 | 12,00 | 127,551 | 6,12 | 780,600 | 1436,0000 | BD |
| VKM-13596 | | 30,00 | 35,00 | 10,00 | 202,546 | 4,18 | 846,600 | 1481,0000 | BD |
| VKM-13725 | | 26,00 | 31,00 | 8,50 | 311,149 | 2,79 | 871,600 | 1502,0000 | BD |
| VKM-13598 | | 20,00 | 25,00 | 7,50 | 683,594 | 1,86 | 1272,000 | 1318,0000 | BD |
| VKM-13750 | 5,60 | 42,60 | 48,20 | 14,00 | 111,309 | 7,35 | 819,100 | 1873,0000 | BD |
| VKM-13755 | | 38,60 | 44,20 | 13,80 | 149,623 | 7,05 | 1056,000 | 1749,0000 | BD |
| VKM-13760 | | 30,60 | 36,20 | 11,00 | 300,328 | 4,52 | 1356,000 | 1729,0000 | BE |
| VKM-13765 | | 22,40 | 28,00 | 8,00 | 745,478 | 1,66 | 1271,000 | 1738,0000 | BE |
| VKM-12365 | 6,00 | 109,00 | 115,00 | 60,00 | 8,757 | 48,88 | 428,200 | 1346,0000 | BE |
| VKM-12367 | | 74,00 | 80,00 | 35,00 | 27,985 | 27,50 | 770,400 | 1495,0000 | BE |
| VKM-12369 | | 64,00 | 70,00 | 25,00 | 43,259 | 17,23 | 745,100 | 1829,0000 | BE |
| VKM-12371 | | 54,00 | 60,00 | 18,00 | 72,016 | 10,73 | 773,700 | 2113,0000 | BE |
| VKM-12372 | | 44,00 | 50,00 | 15,00 | 133,124 | 7,97 | 1061,000 | 2037,0000 | BE |
| VKM-12374 | | 34,00 | 40,00 | 10,00 | 288,520 | 3,05 | 880,200 | 2411,0000 | BE |
| VKM-13780 | | 26,00 | 32,00 | 9,50 | 645,198 | 2,90 | 1740,000 | 1947,0000 | BE |
| VKM-12378 | | 6,30 | 93,70 | 100,00 | 50,00 | 16,755 | 40,65 | 681,300 | 1499,0000 |
| VKM-12380 | 83,70 | | 90,00 | 30,00 | 23,507 | 21,48 | 505,700 | 2171,0000 | BF |
| VKM-12390 | 73,70 | | 80,00 | 28,00 | 34,432 | 19,36 | 667,200 | 2088,0000 | BF |
| VKM-12392 | 63,70 | | 70,00 | 24,00 | 53,328 | 15,76 | 840,600 | 2105,0000 | BF |
| VKM-13800 | 52,80 | | 59,10 | 19,50 | 93,642 | 11,50 | 1078,000 | 2158,0000 | BF |
| VKM-13805 | 43,80 | | 50,10 | 15,00 | 164,039 | 7,43 | 1221,000 | 2302,0000 | BF |
| VKM-13810 | 35,30 | | 41,60 | 11,00 | 313,362 | 3,69 | 1157,000 | 2514,0000 | BF |
| VKM-13815 | 27,30 | | 33,60 | 10,00 | 677,458 | 2,82 | 1279,000 | 2375,0000 | BF |
| VKM-13840 | 6,50 | 23,50 | 30,00 | 9,50 | 1203,533 | 2,09 | 2521,000 | 2091,0000 | BF |
| VKM-13845 | 7,00 | 113,00 | 120,00 | 60,00 | 14,560 | 47,94 | 698,500 | 1895,0000 | BG |
| VKM-13850 | | 103,00 | 110,00 | 50,00 | 19,226 | 39,65 | 762,800 | 2023,0000 | BG |
| VKM-13855 | | 93,00 | 100,00 | 40,00 | 26,119 | 30,16 | 787,900 | 2270,0000 | BG |
| VKM-13860 | | 83,00 | 90,00 | 35,00 | 36,742 | 25,03 | 920,900 | 2347,0000 | BG |
| VKM-13865 | | 73,00 | 80,00 | 30,00 | 54,005 | 21,24 | 1147,000 | 2349,0000 | BG |
| VKM-13870 | | 63,00 | 70,00 | 22,00 | 84,019 | 13,02 | 1095,000 | 2808,0000 | BG |
| VKM-13875 | | 53,00 | 60,00 | 18,00 | 141,115 | 9,43 | 1330,000 | 2874,0000 | BG |

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|
| KM-3592 | 5,00 | 45,00 | 50,00 | 16,00 | 69,873 | 9,94 | 694,600 | 1372,0000 | BA |
| KM-3720 | | 38,00 | 43,00 | 13,50 | 116,037 | 7,50 | 871,700 | 1382,0000 | BA |
| KM-3594 | | 35,00 | 40,00 | 12,00 | 148,506 | 6,12 | 908,900 | 1427,0000 | BA |
| KM-3596 | | 30,00 | 35,00 | 10,00 | 235,822 | 4,18 | 985,700 | 1472,0000 | BA |
| KM-3725 | | 26,00 | 31,00 | 8,50 | 362,666 | 2,79 | 1014,000 | 1492,0000 | BA |
| KM-3598 | | 20,00 | 25,00 | 7,50 | 795,898 | 1,86 | 1481,000 | 1310,0000 | BA |
| KM-3750 | 5,60 | 42,60 | 48,20 | 14,00 | 129,596 | 7,35 | 953,700 | 1861,0000 | BA |
| KM-3755 | | 38,60 | 44,20 | 13,80 | 174,204 | 7,05 | 1230,000 | 1738,0000 | BA |
| KM-3760 | | 30,60 | 36,20 | 11,00 | 349,668 | 4,52 | 1579,000 | 1718,0000 | BB |
| KM-3765 | | 22,40 | 28,00 | 8,00 | 891,406 | 1,66 | 1480,000 | 1727,0000 | BB |
| KM-2365 | 6,00 | 109,00 | 115,00 | 60,00 | 10,105 | 48,88 | 498,500 | 1337,0000 | BB |
| KM-2367 | | 74,00 | 80,00 | 35,00 | 32,582 | 27,50 | 897,000 | 1485,0000 | BB |
| KM-2369 | | 64,00 | 70,00 | 25,00 | 50,365 | 17,23 | 867,600 | 1818,0000 | BB |
| KM-2371 | | 54,00 | 60,00 | 18,00 | 83,848 | 10,73 | 900,800 | 2099,0000 | BB |
| KM-2372 | | 44,00 | 50,00 | 15,00 | 154,994 | 7,97 | 1236,000 | 2054,0000 | BB |
| KM-2374 | | 34,00 | 40,00 | 10,00 | 335,920 | 3,05 | 1024,000 | 2395,0000 | BB |
| KM-3780 | | 26,00 | 32,00 | 9,50 | 751,195 | 2,90 | 2026,000 | 1934,0000 | BB |
| KM-2378 | | 6,30 | 93,70 | 100,00 | 50,00 | 19,508 | 40,65 | 793,200 | 1490,0000 |
| KM-2380 | 83,70 | | 90,00 | 30,00 | 27,369 | 21,48 | 588,800 | 2157,0000 | BC |
| KM-2390 | 73,70 | | 80,00 | 28,00 | 40,089 | 19,36 | 776,900 | 2075,0000 | BC |
| KM-2392 | 63,70 | | 70,00 | 24,00 | 62,089 | 15,76 | 978,700 | 2091,0000 | BC |
| KM-3800 | 52,80 | | 59,10 | 19,50 | 109,026 | 11,50 | 1255,000 | 2145,0000 | BC |
| KM-3805 | 43,80 | | 50,10 | 15,00 | 190,989 | 7,43 | 1421,000 | 2288,0000 | BC |
| KM-3810 | 35,30 | | 41,60 | 11,00 | 364,843 | 3,69 | 1347,000 | 2498,0000 | BC |
| KM-3815 | 27,30 | | 33,60 | 10,00 | 788,755 | 2,82 | 2231,000 | 2133,0000 | BC |
| KM-3840 | 6,50 | 23,50 | 30,00 | 9,50 | 1401,256 | 2,09 | 2935,000 | 2078,0000 | BD |
| KM-3845 | 7,00 | 113,00 | 120,00 | 60,00 | 16,952 | 47,94 | 813,200 | 1883,0000 | BD |
| KM-3850 | | 103,00 | 110,00 | 50,00 | 22,385 | 39,65 | 888,100 | 2011,0000 | BD |
| KM-3855 | | 93,00 | 100,00 | 40,00 | 30,410 | 30,16 | 917,300 | 2256,0000 | BD |
| KM-3860 | | 83,00 | 90,00 | 35,00 | 42,778 | 25,03 | 1072,000 | 2332,0000 | BD |
| KM-3865 | | 73,00 | 80,00 | 30,00 | 62,877 | 21,24 | 1336,000 | 2334,0000 | BD |
| KM-3870 | | 63,00 | 70,00 | 22,00 | 97,822 | 13,02 | 1275,000 | 2790,0000 | BD |
| KM-3875 | | 53,00 | 60,00 | 18,00 | 164,298 | 9,43 | 1549,000 | 2856,0000 | BD |

Endless compression springs

Music wire EN 10270-1-SH (A228, BS 5216)

Length 1000 mm

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| KM-3880 | 7,00 | 43,00 | 50,00 | 14,00 | 307,648 | 5,69 | 1752,000 | 2975,0000 | BD | |
| KM-3885 | | 33,00 | 40,00 | 11,00 | 680,641 | 2,98 | 2027,000 | 2888,0000 | BD | |
| KM-3921 | | 20,80 | 27,80 | 9,20 | 2718,128 | 1,31 | 3580,000 | 2202,0000 | BD | |
| KM-3890 | 8,00 | 122,00 | 130,00 | 65,00 | 22,980 | 50,38 | 1158,000 | 2496,0000 | BD | |
| KM-3895 | | 112,00 | 120,00 | 55,00 | 29,701 | 41,05 | 1219,000 | 2708,0000 | BD | |
| KM-3900 | | 102,00 | 110,00 | 45,00 | 39,321 | 32,35 | 1273,000 | 2972,0000 | BD | |
| KM-3905 | | 92,00 | 100,00 | 40,00 | 53,588 | 29,28 | 1569,000 | 2916,0000 | BD | |
| KM-3907 | | 82,00 | 90,00 | 30,00 | 75,681 | 20,00 | 1513,000 | 3410,0000 | BD | |
| KM-3909 | | 72,00 | 80,00 | 25,00 | 111,797 | 15,03 | 1680,000 | 3622,0000 | BD | |
| KM-3911 | | 62,00 | 70,00 | 20,00 | 175,086 | 10,30 | 1806,000 | 3891,0000 | BD | |
| KM-3949 | | 48,00 | 56,00 | 15,00 | 377,315 | 5,79 | 2187,000 | 3974,0000 | BD | |
| KM-3950 | | 42,00 | 50,00 | 14,00 | 563,222 | 4,83 | 2726,000 | 3747,0000 | BD | |
| KM-3961 | | 39,00 | 47,00 | 13,00 | 703,451 | 3,79 | 2671,000 | 3773,0000 | BD | |
| KM-3965 | | 34,00 | 42,00 | 12,00 | 1061,673 | 2,93 | 3116,000 | 3551,0000 | BD | |
| KM-3967 | | 10,00 | 130,00 | 140,00 | 60,00 | 46,370 | 44,65 | 2072,000 | 4836,0000 | BE |
| KM-3969 | | | 110,00 | 120,00 | 45,00 | 76,540 | 30,22 | 2313,000 | 4993,0000 | BE |
| KM-3971 | | | 90,00 | 100,00 | 30,00 | 139,746 | 17,76 | 2485,000 | 5832,0000 | BE |
| KM-3973 | 70,00 | | 80,00 | 22,00 | 297,012 | 9,78 | 2906,000 | 6310,0000 | BE | |
| KM-4010 | 46,50 | | 57,50 | 16,60 | 950,576 | 5,15 | 4906,000 | 5602,0000 | BE | |
| KM-4015 | 39,00 | | 49,00 | 14,00 | 1717,409 | 2,63 | 4529,000 | 5478,0000 | BE | |
| KM-4020 | 36,00 | | 46,00 | 13,20 | 2183,535 | 1,83 | 4000,000 | 5385,0000 | BE | |

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

Endless compression springs

| article number | d wire diameter | D mean coil diameter | De outer coil diameter | s pitch/distance from mid-wire to mid-wire | R1 spring rate from one active coil N/mm | sn1 maximum spring deflection of one coil | Fn maximum possible spring force | weight one spring in gram | price group | |
|----------------|-----------------|----------------------|------------------------|--|--|---|----------------------------------|---------------------------|-------------|----|
| VKM-13880 | 7,00 | 43,00 | 50,00 | 14,00 | 264,238 | 5,69 | 1507,000 | 2994,0000 | BG | |
| VKM-13885 | | 33,00 | 40,00 | 11,00 | 584,599 | 2,98 | 1741,000 | 2907,0000 | BG | |
| VKM-13921 | | 20,80 | 27,80 | 9,20 | 2334,589 | 1,31 | 3272,000 | 2197,0000 | BG | |
| VKM-13890 | 8,00 | 122,00 | 130,00 | 65,00 | 19,737 | 50,38 | 994,900 | 2512,0000 | BG | |
| VKM-13895 | | 112,00 | 120,00 | 55,00 | 25,510 | 41,05 | 1047,000 | 2725,0000 | BG | |
| VKM-13900 | | 102,00 | 110,00 | 45,00 | 33,773 | 32,35 | 1093,000 | 2991,0000 | BG | |
| VKM-13905 | | 92,00 | 100,00 | 40,00 | 46,026 | 29,28 | 1348,000 | 2935,0000 | BG | |
| VKM-13907 | | 82,00 | 90,00 | 30,00 | 65,002 | 20,00 | 1042,000 | 3936,0000 | BG | |
| VKM-13909 | | 72,00 | 80,00 | 25,00 | 96,022 | 15,03 | 1443,000 | 3645,0000 | BG | |
| VKM-13911 | | 62,00 | 70,00 | 20,00 | 150,381 | 10,30 | 1551,000 | 3916,0000 | BG | |
| VKM-13949 | | 48,00 | 56,00 | 15,00 | 324,074 | 5,79 | 1879,000 | 4000,0000 | BG | |
| VKM-13950 | | 42,00 | 50,00 | 14,00 | 483,749 | 4,83 | 2341,000 | 3771,0000 | BG | |
| VKM-13961 | | 39,00 | 47,00 | 13,00 | 604,191 | 3,79 | 2294,000 | 3797,0000 | BG | |
| VKM-13965 | | 34,00 | 42,00 | 12,00 | 911,866 | 2,93 | 2676,000 | 3574,0000 | BG | |
| VKM-13967 | | 10,00 | 130,00 | 140,00 | 60,00 | 39,827 | 44,65 | 1780,000 | 4414,0000 | BH |
| VKM-13969 | | | 110,00 | 120,00 | 45,00 | 65,740 | 30,22 | 1987,000 | 5025,0000 | BH |
| VKM-13971 | 90,00 | | 100,00 | 30,00 | 120,027 | 17,76 | 2134,000 | 5869,0000 | BH | |
| VKM-13973 | 70,00 | | 80,00 | 22,00 | 255,102 | 9,78 | 2496,000 | 6350,0000 | BH | |
| VKM-14010 | 46,50 | | 57,50 | 16,60 | 816,446 | 5,15 | 4214,000 | 5638,0000 | BH | |
| VKM-14015 | 39,00 | | 49,00 | 14,00 | 1475,076 | 2,63 | 4005,000 | 5483,0000 | BH | |
| VKM-14020 | 36,00 | | 46,00 | 13,20 | 1875,429 | 1,83 | 3435,000 | 5419,0000 | BH | |

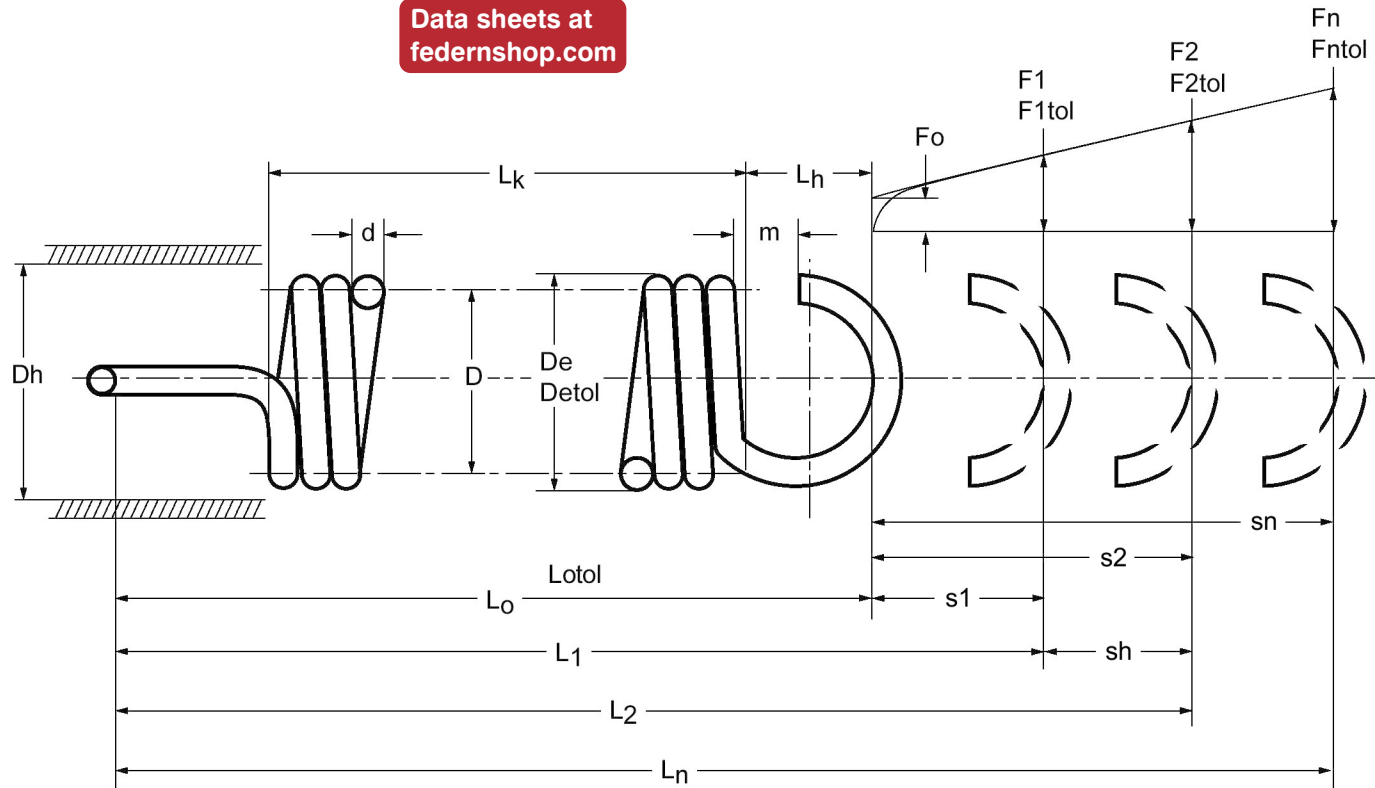
You can satisfy all
your spring needs at

www.federnshop.com



Extension springs

Data sheets at
federnshop.com



| formula | unit | technical term | inquiry | formula | unit | technical term | inquiry |
|-------------|------|---------------------------------------|---------|-------------|------|---|---------|
| d | mm | wire diameter | | L_k | mm | length of relaxed spring body | |
| D | mm | mean coil diameter | | L_0 | mm | unstressed spring length, inner loop to inner loop | |
| D_e | mm | outer coil diameter | | L_0^{tol} | mm | +/- tolerance of unstressed length | |
| De | mm | +/- tolerance of outer coil diameter | | L_n | mm | maximum spring length, inner loop to inner loop | |
| D_h | mm | minimum bush diameter | | s_n | mm | maximum spring deflection | |
| F_0 | N | initial tension | | L_h | mm | distance of inner edge of loop from the spring body | |
| F_n | N | maximum spring force | | m | mm | loop opening width | |
| F_n^{tol} | N | +/- tolerance of maximum spring force | | R | N/mm | spring rate | |

Extension springs

Material

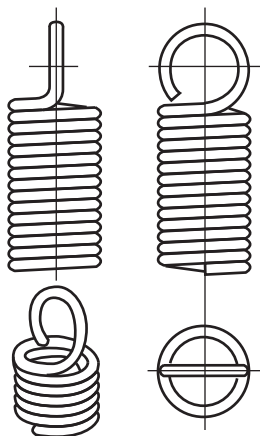
Patented drawn spring steel wire in compliance with EN 10270 part 1 type DH for all wire diameters up to 1.9 mm. For diameters between 2.0 and 8.0 mm type SH will be used (A228 / BS 5216). Our stainless steel springs are manufactured using spring steel wire material no. 1.4310 in compliance with EN 10270 part 3 (A301 / BS 301S21). The tolerances of the wire diameters comply with EN 10270.

Design

The springs are right-hand coiled (clockwise).

Loops

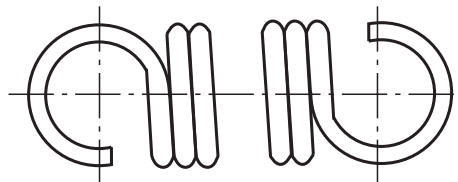
A 1/1 German loop in compliance with DIN 2097 is fixed to each end of the spring.



Each of our extension springs is available with a choice of 2 different loop positions. One of the positions is 180° (indicated in the table by an catalogue number which ends with the letter "I").

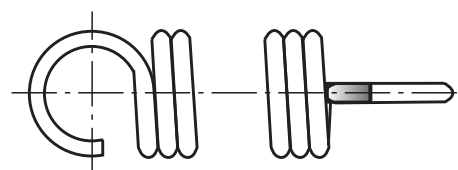
In this case the loops are parallel, the loop ends are set at 180° (as in a right-hand screw).

Loop position I



The other loop position is 270° (indicated by an catalogue number which ends with an "X") In this case the loops are positioned cross-wise. The loop ends have been turned through 270°.

Loop position X



Loops are stocked without openings ($m=0$). However it is possible to have an opening cut into the loop at an extra cost, without causing any delay.

Please contact our service department in Metzingen and Cunewalde if you have any questions about loops and positions.

Metzingen
Phone 0049 (0)7123 960-119, Fax -195
Cunewalde
Phone 0049 (0)35877 227-0, Fax -14
technik@gutekunst-co.com

Surface treatment

Extension springs made of spring-steel wire EN 10270-1-DH and -SH will be lightly oiled after the thermal coating. Springs made of material no. 1.4310 will not be re-coated after the thermal coating, as a surface protection is not normally required. All subsequent surface treatments cause unavoidable delay, as the application of a protective layer between the coils is very difficult due to the preset nature of the spring body. Here the selection of a suitable material should be made for an additional surface coating. The extension springs can also be delivered in pre-galvanised material at an extra charge and delivery time.

Use

Extension springs can be used with the stated deflections and loads by dead or infrequent strains. In all other cases an arithmetical check of the application of the spring should be carried out. It is crucial to check the stresses at the point of attachment of the loop to the body, as this is the critical point for possible fractures. A longer life-span can often be attained by choosing a different loop type.

Please contact our service department in Metzingen and Cunewalde if you have any questions about load capacity.
Metzingen
Phone 0049 (0)7123 960-119, Fax -195
Cunewalde
Phone 0049 (0)35877 227-0, Fax -14
technik@gutekunst-co.com

Extension springs

Production compensation

In order to maintain the stated tolerated measurements we need to carry out production compensation with either the pre-stress (F0) or the mean coil diameter (D).

Quality control

Extension springs are tested for compliance to the tolerated loads and measurements before they are approved and reach the production warehouse. The tests take place in our quality control department according to DIN ISO 2859-1 level II. The procedure normally consists of a simple spot check programme, test-level AQL= 1.0. Specific tests can also be carried out and documented for each individual spring upon the customer's request.

The following charges apply for the quality control certificates issued by us.

In compliance with:

| | |
|-------------------|-----------|
| DIN EN 10204-2.1 | for free |
| DIN EN 10204-2.2 | EUR 15,34 |
| DIN EN 10204-3.1B | EUR 30,68 |

Please contact our Quality Assurance department with any questions you may have about testing and quality assurance. Phone 0049 (0)35877 227-11, Fax -14 tqm@gutekunst-co.com

Calculation

The calculation and design of the extension springs is carried out in accordance with EN specification 13906, section 2. DIN 2097 Grade II is taken as the basic standard for the tolerances.

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| Z-2051I | 0,20 | 3,00 | 0,20 | 3,50 | 180,00 | 37,00 | 8,60 | 0,60 | 4,30 | 2,15 | 0,061 | 1,261 | 0,11 | 0,036 | 41,57 | 32,97 | 0,0488 | ZE | | | |
| Z-2051X | | | | | 270,00 | 37,00 | 8,60 | 0,60 | 4,35 | 2,12 | 0,061 | 1,261 | 0,11 | 0,036 | 41,97 | 33,37 | 0,0494 | ZE | | | |
| Z-2052I | | | | | 180,00 | 53,00 | 13,00 | 0,60 | 8,70 | 2,15 | 0,061 | 1,261 | 0,09 | 0,017 | 81,35 | 68,35 | 0,0966 | ZE | | | |
| Z-2052X | | | | | 270,00 | 53,00 | 13,00 | 0,60 | 8,75 | 2,12 | 0,061 | 1,261 | 0,09 | 0,017 | 81,75 | 68,75 | 0,0971 | ZE | | | |
| Z-2053I | | | | | 180,00 | 65,00 | 17,40 | 0,70 | 13,10 | 2,15 | 0,061 | 1,261 | 0,09 | 0,012 | 121,13 | 103,73 | 0,1443 | ZE | | | |
| Z-2053X | | | | | 270,00 | 66,00 | 17,40 | 0,70 | 13,15 | 2,12 | 0,061 | 1,261 | 0,09 | 0,011 | 121,54 | 104,14 | 0,1449 | ZE | | | |
| Z-2054I | | | | | 180,00 | 76,00 | 21,80 | 0,70 | 17,50 | 2,15 | 0,061 | 1,261 | 0,09 | 0,009 | 160,92 | 139,12 | 0,1921 | ZE | | | |
| Z-2054X | | | | | 270,00 | 76,00 | 21,80 | 0,70 | 17,55 | 2,12 | 0,061 | 1,261 | 0,09 | 0,009 | 161,32 | 139,52 | 0,1927 | ZE | | | |
| Z-001I | 2,70 | 0,15 | 3,20 | 180,00 | 25,00 | 6,20 | 0,60 | 2,50 | 1,85 | 0,081 | 1,391 | 0,13 | 0,091 | 20,65 | 14,45 | 0,0262 | ZD | | | | |
| Z-001X | | | | 270,00 | 26,00 | 6,20 | 0,60 | 2,55 | 1,82 | 0,081 | 1,391 | 0,13 | 0,089 | 20,96 | 14,76 | 0,0267 | ZD | | | | |
| Z-002I | | | | 180,00 | 37,00 | 8,80 | 0,60 | 5,10 | 1,85 | 0,081 | 1,391 | 0,11 | 0,043 | 39,56 | 30,76 | 0,0514 | ZD | | | | |
| Z-002X | | | | 270,00 | 37,00 | 8,80 | 0,60 | 5,15 | 1,82 | 0,081 | 1,391 | 0,11 | 0,042 | 39,87 | 31,07 | 0,0518 | ZD | | | | |
| Z-003I | | | | 180,00 | 47,00 | 11,80 | 0,60 | 8,10 | 1,85 | 0,081 | 1,391 | 0,10 | 0,026 | 61,39 | 49,59 | 0,0804 | ZE | | | | |
| Z-003X | | | | 270,00 | 47,00 | 11,80 | 0,60 | 8,15 | 1,82 | 0,081 | 1,391 | 0,10 | 0,026 | 61,70 | 49,90 | 0,0809 | ZE | | | | |
| Z-003AI | | | | 180,00 | 76,00 | 24,50 | 0,70 | 20,70 | 1,90 | 0,081 | 1,391 | 0,09 | 0,010 | 153,17 | 128,67 | 0,2026 | ZE | | | | |
| Z-003AX | | | | 270,00 | 76,00 | 24,50 | 0,70 | 20,75 | 1,87 | 0,081 | 1,391 | 0,09 | 0,010 | 153,49 | 128,99 | 0,2031 | ZE | | | | |
| Z-004I | 2,20 | 0,15 | 2,70 | 180,00 | 17,00 | 4,40 | 0,60 | 1,50 | 1,45 | 0,101 | 1,691 | 0,19 | 0,313 | 9,49 | 5,09 | 0,0132 | ZD | | | | |
| Z-004X | | | | 270,00 | 17,00 | 4,40 | 0,60 | 1,55 | 1,42 | 0,101 | 1,691 | 0,19 | 0,302 | 9,68 | 5,28 | 0,0136 | ZD | | | | |
| Z-005I | | | | 180,00 | 32,00 | 8,00 | 0,60 | 5,10 | 1,45 | 0,101 | 1,691 | 0,12 | 0,083 | 27,16 | 19,16 | 0,0411 | ZD | | | | |
| Z-005X | | | | 270,00 | 32,00 | 8,00 | 0,60 | 5,15 | 1,42 | 0,101 | 1,691 | 0,12 | 0,082 | 27,35 | 19,35 | 0,0415 | ZD | | | | |
| Z-006I | | | | 180,00 | 41,00 | 11,00 | 0,60 | 8,10 | 1,45 | 0,101 | 1,691 | 0,11 | 0,052 | 41,89 | 30,89 | 0,0644 | ZE | | | | |
| Z-006X | | | | 270,00 | 41,00 | 11,00 | 0,60 | 8,15 | 1,42 | 0,101 | 1,691 | 0,11 | 0,051 | 42,08 | 31,08 | 0,0648 | ZE | | | | |
| Z-006FI | | | | 0,25 | 5,00 | 0,30 | 5,70 | 180,00 | 34,00 | 10,00 | 0,60 | 2,63 | 3,68 | 0,031 | 1,461 | 0,18 | 0,039 | 46,51 | 36,51 | 0,0662 | ZE |
| Z-006FX | | | | | | | | 270,00 | 34,00 | 10,00 | 0,60 | 2,69 | 3,65 | 0,031 | 1,461 | 0,17 | 0,038 | 47,48 | 37,48 | 0,0676 | ZE |
| Z-006GI | 180,00 | 49,00 | 12,70 | | | | | 0,60 | 5,38 | 3,66 | 0,031 | 1,461 | 0,14 | 0,018 | 91,49 | 78,79 | 0,1294 | ZE | | | |
| Z-006GX | 270,00 | 50,00 | 12,70 | | | | | 0,60 | 5,44 | 3,63 | 0,031 | 1,461 | 0,14 | 0,018 | 92,45 | 79,75 | 0,1309 | ZE | | | |
| Z-006HI | 180,00 | 71,00 | 18,20 | | | | | 0,70 | 10,88 | 3,66 | 0,031 | 1,461 | 0,12 | 0,009 | 181,95 | 163,75 | 0,2560 | ZE | | | |
| Z-006HX | 270,00 | 71,00 | 18,20 | | | | | 0,70 | 10,94 | 3,63 | 0,031 | 1,461 | 0,12 | 0,009 | 182,90 | 164,70 | 0,2574 | ZE | | | |
| Z-006JI | 180,00 | 101,00 | 29,20 | | | | | 0,90 | 21,88 | 3,66 | 0,031 | 1,461 | 0,11 | 0,004 | 361,67 | 332,47 | 0,5091 | ZE | | | |
| Z-006JX | 270,00 | 101,00 | 29,20 | | | | | 0,90 | 21,94 | 3,63 | 0,031 | 1,461 | 0,11 | 0,004 | 363,30 | 334,10 | 0,5105 | ZE | | | |
| Z-006KI | 4,20 | 0,25 | 4,90 | 180,00 | 144,00 | 51,20 | 1,30 | 43,88 | 3,66 | 0,031 | 1,461 | 0,11 | 0,002 | 723,30 | 672,10 | 1,0150 | ZE | | | | |
| Z-006KX | | | | 270,00 | 144,00 | 51,20 | 1,30 | 43,94 | 3,63 | 0,031 | 1,461 | 0,11 | 0,002 | 724,20 | 673,00 | 1,0160 | ZE | | | | |
| Z-006AI | | | | | 180,00 | 22,00 | 7,60 | 0,60 | 1,62 | 2,98 | 0,041 | 1,731 | 0,24 | 0,117 | 22,00 | 14,40 | 0,0359 | ZD | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| RZ-20511 | 0,20 | 3,00 | 0,20 | 3,50 | 180,00 | 37,00 | 8,60 | 0,60 | 4,30 | 2,15 | 0,051 | 0,991 | 0,10 | 0,031 | 38,77 | 30,17 | 0,0486 | ZH | | | |
| RZ-2051X | | | | | 270,00 | 37,00 | 8,60 | 0,60 | 4,35 | 2,12 | 0,051 | 0,991 | 0,10 | 0,031 | 39,14 | 30,54 | 0,0492 | ZH | | | |
| RZ-2052I | | | | | 180,00 | 53,00 | 13,00 | 0,60 | 8,70 | 2,15 | 0,051 | 0,991 | 0,09 | 0,015 | 75,55 | 62,55 | 0,0967 | ZH | | | |
| RZ-2052X | | | | | 270,00 | 53,00 | 13,00 | 0,60 | 8,75 | 2,12 | 0,051 | 0,991 | 0,09 | 0,015 | 75,92 | 62,92 | 0,0972 | ZH | | | |
| RZ-2053I | | | | | 180,00 | 65,00 | 17,40 | 0,70 | 13,10 | 2,15 | 0,051 | 0,991 | 0,09 | 0,010 | 112,33 | 94,93 | 0,1448 | ZH | | | |
| RZ-2053X | | | | | 270,00 | 66,00 | 17,40 | 0,70 | 13,15 | 2,12 | 0,051 | 0,991 | 0,09 | 0,010 | 112,69 | 95,29 | 0,1453 | ZH | | | |
| RZ-2054I | | | | | 180,00 | 76,00 | 21,80 | 0,70 | 17,50 | 2,15 | 0,051 | 0,991 | 0,08 | 0,007 | 149,10 | 127,30 | 0,1928 | ZH | | | |
| RZ-2054X | | | | | 270,00 | 76,00 | 21,80 | 0,70 | 17,55 | 2,12 | 0,051 | 0,991 | 0,08 | 0,007 | 149,47 | 127,67 | 0,1934 | ZH | | | |
| RZ-001I | 2,70 | 0,15 | 3,20 | 180,00 | 25,00 | 6,20 | 0,60 | 2,50 | 1,85 | 0,061 | 1,101 | 0,13 | 0,078 | 19,49 | 13,29 | 0,0259 | ZG | | | | |
| RZ-001X | | | | 270,00 | 26,00 | 6,20 | 0,60 | 2,55 | 1,82 | 0,061 | 1,101 | 0,13 | 0,076 | 19,78 | 13,58 | 0,0263 | ZG | | | | |
| RZ-002I | | | | 180,00 | 37,00 | 8,80 | 0,60 | 5,10 | 1,85 | 0,061 | 1,101 | 0,10 | 0,037 | 37,11 | 28,31 | 0,0512 | ZG | | | | |
| RZ-002X | | | | 270,00 | 37,00 | 8,80 | 0,60 | 5,15 | 1,82 | 0,061 | 1,101 | 0,10 | 0,036 | 37,40 | 28,60 | 0,0517 | ZG | | | | |
| RZ-003I | | | | 180,00 | 47,00 | 11,80 | 0,60 | 8,10 | 1,85 | 0,061 | 1,101 | 0,10 | 0,023 | 57,44 | 45,64 | 0,0805 | ZG | | | | |
| RZ-003X | | | | 270,00 | 47,00 | 11,80 | 0,60 | 8,15 | 1,82 | 0,061 | 1,101 | 0,10 | 0,023 | 57,73 | 45,93 | 0,0810 | ZG | | | | |
| RZ-003AI | | | | 180,00 | 76,00 | 24,50 | 0,70 | 20,70 | 1,90 | 0,061 | 1,101 | 0,09 | 0,009 | 143,40 | 118,90 | 0,2034 | ZH | | | | |
| RZ-003AX | | | | 270,00 | 76,00 | 24,50 | 0,70 | 20,75 | 1,87 | 0,061 | 1,101 | 0,09 | 0,009 | 143,76 | 119,26 | 0,2039 | ZH | | | | |
| RZ-004I | 2,20 | 0,15 | 2,70 | 180,00 | 17,00 | 4,40 | 0,60 | 1,50 | 1,45 | 0,081 | 1,341 | 0,18 | 0,269 | 9,06 | 4,66 | 0,0129 | ZG | | | | |
| RZ-004X | | | | 270,00 | 17,00 | 4,40 | 0,60 | 1,55 | 1,42 | 0,081 | 1,341 | 0,18 | 0,259 | 9,24 | 4,84 | 0,0133 | ZG | | | | |
| RZ-005I | | | | 180,00 | 32,00 | 8,00 | 0,60 | 5,10 | 1,45 | 0,081 | 1,341 | 0,12 | 0,071 | 25,57 | 17,57 | 0,0410 | ZG | | | | |
| RZ-005X | | | | 270,00 | 32,00 | 8,00 | 0,60 | 5,15 | 1,42 | 0,081 | 1,341 | 0,12 | 0,071 | 25,75 | 17,75 | 0,0414 | ZG | | | | |
| RZ-006I | | | | 180,00 | 41,00 | 11,00 | 0,60 | 8,10 | 1,45 | 0,081 | 1,341 | 0,11 | 0,044 | 39,32 | 28,32 | 0,0644 | ZH | | | | |
| RZ-006X | | | | 270,00 | 41,00 | 11,00 | 0,60 | 8,15 | 1,42 | 0,081 | 1,341 | 0,11 | 0,044 | 39,50 | 28,50 | 0,0648 | ZH | | | | |
| RZ-006FI | | | | 0,25 | 5,00 | 0,30 | 5,70 | 180,00 | 34,00 | 10,00 | 0,60 | 2,63 | 3,68 | 0,021 | 1,080 | 0,17 | 0,034 | 41,61 | 31,61 | 0,0653 | ZH |
| RZ-006FX | | | | | | | | 270,00 | 34,00 | 10,00 | 0,60 | 2,69 | 3,65 | 0,021 | 1,080 | 0,17 | 0,033 | 42,41 | 32,41 | 0,0667 | ZH |
| RZ-006GI | 180,00 | 49,00 | 12,70 | | | | | 0,60 | 5,38 | 3,66 | 0,021 | 1,080 | 0,13 | 0,016 | 80,84 | 68,14 | 0,1290 | ZH | | | |
| RZ-006GX | 270,00 | 50,00 | 12,70 | | | | | 0,60 | 5,44 | 3,63 | 0,021 | 1,080 | 0,13 | 0,015 | 81,63 | 68,93 | 0,1304 | ZH | | | |
| RZ-006HI | 180,00 | 71,00 | 18,20 | | | | | 0,70 | 10,88 | 3,66 | 0,021 | 1,080 | 0,12 | 0,008 | 159,40 | 141,20 | 0,2564 | ZH | | | |
| RZ-006HX | 270,00 | 71,00 | 18,20 | | | | | 0,70 | 10,94 | 3,63 | 0,021 | 1,080 | 1,12 | 0,007 | 160,10 | 141,90 | 0,2578 | ZH | | | |
| RZ-006JI | 180,00 | 101,00 | 29,20 | | | | | 0,90 | 21,88 | 3,66 | 0,021 | 1,080 | 0,11 | 0,004 | 316,50 | 287,30 | 0,5113 | ZH | | | |
| RZ-006JX | 270,00 | 101,00 | 29,20 | | | | | 0,90 | 21,94 | 3,63 | 0,021 | 1,080 | 0,11 | 0,004 | 317,30 | 288,10 | 0,5127 | ZH | | | |
| RZ-006KI | 180,00 | 144,00 | 51,20 | 1,30 | 43,88 | 3,66 | 0,021 | 1,080 | 0,10 | 0,002 | 630,70 | 579,50 | 1,0210 | ZH | | | | | | | |
| RZ-006KX | 270,00 | 144,00 | 51,20 | 1,30 | 43,94 | 3,63 | 0,021 | 1,080 | 0,10 | 0,002 | 631,50 | 580,30 | 1,0224 | ZH | | | | | | | |
| RZ-006AI | 4,20 | 0,25 | 4,90 | 180,00 | 22,00 | 7,60 | 0,60 | 1,62 | 2,98 | 0,031 | 1,371 | 0,24 | 0,101 | 20,86 | 13,26 | 0,0348 | ZG | | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|-------|--------|----|
| RZ-006AX | 0,25 | 4,20 | 0,25 | 4,90 | 270,00 | 22,00 | 7,60 | 0,60 | 1,68 | 2,95 | 0,031 | 1,371 | 0,23 | 0,097 | 21,47 | 13,87 | 0,0360 | ZG | | | | |
| RZ-006BI | | | | | 180,00 | 28,00 | 8,60 | 0,60 | 2,62 | 2,98 | 0,031 | 1,371 | 0,19 | 0,059 | 31,51 | 22,91 | 0,0541 | ZG | | | | |
| RZ-006BX | | | | | 270,00 | 28,00 | 8,60 | 0,60 | 2,68 | 2,95 | 0,031 | 1,371 | 0,19 | 0,057 | 32,11 | 23,51 | 0,0552 | ZG | | | | |
| RZ-006CI | | | | | 180,00 | 36,00 | 10,20 | 0,60 | 4,12 | 3,03 | 0,031 | 1,371 | 0,16 | 0,036 | 47,58 | 37,38 | 0,0830 | ZG | | | | |
| RZ-006CX | | | | | 270,00 | 36,00 | 10,20 | 0,60 | 4,18 | 3,00 | 0,031 | 1,371 | 0,16 | 0,035 | 48,18 | 37,98 | 0,0841 | ZG | | | | |
| RZ-006DI | | | | | 180,00 | 45,00 | 12,40 | 0,60 | 6,37 | 3,01 | 0,031 | 1,371 | 0,14 | 0,023 | 71,49 | 59,09 | 0,1263 | ZG | | | | |
| RZ-006DX | | | | | 270,00 | 45,00 | 12,40 | 0,60 | 6,43 | 2,98 | 0,031 | 1,371 | 0,14 | 0,022 | 72,09 | 59,69 | 0,1275 | ZG | | | | |
| RZ-006EI | | | | | 180,00 | 57,00 | 16,20 | 0,70 | 10,12 | 3,03 | 0,031 | 1,371 | 0,13 | 0,014 | 111,46 | 95,26 | 0,1986 | ZG | | | | |
| RZ-006EX | | | | | 270,00 | 57,00 | 16,20 | 0,70 | 10,18 | 3,00 | 0,031 | 1,371 | 0,13 | 0,014 | 112,07 | 95,87 | 0,1997 | ZG | | | | |
| RZ-007I | | | | | 3,45 | 0,20 | 0,20 | 4,10 | 180,00 | 26,00 | 7,90 | 0,60 | 3,13 | 2,38 | 0,081 | 1,661 | 0,19 | 0,091 | 25,28 | 17,38 | 0,0518 | ZG |
| RZ-007X | 270,00 | 26,00 | 7,90 | 0,60 | | | | | 3,19 | 2,35 | 0,081 | 1,661 | 0,19 | 0,089 | 25,66 | 17,76 | 0,0527 | ZG | | | | |
| RZ-008I | 180,00 | 38,00 | 11,20 | 0,60 | | | | | 6,37 | 2,41 | 0,081 | 1,661 | 0,15 | 0,043 | 48,23 | 37,03 | 0,1023 | ZG | | | | |
| RZ-008X | 270,00 | 38,00 | 11,20 | 0,60 | | | | | 6,43 | 2,38 | 0,081 | 1,661 | 0,15 | 0,042 | 48,61 | 37,41 | 0,1033 | ZG | | | | |
| RZ-009I | 180,00 | 48,00 | 15,00 | 0,60 | | | | | 10,13 | 2,43 | 0,081 | 1,661 | 0,14 | 0,026 | 74,71 | 59,71 | 0,1610 | ZG | | | | |
| RZ-009X | 270,00 | 48,00 | 15,00 | 0,60 | | | | | 10,19 | 2,40 | 0,081 | 1,661 | 0,14 | 0,026 | 75,09 | 60,09 | 0,1620 | ZG | | | | |
| RZ-009AI | 180,00 | 56,00 | 18,40 | 0,70 | | | | | 13,62 | 2,38 | 0,081 | 1,661 | 0,13 | 0,020 | 99,27 | 80,87 | 0,2155 | ZG | | | | |
| RZ-009AX | 270,00 | 56,00 | 18,40 | 0,70 | | | | | 13,68 | 2,35 | 0,081 | 1,661 | 0,13 | 0,019 | 99,65 | 81,25 | 0,2164 | ZG | | | | |
| RZ-010I | 2,75 | 0,15 | 0,15 | 3,30 | | | | | 180,00 | 22,00 | 6,80 | 0,60 | 3,12 | 1,83 | 0,141 | 2,061 | 0,21 | 0,191 | 16,91 | 10,11 | 0,0403 | ZG |
| RZ-010X | | | | | | | | | 270,00 | 22,00 | 6,80 | 0,60 | 3,19 | 1,80 | 0,141 | 2,061 | 0,21 | 0,186 | 17,13 | 10,33 | 0,0412 | ZG |
| RZ-011I | | | | | 180,00 | 32,00 | 10,10 | 0,60 | 6,38 | 1,86 | 0,141 | 2,061 | 0,18 | 0,089 | 31,63 | 21,53 | 0,0801 | ZG | | | | |
| RZ-011X | | | | | 270,00 | 32,00 | 10,10 | 0,60 | 6,44 | 1,83 | 0,141 | 2,061 | 0,18 | 0,088 | 31,85 | 21,75 | 0,0808 | ZG | | | | |
| RZ-012I | | | | | 180,00 | 41,00 | 13,80 | 0,60 | 10,13 | 1,83 | 0,141 | 2,061 | 0,16 | 0,055 | 48,51 | 34,71 | 0,1258 | ZG | | | | |
| RZ-012X | | | | | 270,00 | 41,00 | 13,80 | 0,60 | 10,19 | 1,80 | 0,141 | 2,061 | 0,16 | 0,055 | 48,73 | 34,93 | 0,1265 | ZG | | | | |
| RZ-012AI | | | | | 180,00 | 44,00 | 15,60 | 0,60 | 11,88 | 1,86 | 0,141 | 2,061 | 0,16 | 0,047 | 56,47 | 40,87 | 0,1471 | ZG | | | | |
| RZ-012AX | | | | | 270,00 | 44,00 | 15,60 | 0,60 | 11,91 | 1,83 | 0,141 | 2,061 | 0,16 | 0,047 | 56,69 | 41,09 | 0,1475 | ZG | | | | |
| RZ-012BI | | | | | 180,00 | 47,00 | 17,30 | 0,70 | 13,63 | 1,83 | 0,141 | 2,061 | 0,15 | 0,041 | 64,32 | 47,02 | 0,1685 | ZG | | | | |
| RZ-012BX | | | | | 270,00 | 47,00 | 17,30 | 0,70 | 13,69 | 1,80 | 0,141 | 2,061 | 0,15 | 0,041 | 64,54 | 47,24 | 0,1692 | ZG | | | | |
| RZ-012CI | | | | | 180,00 | 51,00 | 19,30 | 0,70 | 15,63 | 1,83 | 0,141 | 2,061 | 0,15 | 0,036 | 73,35 | 54,05 | 0,1929 | ZG | | | | |
| RZ-012CX | | | | | 270,00 | 51,00 | 19,30 | 0,70 | 15,69 | 1,80 | 0,141 | 2,061 | 0,15 | 0,035 | 73,57 | 54,27 | 0,1936 | ZG | | | | |
| RZ-012DI | | | | | 180,00 | 54,00 | 21,30 | 0,70 | 17,63 | 1,83 | 0,141 | 2,061 | 0,15 | 0,031 | 82,38 | 61,08 | 0,2173 | ZG | | | | |
| RZ-012DX | | | | | 270,00 | 54,00 | 21,30 | 0,70 | 17,69 | 1,80 | 0,141 | 2,061 | 0,15 | 0,031 | 82,60 | 61,30 | 0,2180 | ZG | | | | |
| RZ-012EI | 180,00 | 57,00 | 23,30 | 0,70 | 19,63 | 1,83 | 0,141 | 2,061 | 0,15 | 0,028 | 91,41 | 68,11 | 0,2417 | ZG | | | | | | | | |
| RZ-012EX | 270,00 | 57,00 | 23,30 | 0,70 | 19,69 | 1,80 | 0,141 | 2,061 | 0,15 | 0,028 | 91,63 | 68,33 | 0,2424 | ZG | | | | | | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|-------|--------|----|
| Z-006AX | 0,25 | 4,20 | 0,25 | 4,90 | 270,00 | 22,00 | 7,60 | 0,60 | 1,68 | 2,95 | 0,041 | 1,731 | 0,24 | 0,112 | 22,64 | 15,04 | 0,0371 | ZD | | | | |
| Z-006BI | | | | | 180,00 | 28,00 | 8,60 | 0,60 | 2,62 | 2,98 | 0,041 | 1,731 | 0,19 | 0,060 | 33,45 | 24,85 | 0,0550 | ZD | | | | |
| Z-006BX | | | | | 270,00 | 28,00 | 8,60 | 0,60 | 2,68 | 2,95 | 0,041 | 1,731 | 0,19 | 0,060 | 34,10 | 25,50 | 0,0562 | ZD | | | | |
| Z-006CI | | | | | 180,00 | 36,00 | 10,20 | 0,60 | 4,12 | 3,03 | 0,041 | 1,731 | 0,16 | 0,042 | 50,74 | 40,54 | 0,0837 | ZD | | | | |
| Z-006CX | | | | | 270,00 | 36,00 | 10,20 | 0,60 | 4,18 | 3,00 | 0,041 | 1,731 | 0,16 | 0,041 | 51,40 | 41,20 | 0,0849 | ZD | | | | |
| Z-006DI | | | | | 180,00 | 45,00 | 12,40 | 0,60 | 6,37 | 3,01 | 0,041 | 1,731 | 0,15 | 0,026 | 76,49 | 64,09 | 0,1268 | ZD | | | | |
| Z-006DX | | | | | 270,00 | 45,00 | 12,40 | 0,60 | 6,43 | 2,98 | 0,041 | 1,731 | 0,15 | 0,026 | 77,14 | 64,74 | 0,1280 | ZD | | | | |
| Z-006EI | | | | | 180,00 | 57,00 | 16,20 | 0,70 | 10,12 | 3,03 | 0,041 | 1,731 | 0,13 | 0,016 | 119,52 | 103,32 | 0,1985 | ZD | | | | |
| Z-006EX | | | | | 270,00 | 57,00 | 16,20 | 0,70 | 10,18 | 3,00 | 0,041 | 1,731 | 0,13 | 0,016 | 120,18 | 103,98 | 0,1997 | ZD | | | | |
| Z-007I | | | | | 3,45 | 0,20 | 0,20 | 4,10 | 180,00 | 26,00 | 7,90 | 0,60 | 3,13 | 2,38 | 0,101 | 2,101 | 0,19 | 0,106 | 26,79 | 18,89 | 0,0523 | ZD |
| Z-007X | 270,00 | 26,00 | 7,90 | 0,60 | | | | | 3,19 | 2,35 | 0,101 | 2,101 | 0,19 | 0,103 | 27,20 | 19,30 | 0,0533 | ZD | | | | |
| Z-008I | 180,00 | 38,00 | 11,20 | 0,60 | | | | | 6,37 | 2,41 | 0,101 | 2,101 | 0,16 | 0,050 | 51,44 | 40,24 | 0,1027 | ZD | | | | |
| Z-008X | 270,00 | 38,00 | 11,20 | 0,60 | | | | | 6,43 | 2,38 | 0,101 | 2,101 | 0,16 | 0,049 | 51,85 | 40,65 | 0,1037 | ZD | | | | |
| Z-009I | 180,00 | 48,00 | 15,00 | 0,60 | | | | | 10,13 | 2,43 | 0,101 | 2,101 | 0,15 | 0,031 | 79,88 | 64,88 | 0,1609 | ZD | | | | |
| Z-009X | 270,00 | 48,00 | 15,00 | 0,60 | | | | | 10,19 | 2,40 | 0,101 | 2,101 | 0,15 | 0,031 | 80,50 | 65,50 | 0,1618 | ZD | | | | |
| Z-009AI | 180,00 | 56,00 | 18,40 | 0,70 | | | | | 13,62 | 2,38 | 0,101 | 2,101 | 0,14 | 0,023 | 106,50 | 88,10 | 0,2152 | ZD | | | | |
| Z-009AX | 270,00 | 56,00 | 18,40 | 0,70 | | | | | 13,68 | 2,35 | 0,101 | 2,101 | 0,14 | 0,023 | 106,90 | 88,50 | 0,2161 | ZD | | | | |
| Z-010I | 2,75 | 0,15 | 0,15 | 3,30 | | | | | 180,00 | 22,00 | 6,80 | 0,60 | 3,12 | 1,83 | 0,180 | 2,611 | 0,22 | 0,221 | 17,77 | 10,97 | 0,0409 | ZD |
| Z-010X | | | | | | | | | 270,00 | 22,00 | 6,80 | 0,60 | 3,19 | 1,80 | 0,180 | 2,611 | 0,22 | 0,217 | 18,00 | 11,20 | 0,0417 | ZD |
| Z-011I | | | | | 180,00 | 32,00 | 10,10 | 0,60 | 6,38 | 1,86 | 0,180 | 2,611 | 0,18 | 0,107 | 33,45 | 23,35 | 0,0803 | ZD | | | | |
| Z-011X | | | | | 270,00 | 32,00 | 10,10 | 0,60 | 6,44 | 1,83 | 0,180 | 2,611 | 0,18 | 0,103 | 33,69 | 23,59 | 0,0810 | ZD | | | | |
| Z-012I | | | | | 180,00 | 41,00 | 13,80 | 0,60 | 10,13 | 1,83 | 0,180 | 2,611 | 0,17 | 0,064 | 51,45 | 37,65 | 0,1257 | ZD | | | | |
| Z-012X | | | | | 270,00 | 41,00 | 13,80 | 0,60 | 10,19 | 1,80 | 0,180 | 2,611 | 0,17 | 0,064 | 51,69 | 37,89 | 0,1265 | ZD | | | | |
| Z-012AI | | | | | 180,00 | 44,00 | 15,60 | 0,60 | 11,88 | 1,86 | 0,180 | 2,611 | 0,16 | 0,055 | 59,92 | 44,32 | 0,1470 | ZD | | | | |
| Z-012AX | | | | | 270,00 | 44,00 | 15,60 | 0,60 | 11,91 | 1,83 | 0,180 | 2,611 | 0,16 | 0,054 | 60,16 | 44,56 | 0,1477 | ZD | | | | |
| Z-012BI | | | | | 180,00 | 47,00 | 17,30 | 0,70 | 13,63 | 1,83 | 0,180 | 2,611 | 0,16 | 0,048 | 68,29 | 50,99 | 0,1682 | ZD | | | | |
| Z-012BX | | | | | 270,00 | 47,00 | 17,30 | 0,70 | 13,69 | 1,80 | 0,180 | 2,611 | 0,16 | 0,047 | 68,53 | 51,23 | 0,1689 | ZD | | | | |
| Z-012CI | | | | | 180,00 | 51,00 | 19,30 | 0,70 | 15,63 | 1,83 | 0,180 | 2,611 | 0,16 | 0,041 | 77,92 | 58,62 | 0,1924 | ZD | | | | |
| Z-012CX | | | | | 270,00 | 51,00 | 19,30 | 0,70 | 15,69 | 1,80 | 0,180 | 2,611 | 0,16 | 0,041 | 78,16 | 58,86 | 0,1932 | ZD | | | | |
| Z-012DI | | | | | 180,00 | 54,00 | 21,30 | 0,70 | 17,63 | 1,83 | 0,180 | 2,611 | 0,16 | 0,037 | 87,54 | 66,24 | 0,2166 | ZD | | | | |
| Z-012DX | | | | | 270,00 | 54,00 | 21,30 | 0,70 | 17,69 | 1,80 | 0,180 | 2,611 | 0,16 | 0,037 | 87,78 | 66,48 | 0,2174 | ZD | | | | |
| Z-012EI | 180,00 | 57,00 | 23,30 | 0,70 | 19,63 | 1,83 | 0,180 | 2,611 | 0,16 | 0,033 | 97,17 | 73,87 | 0,2409 | ZD | | | | | | | | |
| Z-012EX | 270,00 | 57,00 | 23,30 | 0,70 | 19,69 | 1,80 | 0,180 | 2,611 | 0,16 | 0,033 | 97,41 | 74,11 | 0,2416 | ZD | | | | | | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| Z-013I | 0,25 | 2,20 | 0,10 | 2,70 | 180,00 | 19,00 | 5,90 | 0,50 | 3,13 | 1,38 | 0,251 | 3,221 | 0,29 | 0,467 | 12,29 | 6,39 | 0,0319 | ZD | | | |
| Z-013X | | | | | 270,00 | 20,00 | 5,90 | 0,50 | 3,19 | 1,35 | 0,251 | 3,221 | 0,29 | 0,457 | 12,42 | 6,52 | 0,0325 | ZD | | | |
| Z-014I | | | | | 180,00 | 28,00 | 9,20 | 0,50 | 6,38 | 1,41 | 0,251 | 3,221 | 0,24 | 0,219 | 22,78 | 13,58 | 0,0627 | ZD | | | |
| Z-014X | | | | | 270,00 | 29,00 | 9,20 | 0,50 | 6,44 | 1,38 | 0,251 | 3,221 | 0,24 | 0,217 | 22,91 | 13,71 | 0,0633 | ZD | | | |
| Z-015I | | | | | 180,00 | 36,00 | 12,90 | 0,50 | 10,13 | 1,38 | 0,251 | 3,221 | 0,22 | 0,136 | 34,79 | 21,89 | 0,0981 | ZD | | | |
| Z-015X | | | | | 270,00 | 36,00 | 12,90 | 0,50 | 10,19 | 1,35 | 0,251 | 3,221 | 0,22 | 0,135 | 34,93 | 22,03 | 0,0988 | ZD | | | |
| Z-015AI | | | | | 180,00 | 39,00 | 14,70 | 0,50 | 11,88 | 1,41 | 0,251 | 3,221 | 0,21 | 0,115 | 40,47 | 25,77 | 0,1147 | ZD | | | |
| Z-015AX | | | | | 270,00 | 39,00 | 14,70 | 0,50 | 11,94 | 1,38 | 0,251 | 3,221 | 0,21 | 0,115 | 40,60 | 25,90 | 0,1153 | ZD | | | |
| Z-015BI | | | | | 180,00 | 42,00 | 16,40 | 0,60 | 13,63 | 1,38 | 0,251 | 3,221 | 0,21 | 0,100 | 46,04 | 29,64 | 0,1313 | ZD | | | |
| Z-015BX | | | | | 270,00 | 42,00 | 16,40 | 0,60 | 13,69 | 1,35 | 0,251 | 3,221 | 0,21 | 0,100 | 46,18 | 29,78 | 0,1319 | ZD | | | |
| Z-015CI | | | | | 180,00 | 45,00 | 18,40 | 0,60 | 15,63 | 1,38 | 0,251 | 3,221 | 0,21 | 0,087 | 52,48 | 34,08 | 0,1502 | ZD | | | |
| Z-015CX | | | | | 270,00 | 45,00 | 18,40 | 0,60 | 15,69 | 1,35 | 0,251 | 3,221 | 0,21 | 0,087 | 52,62 | 34,22 | 0,1508 | ZD | | | |
| Z-015DI | | | | | 180,00 | 48,00 | 20,40 | 0,60 | 17,63 | 1,38 | 0,251 | 3,221 | 0,21 | 0,077 | 58,91 | 38,51 | 0,1691 | ZD | | | |
| Z-015DX | | | | | 270,00 | 48,00 | 20,40 | 0,60 | 17,69 | 1,35 | 0,251 | 3,221 | 0,21 | 0,077 | 59,05 | 38,65 | 0,1697 | ZD | | | |
| Z-015EI | | | | | 180,00 | 51,00 | 22,40 | 0,60 | 19,63 | 1,38 | 0,251 | 3,221 | 0,20 | 0,069 | 65,34 | 42,94 | 0,1880 | ZD | | | |
| Z-015EX | | | | | 270,00 | 51,00 | 22,40 | 0,60 | 19,69 | 1,35 | 0,251 | 3,221 | 0,20 | 0,069 | 65,48 | 43,08 | 0,1886 | ZD | | | |
| Z-015FI | 0,32 | 5,50 | 0,30 | 6,30 | 180,00 | 23,00 | 10,00 | 0,60 | 2,08 | 3,96 | 0,081 | 2,711 | 0,37 | 0,140 | 28,85 | 18,85 | 0,0771 | ZD | | | |
| Z-015FX | | | | | 270,00 | 23,00 | 10,00 | 0,60 | 2,16 | 3,92 | 0,081 | 2,711 | 0,36 | 0,134 | 29,70 | 19,70 | 0,0797 | ZD | | | |
| Z-015GI | | | | | 180,00 | 29,00 | 11,30 | 0,60 | 3,36 | 3,97 | 0,081 | 2,711 | 0,29 | 0,081 | 43,86 | 32,56 | 0,1182 | ZD | | | |
| Z-015GX | | | | | 270,00 | 29,00 | 11,30 | 0,60 | 3,44 | 3,93 | 0,081 | 2,711 | 0,29 | 0,079 | 44,71 | 33,41 | 0,1208 | ZD | | | |
| Z-015HI | | | | | 180,00 | 36,00 | 13,20 | 0,60 | 5,28 | 3,96 | 0,081 | 2,711 | 0,25 | 0,050 | 66,31 | 53,11 | 0,1799 | ZD | | | |
| Z-015HX | | | | | 270,00 | 37,00 | 13,20 | 0,60 | 5,36 | 3,92 | 0,081 | 2,711 | 0,25 | 0,049 | 67,17 | 53,97 | 0,1825 | ZD | | | |
| Z-015JI | | | | | 180,00 | 46,00 | 16,10 | 0,70 | 8,16 | 3,97 | 0,081 | 2,711 | 0,22 | 0,031 | 100,05 | 83,95 | 0,2724 | ZE | | | |
| Z-015JX | | | | | 270,00 | 46,00 | 16,10 | 0,70 | 8,24 | 3,93 | 0,081 | 2,711 | 0,22 | 0,031 | 100,91 | 84,81 | 0,2749 | ZE | | | |
| Z-015KI | | | | | 180,00 | 58,00 | 20,90 | 0,70 | 12,96 | 3,97 | 0,081 | 2,711 | 0,21 | 0,019 | 156,25 | 135,35 | 0,4266 | ZE | | | |
| Z-015KX | | | | | 270,00 | 58,00 | 20,90 | 0,70 | 13,04 | 3,93 | 0,081 | 2,711 | 0,20 | 0,019 | 157,10 | 136,20 | 0,4291 | ZE | | | |
| Z-015LI | | | | | 180,00 | 71,00 | 27,30 | 0,90 | 19,36 | 3,97 | 0,081 | 2,711 | 0,19 | 0,013 | 231,18 | 203,88 | 0,6322 | ZE | | | |
| Z-015LX | | | | | 270,00 | 71,00 | 27,30 | 0,90 | 19,44 | 3,93 | 0,081 | 2,711 | 0,19 | 0,013 | 232,03 | 204,73 | 0,6347 | ZE | | | |
| Z-016I | | | | | 4,32 | 0,20 | 5,00 | 180,00 | 25,00 | 10,00 | 0,60 | 4,00 | 3,00 | 0,181 | 3,431 | 0,30 | 0,145 | 32,42 | 22,42 | 0,1072 | ZD |
| Z-016X | | | | | | | | 270,00 | 26,00 | 10,00 | 0,60 | 4,08 | 2,96 | 0,181 | 3,431 | 0,30 | 0,145 | 32,91 | 22,91 | 0,1092 | ZD |
| Z-017I | | | | | | | | 180,00 | 37,00 | 14,20 | 0,60 | 8,16 | 3,02 | 0,181 | 3,431 | 0,25 | 0,068 | 61,96 | 47,76 | 0,2104 | ZD |
| Z-017X | | | | | | | | 270,00 | 37,00 | 14,20 | 0,60 | 8,24 | 2,98 | 0,181 | 3,431 | 0,25 | 0,067 | 62,45 | 48,25 | 0,2124 | ZD |
| Z-018I | 180,00 | 47,00 | 19,00 | 0,70 | | | | 12,96 | 3,02 | 0,181 | 3,431 | 0,23 | 0,042 | 96,00 | 77,00 | 0,3295 | ZE | | | | |
| | | | | | | | | | | | | | | | | | | | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| RZ-013I | 0,25 | 2,20 | 0,10 | 2,70 | 180,00 | 19,00 | 5,90 | 0,50 | 3,13 | 1,38 | 0,201 | 2,551 | 0,28 | 0,400 | 11,76 | 5,86 | 0,0316 | ZG | | | |
| RZ-013X | | | | | 270,00 | 20,00 | 5,90 | 0,50 | 3,19 | 1,35 | 0,201 | 2,551 | 0,28 | 0,392 | 11,89 | 5,99 | 0,0321 | ZG | | | |
| RZ-014I | | | | | 180,00 | 28,00 | 9,20 | 0,50 | 6,38 | 1,41 | 0,201 | 2,551 | 0,23 | 0,188 | 21,69 | 12,49 | 0,0625 | ZG | | | |
| RZ-014X | | | | | 270,00 | 29,00 | 9,20 | 0,50 | 6,44 | 1,38 | 0,201 | 2,551 | 0,23 | 0,186 | 21,82 | 12,62 | 0,0630 | ZG | | | |
| RZ-015I | | | | | 180,00 | 36,00 | 12,90 | 0,50 | 10,13 | 1,38 | 0,201 | 2,551 | 0,21 | 0,117 | 33,04 | 20,14 | 0,0981 | ZG | | | |
| RZ-015X | | | | | 270,00 | 36,00 | 12,90 | 0,50 | 10,19 | 1,35 | 0,201 | 2,551 | 0,21 | 0,116 | 33,16 | 20,26 | 0,0987 | ZG | | | |
| RZ-015AI | | | | | 180,00 | 39,00 | 14,70 | 0,50 | 11,88 | 1,41 | 0,201 | 2,551 | 0,20 | 0,099 | 38,41 | 23,71 | 0,1148 | ZG | | | |
| RZ-015AX | | | | | 270,00 | 39,00 | 14,70 | 0,50 | 11,94 | 1,38 | 0,201 | 2,551 | 0,20 | 0,099 | 38,53 | 23,83 | 0,1153 | ZG | | | |
| RZ-015BI | | | | | 180,00 | 42,00 | 16,40 | 0,60 | 13,63 | 1,38 | 0,201 | 2,551 | 0,20 | 0,086 | 43,67 | 27,27 | 0,1314 | ZG | | | |
| RZ-015BX | | | | | 270,00 | 42,00 | 16,40 | 0,60 | 13,69 | 1,35 | 0,201 | 2,551 | 0,20 | 0,086 | 43,80 | 27,40 | 0,1320 | ZG | | | |
| RZ-015CI | | | | | 180,00 | 45,00 | 18,40 | 0,60 | 15,63 | 1,38 | 0,201 | 2,551 | 0,20 | 0,075 | 49,75 | 31,35 | 0,1504 | ZG | | | |
| RZ-015CX | | | | | 270,00 | 45,00 | 18,40 | 0,60 | 15,69 | 1,35 | 0,201 | 2,551 | 0,20 | 0,075 | 49,88 | 31,48 | 0,1510 | ZG | | | |
| RZ-015DI | | | | | 180,00 | 48,00 | 20,40 | 0,60 | 17,63 | 1,38 | 0,201 | 2,551 | 0,20 | 0,066 | 55,83 | 35,43 | 0,1695 | ZG | | | |
| RZ-015DX | | | | | 270,00 | 48,00 | 20,40 | 0,60 | 17,69 | 1,35 | 0,201 | 2,551 | 0,20 | 0,066 | 55,96 | 35,56 | 0,1700 | ZG | | | |
| RZ-015EI | | | | | 180,00 | 51,00 | 22,40 | 0,60 | 19,63 | 1,38 | 0,201 | 2,551 | 0,19 | 0,059 | 61,91 | 39,51 | 0,1885 | ZG | | | |
| RZ-015EX | 270,00 | 51,00 | 22,40 | 0,60 | 19,69 | 1,35 | 0,201 | 2,551 | 0,19 | 0,059 | 62,04 | 39,64 | 0,1891 | ZG | | | | | | | |
| RZ-015FI | 0,32 | 5,50 | 0,30 | 6,30 | 180,00 | 23,00 | 10,00 | 0,60 | 2,08 | 3,96 | 0,061 | 2,161 | 0,36 | 0,120 | 27,47 | 17,47 | 0,0750 | ZG | | | |
| RZ-015FX | | | | | 270,00 | 23,00 | 10,00 | 0,60 | 2,16 | 3,92 | 0,061 | 2,161 | 0,35 | 0,115 | 28,27 | 18,27 | 0,0776 | ZG | | | |
| RZ-015GI | | | | | 180,00 | 29,00 | 11,30 | 0,60 | 3,36 | 3,97 | 0,061 | 2,161 | 0,28 | 0,069 | 41,48 | 30,18 | 0,1164 | ZG | | | |
| RZ-015GX | | | | | 270,00 | 29,00 | 11,30 | 0,60 | 3,44 | 3,93 | 0,061 | 2,161 | 0,28 | 0,068 | 42,28 | 30,98 | 0,1190 | ZG | | | |
| RZ-015HI | | | | | 180,00 | 36,00 | 13,20 | 0,60 | 5,28 | 3,96 | 0,061 | 2,161 | 0,24 | 0,043 | 62,45 | 49,25 | 0,1785 | ZG | | | |
| RZ-015HX | | | | | 270,00 | 37,00 | 13,20 | 0,60 | 5,36 | 3,92 | 0,061 | 2,161 | 0,24 | 0,042 | 63,24 | 50,04 | 0,1811 | ZG | | | |
| RZ-015JI | | | | | 180,00 | 46,00 | 16,10 | 0,70 | 8,16 | 3,97 | 0,061 | 2,161 | 0,22 | 0,027 | 93,94 | 77,84 | 0,2717 | ZH | | | |
| RZ-015JX | | | | | 270,00 | 46,00 | 16,10 | 0,70 | 8,24 | 3,93 | 0,061 | 2,161 | 0,22 | 0,027 | 94,73 | 78,63 | 0,2742 | ZH | | | |
| RZ-015KI | | | | | 180,00 | 58,00 | 20,90 | 0,70 | 12,96 | 3,97 | 0,061 | 2,161 | 0,20 | 0,017 | 146,40 | 125,50 | 0,4269 | ZH | | | |
| RZ-015KX | | | | | 270,00 | 58,00 | 20,90 | 0,70 | 13,04 | 3,93 | 0,061 | 2,161 | 0,20 | 0,017 | 147,19 | 126,29 | 0,4295 | ZH | | | |
| RZ-015LI | | | | | 180,00 | 71,00 | 27,30 | 0,90 | 19,36 | 3,97 | 0,061 | 2,161 | 0,19 | 0,011 | 216,34 | 189,04 | 0,6339 | ZH | | | |
| RZ-015LX | | | | | 270,00 | 71,00 | 27,30 | 0,90 | 19,44 | 3,93 | 0,061 | 2,161 | 0,19 | 0,011 | 217,13 | 189,83 | 0,6364 | ZH | | | |
| RZ-016I | | | | | 4,32 | 0,20 | 5,00 | 180,00 | 25,00 | 10,00 | 0,60 | 4,00 | 3,00 | 0,141 | 2,731 | 0,29 | 0,125 | 30,78 | 20,78 | 0,1059 | ZG |
| RZ-016X | | | | | | | | 270,00 | 26,00 | 10,00 | 0,60 | 4,08 | 2,96 | 0,141 | 2,731 | 0,29 | 0,122 | 31,23 | 21,23 | 0,1079 | ZG |
| RZ-017I | | | | | | | | 180,00 | 37,00 | 14,20 | 0,60 | 8,16 | 3,02 | 0,141 | 2,731 | 0,24 | 0,059 | 58,46 | 44,26 | 0,2098 | ZG |
| RZ-017X | 270,00 | 37,00 | 14,20 | 0,60 | | | | 8,24 | 2,98 | 0,141 | 2,731 | 0,24 | 0,058 | 58,91 | 44,71 | 0,2118 | ZG | | | | |
| RZ-018I | 180,00 | 47,00 | 19,00 | 0,70 | | | | 12,96 | 3,02 | 0,141 | 2,731 | 0,22 | 0,036 | 90,36 | 71,36 | 0,3296 | ZH | | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-018X | 0,32 | 4,32 | 0,20 | 5,00 | 270,00 | 47,00 | 19,00 | 0,70 | 13,04 | 2,98 | 0,141 | 2,731 | 0,22 | 0,036 | 90,81 | 71,81 | 0,3316 | ZH | | |
| RZ-018AI | | | | | 180,00 | 55,00 | 23,50 | 0,70 | 17,44 | 3,03 | 0,141 | 2,731 | 0,21 | 0,027 | 120,15 | 96,65 | 0,4415 | ZH | | |
| RZ-018AX | | | | | 270,00 | 55,00 | 23,50 | 0,70 | 17,52 | 2,99 | 0,141 | 2,731 | 0,21 | 0,027 | 120,61 | 97,11 | 0,4435 | ZH | | |
| RZ-019I | 3,52 | 0,20 | 4,20 | 180,00 | 22,00 | 8,70 | 0,60 | 4,00 | 2,35 | 0,181 | 3,331 | 0,33 | 0,243 | 21,62 | 12,92 | 0,0847 | ZG | | | |
| RZ-019X | | | | 270,00 | 22,00 | 8,70 | 0,60 | 4,08 | 2,31 | 0,181 | 3,331 | 0,33 | 0,238 | 21,90 | 13,20 | 0,0863 | ZG | | | |
| RZ-020I | | | | 180,00 | 32,00 | 12,90 | 0,60 | 8,16 | 2,37 | 0,181 | 3,331 | 0,27 | 0,114 | 40,43 | 27,53 | 0,1678 | ZG | | | |
| RZ-020X | | | | 270,00 | 32,00 | 12,90 | 0,60 | 8,24 | 2,33 | 0,181 | 3,331 | 0,27 | 0,113 | 40,71 | 27,81 | 0,1694 | ZG | | | |
| RZ-021I | | | | 180,00 | 41,00 | 17,70 | 0,70 | 12,96 | 2,37 | 0,181 | 3,331 | 0,25 | 0,071 | 62,09 | 44,39 | 0,2637 | ZG | | | |
| RZ-021X | | | | 270,00 | 41,00 | 17,70 | 0,70 | 13,04 | 2,33 | 0,181 | 3,331 | 0,25 | 0,070 | 62,37 | 44,67 | 0,2653 | ZG | | | |
| RZ-021AI | | | | 180,00 | 44,00 | 20,00 | 0,70 | 15,20 | 2,40 | 0,181 | 3,331 | 0,24 | 0,060 | 72,26 | 52,26 | 0,3085 | ZG | | | |
| RZ-021AX | | | | 270,00 | 44,00 | 20,00 | 0,70 | 15,28 | 2,36 | 0,181 | 3,331 | 0,24 | 0,060 | 72,54 | 52,54 | 0,3101 | ZG | | | |
| RZ-021BI | | | | 180,00 | 47,00 | 21,90 | 0,37 | 17,12 | 2,39 | 0,181 | 3,331 | 0,24 | 0,053 | 80,90 | 59,00 | 0,3468 | ZG | | | |
| RZ-021BX | | | | 270,00 | 47,00 | 21,90 | 0,70 | 17,20 | 2,35 | 0,181 | 3,331 | 0,24 | 0,053 | 81,30 | 59,40 | 0,3484 | ZG | | | |
| RZ-021CI | | | | 180,00 | 51,00 | 24,80 | 0,70 | 20,00 | 2,40 | 0,181 | 3,331 | 0,23 | 0,046 | 93,91 | 69,11 | 0,4044 | ZG | | | |
| RZ-021CX | | | | 270,00 | 51,00 | 24,80 | 0,70 | 20,08 | 2,36 | 0,181 | 3,331 | 0,23 | 0,045 | 94,19 | 69,39 | 0,4060 | ZG | | | |
| RZ-021DI | | | | 180,00 | 54,00 | 27,30 | 0,90 | 22,56 | 2,37 | 0,181 | 3,331 | 0,23 | 0,040 | 105,40 | 78,10 | 0,4555 | ZG | | | |
| RZ-021DX | | | | 270,00 | 54,00 | 27,30 | 0,90 | 22,64 | 2,33 | 0,181 | 3,331 | 0,23 | 0,040 | 105,68 | 78,38 | 0,4571 | ZG | | | |
| RZ-021EI | | | | 180,00 | 57,00 | 29,90 | 0,90 | 25,12 | 2,39 | 0,181 | 3,331 | 0,23 | 0,036 | 116,99 | 87,09 | 0,5066 | ZH | | | |
| RZ-021EX | | | | 270,00 | 57,00 | 29,90 | 0,90 | 25,20 | 2,35 | 0,181 | 3,331 | 0,23 | 0,036 | 117,27 | 87,37 | 0,5082 | ZH | | | |
| RZ-022I | | | | 2,82 | 0,10 | 3,40 | 180,00 | 19,00 | 7,60 | 0,50 | 4,00 | 1,80 | 0,251 | 4,111 | 0,43 | 0,511 | 15,15 | 7,55 | 0,0662 | ZG |
| RZ-022X | | | | | | | 270,00 | 20,00 | 7,60 | 0,50 | 4,08 | 1,76 | 0,251 | 4,111 | 0,43 | 0,500 | 15,32 | 7,72 | 0,0674 | ZG |
| RZ-023I | | | | | | | 180,00 | 28,00 | 11,80 | 0,50 | 8,16 | 1,82 | 0,251 | 4,111 | 0,35 | 0,240 | 27,89 | 16,09 | 0,1311 | ZG |
| RZ-023X | | | | | | | 270,00 | 29,00 | 11,80 | 0,50 | 8,24 | 1,78 | 0,251 | 4,111 | 0,35 | 0,237 | 28,06 | 16,26 | 0,1324 | ZG |
| RZ-024I | 180,00 | 36,00 | 16,60 | | | | 0,60 | 12,96 | 1,82 | 0,251 | 4,111 | 0,32 | 0,149 | 42,55 | 25,95 | 0,2060 | ZG | | | |
| RZ-024X | 270,00 | 36,00 | 16,60 | | | | 0,60 | 13,04 | 1,78 | 0,251 | 4,111 | 0,32 | 0,148 | 42,71 | 26,11 | 0,2073 | ZG | | | |
| RZ-024AI | 180,00 | 39,00 | 18,90 | | | | 0,60 | 15,20 | 1,85 | 0,251 | 4,111 | 0,31 | 0,126 | 49,45 | 30,55 | 0,2410 | ZG | | | |
| RZ-024AX | 270,00 | 39,00 | 18,90 | | | | 0,60 | 15,28 | 1,81 | 0,251 | 4,111 | 0,31 | 0,126 | 49,61 | 30,71 | 0,2422 | ZG | | | |
| RZ-024BI | 180,00 | 42,00 | 21,10 | | | | 0,60 | 17,44 | 1,83 | 0,251 | 4,111 | 0,31 | 0,110 | 56,24 | 35,14 | 0,2760 | ZG | | | |
| RZ-024BX | 270,00 | 42,00 | 21,10 | | | | 0,60 | 17,52 | 1,79 | 0,251 | 4,111 | 0,31 | 0,109 | 56,41 | 35,31 | 0,2772 | ZG | | | |
| RZ-024CI | 180,00 | 45,00 | 23,70 | | | | 0,60 | 20,00 | 1,85 | 0,251 | 4,111 | 0,30 | 0,095 | 64,10 | 40,40 | 0,3159 | ZG | | | |
| RZ-024CX | 270,00 | 45,00 | 23,70 | | | | 0,60 | 20,08 | 1,81 | 0,251 | 4,111 | 0,30 | 0,095 | 64,26 | 40,56 | 0,3172 | ZG | | | |
| RZ-024DI | 180,00 | 48,00 | 26,20 | | | | 0,80 | 22,56 | 1,82 | 0,251 | 4,111 | 0,30 | 0,084 | 71,85 | 45,65 | 0,3559 | ZH | | | |
| RZ-024DX | 270,00 | 48,00 | 26,20 | | | | 0,80 | 22,64 | 1,78 | 0,251 | 4,111 | 0,30 | 0,084 | 72,02 | 45,82 | 0,3571 | ZH | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-018X | 0,32 | 4,32 | 0,20 | 5,00 | 270,00 | 47,00 | 19,00 | 0,70 | 13,04 | 2,98 | 0,181 | 3,431 | 0,23 | 0,042 | 96,49 | 77,49 | 0,3315 | ZE | | |
| Z-018AI | | | | | 180,00 | 55,00 | 23,50 | 0,70 | 17,44 | 3,03 | 0,181 | 3,431 | 0,22 | 0,031 | 127,79 | 104,29 | 0,4407 | ZE | | |
| Z-018AX | | | | | 270,00 | 55,00 | 23,50 | 0,70 | 17,52 | 2,99 | 0,181 | 3,431 | 0,22 | 0,031 | 128,28 | 104,78 | 0,4426 | ZE | | |
| Z-019I | 3,52 | 0,20 | 4,20 | 180,00 | 22,00 | 8,70 | 0,60 | 4,00 | 2,35 | 0,221 | 4,191 | 0,34 | 0,283 | 22,68 | 13,98 | 0,0858 | ZD | | | |
| Z-019X | | | | 270,00 | 22,00 | 8,70 | 0,60 | 4,08 | 2,31 | 0,221 | 4,191 | 0,34 | 0,277 | 22,99 | 14,29 | 0,0874 | ZD | | | |
| Z-020I | | | | 180,00 | 32,00 | 12,90 | 0,60 | 8,16 | 2,37 | 0,221 | 4,191 | 0,28 | 0,133 | 42,69 | 29,79 | 0,1684 | ZD | | | |
| Z-020X | | | | 270,00 | 32,00 | 12,90 | 0,60 | 8,24 | 2,33 | 0,221 | 4,191 | 0,28 | 0,132 | 43,00 | 30,10 | 0,1700 | ZD | | | |
| Z-021I | | | | 180,00 | 41,00 | 17,70 | 0,70 | 12,96 | 2,37 | 0,221 | 4,191 | 0,26 | 0,083 | 65,73 | 48,03 | 0,2637 | ZD | | | |
| Z-021X | | | | 270,00 | 41,00 | 17,70 | 0,70 | 13,04 | 2,33 | 0,221 | 4,191 | 0,26 | 0,082 | 66,04 | 48,34 | 0,2653 | ZD | | | |
| Z-021AI | | | | 180,00 | 44,00 | 20,00 | 0,70 | 15,20 | 2,40 | 0,221 | 4,191 | 0,25 | 0,070 | 76,54 | 56,54 | 0,3082 | ZD | | | |
| Z-021AX | | | | 270,00 | 44,00 | 20,00 | 0,70 | 15,28 | 2,36 | 0,221 | 4,191 | 0,25 | 0,070 | 76,85 | 56,85 | 0,3098 | ZD | | | |
| Z-021BI | | | | 180,00 | 47,00 | 21,90 | 0,37 | 17,12 | 2,39 | 0,221 | 4,191 | 0,25 | 0,062 | 85,74 | 63,84 | 0,3464 | ZD | | | |
| Z-021BX | | | | 270,00 | 47,00 | 21,90 | 0,70 | 17,20 | 2,35 | 0,221 | 4,191 | 0,25 | 0,062 | 86,04 | 64,14 | 0,3479 | ZD | | | |
| Z-021CI | | | | 180,00 | 51,00 | 24,80 | 0,70 | 20,00 | 2,40 | 0,221 | 4,191 | 0,25 | 0,053 | 99,58 | 74,78 | 0,4035 | ZD | | | |
| Z-021CX | | | | 270,00 | 51,00 | 24,80 | 0,70 | 20,08 | 2,36 | 0,221 | 4,191 | 0,25 | 0,053 | 99,89 | 75,09 | 0,4051 | ZD | | | |
| Z-021DI | | | | 180,00 | 54,00 | 27,30 | 0,90 | 22,56 | 2,37 | 0,221 | 4,191 | 0,24 | 0,047 | 111,81 | 84,51 | 0,4544 | ZD | | | |
| Z-021DX | | | | 270,00 | 54,00 | 27,30 | 0,90 | 22,64 | 2,33 | 0,221 | 4,191 | 0,24 | 0,047 | 112,20 | 84,90 | 0,4560 | ZD | | | |
| Z-021EI | | | | 180,00 | 57,00 | 29,90 | 0,90 | 25,12 | 2,39 | 0,221 | 4,191 | 0,24 | 0,042 | 124,30 | 94,40 | 0,5052 | ZE | | | |
| Z-021EX | | | | 270,00 | 57,00 | 29,90 | 0,90 | 25,20 | 2,35 | 0,221 | 4,191 | 0,24 | 0,042 | 124,44 | 94,54 | 0,5069 | ZE | | | |
| Z-022I | | | | 2,82 | 0,10 | 3,40 | 180,00 | 19,00 | 7,60 | 0,50 | 4,00 | 1,80 | 0,311 | 5,171 | 0,45 | 0,594 | 15,77 | 8,17 | 0,0670 | ZD |
| Z-022X | | | | | | | 270,00 | 20,00 | 7,60 | 0,50 | 4,08 | 1,76 | 0,311 | 5,171 | 0,44 | 0,582 | 15,95 | 8,35 | 0,0683 | ZD |
| Z-023I | | | | | | | 180,00 | 28,00 | 11,80 | 0,50 | 8,16 | 1,82 | 0,311 | 5,171 | 0,37 | 0,279 | 29,20 | 17,40 | 0,1316 | ZD |
| Z-023X | | | | | | | 270,00 | 29,00 | 11,80 | 0,50 | 8,24 | 1,78 | 0,311 | 5,171 | 0,37 | 0,276 | 29,38 | 17,58 | 0,1329 | ZD |
| Z-024I | 180,00 | 36,00 | 16,60 | | | | 0,60 | 12,96 | 1,82 | 0,311 | 5,171 | 0,34 | 0,173 | 44,66 | 28,06 | 0,2062 | ZD | | | |
| Z-024X | 270,00 | 36,00 | 16,60 | | | | 0,60 | 13,04 | 1,78 | 0,311 | 5,171 | 0,34 | 0,173 | 44,83 | 28,23 | 0,2074 | ZD | | | |
| Z-024AI | 180,00 | 39,00 | 18,90 | | | | 0,60 | 15,20 | 1,85 | 0,311 | 5,171 | 0,33 | 0,147 | 51,93 | 33,03 | 0,2410 | ZD | | | |
| Z-024AX | 270,00 | 39,00 | 18,90 | | | | 0,60 | 15,28 | 1,81 | 0,311 | 5,171 | 0,33 | 0,146 | 52,11 | 33,21 | 0,2422 | ZD | | | |
| Z-024BI | 180,00 | 42,00 | 21,10 | | | | 0,60 | 17,44 | 1,83 | 0,311 | 5,171 | 0,32 | 0,128 | 59,10 | 38,00 | 0,2758 | ZD | | | |
| Z-024BX | 270,00 | 42,00 | 21,10 | | | | 0,60 | 17,52 | 1,79 | 0,311 | 5,171 | 0,32 | 0,127 | 59,28 | 38,18 | 0,2770 | ZD | | | |
| Z-024CI | 180,00 | 45,00 | 23,70 | | | | 0,60 | 20,00 | 1,85 | 0,311 | 5,171 | 0,32 | 0,111 | 67,38 | 43,68 | 0,3155 | ZD | | | |
| Z-024CX | 270,00 | 45,00 | 23,70 | | | | 0,60 | 20,08 | 1,81 | 0,311 | 5,171 | 0,32 | 0,111 | 67,56 | 43,86 | 0,3167 | ZD | | | |
| Z-024DI | 180,00 | 48,00 | 26,20 | | | | 0,80 | 22,56 | 1,82 | 0,311 | 5,171 | 0,32 | 0,098 | 75,57 | 49,37 | 0,3553 | ZE | | | |
| Z-024DX | 270,00 | 48,00 | 26,20 | | | | 0,80 | 22,64 | 1,78 | 0,311 | 5,171 | 0,32 | 0,098 | 75,74 | 49,54 | 0,3565 | ZE | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|--------|----|
| Z-024EI | 0,32 | 2,82 | 0,10 | 3,40 | 180,00 | 51,00 | 28,80 | 0,80 | 25,12 | 1,84 | 0,311 | 5,171 | 0,31 | 0,088 | 83,85 | 55,05 | 0,3950 | ZE | | | | |
| Z-024EX | | | | | 270,00 | 51,00 | 28,80 | 0,80 | 25,20 | 1,80 | 0,311 | 5,171 | 0,31 | 0,088 | 84,03 | 55,23 | 0,3962 | ZE | | | | |
| Z-024FI | 0,32 | 2,20 | 0,10 | 2,80 | 180,00 | 13,00 | 4,70 | 0,50 | 2,08 | 1,31 | 0,441 | 6,491 | 0,97 | 2,923 | 6,77 | 2,07 | 0,0280 | ZD | | | | |
| Z-024FX | | | | | 270,00 | 14,00 | 4,70 | 0,50 | 2,16 | 1,27 | 0,441 | 6,491 | 0,94 | 2,796 | 6,87 | 2,17 | 0,0290 | ZD | | | | |
| Z-024GI | | | | | 180,00 | 17,00 | 6,00 | 0,50 | 3,36 | 1,32 | 0,441 | 6,491 | 0,76 | 1,692 | 9,58 | 3,58 | 0,0430 | ZD | | | | |
| Z-024GX | | | | | 270,00 | 17,00 | 6,00 | 0,50 | 3,44 | 1,28 | 0,441 | 6,491 | 0,76 | 1,649 | 9,68 | 3,68 | 0,0439 | ZD | | | | |
| Z-024HI | | | | | 180,00 | 22,00 | 7,90 | 0,50 | 5,28 | 1,31 | 0,441 | 6,491 | 0,65 | 1,037 | 13,74 | 5,84 | 0,0655 | ZD | | | | |
| Z-024HX | | | | | 270,00 | 22,00 | 7,90 | 0,50 | 5,36 | 1,27 | 0,441 | 6,491 | 0,65 | 1,021 | 13,84 | 5,94 | 0,0664 | ZD | | | | |
| Z-024JI | | | | | 180,00 | 27,00 | 10,80 | 0,50 | 8,16 | 1,32 | 0,441 | 6,491 | 0,58 | 0,656 | 20,04 | 9,24 | 0,0991 | ZD | | | | |
| Z-024JX | | | | | 270,00 | 27,00 | 10,80 | 0,50 | 8,24 | 1,28 | 0,441 | 6,491 | 0,58 | 0,650 | 20,13 | 9,33 | 0,1001 | ZD | | | | |
| Z-024KI | | | | | 180,00 | 34,00 | 15,60 | 0,50 | 12,96 | 1,32 | 0,441 | 6,491 | 0,53 | 0,407 | 30,49 | 14,89 | 0,1553 | ZD | | | | |
| Z-024KX | | | | | 270,00 | 34,00 | 15,60 | 0,50 | 13,04 | 1,28 | 0,441 | 6,491 | 0,53 | 0,404 | 30,59 | 14,99 | 0,1562 | ZD | | | | |
| Z-024LI | | | | | 180,00 | 42,00 | 22,00 | 0,60 | 19,36 | 1,32 | 0,441 | 6,491 | 0,50 | 0,270 | 44,44 | 22,44 | 0,2301 | ZD | | | | |
| Z-024LX | | | | | 270,00 | 42,00 | 22,00 | 0,60 | 19,44 | 1,28 | 0,441 | 6,491 | 0,50 | 0,269 | 44,53 | 22,53 | 0,2311 | ZD | | | | |
| Z-024MI | | | | | 0,36 | 6,00 | 0,30 | 6,90 | 180,00 | 22,00 | 11,00 | 0,60 | 2,34 | 4,33 | 0,161 | 3,501 | 0,46 | 0,173 | 30,23 | 19,23 | 0,1062 | ZD |
| Z-024MX | | | | | | | | | 270,00 | 22,00 | 11,00 | 0,60 | 2,43 | 4,28 | 0,161 | 3,501 | 0,45 | 0,166 | 31,10 | 20,10 | 0,1098 | ZD |
| Z-024NI | 180,00 | 28,00 | 12,40 | 0,60 | | | | | 3,78 | 4,31 | 0,161 | 3,501 | 0,36 | 0,100 | 45,61 | 33,21 | 0,1628 | ZD | | | | |
| Z-024NX | 270,00 | 28,00 | 12,40 | 0,60 | | | | | 3,87 | 4,26 | 0,161 | 3,501 | 0,36 | 0,098 | 46,49 | 34,09 | 0,1664 | ZD | | | | |
| Z-024OI | 180,00 | 35,00 | 14,60 | 0,60 | | | | | 5,94 | 4,33 | 0,161 | 3,501 | 0,31 | 0,062 | 68,79 | 54,19 | 0,2479 | ZD | | | | |
| Z-024OX | 270,00 | 36,00 | 14,60 | 0,60 | | | | | 6,03 | 4,28 | 0,161 | 3,501 | 0,31 | 0,061 | 69,76 | 55,16 | 0,2514 | ZD | | | | |
| Z-024PI | 180,00 | 44,00 | 17,80 | 0,70 | | | | | 9,18 | 4,31 | 0,161 | 3,501 | 0,28 | 0,039 | 103,46 | 85,66 | 0,3754 | ZE | | | | |
| Z-024PX | 270,00 | 45,00 | 17,80 | 0,70 | | | | | 9,27 | 4,26 | 0,161 | 3,501 | 0,28 | 0,039 | 104,33 | 86,53 | 0,3789 | ZE | | | | |
| Z-024QI | 180,00 | 56,00 | 23,20 | 0,70 | | | | | 14,58 | 4,31 | 0,161 | 3,501 | 0,26 | 0,024 | 161,50 | 138,30 | 0,5878 | ZE | | | | |
| Z-024QX | 270,00 | 57,00 | 23,20 | 0,70 | | | | | 14,67 | 4,26 | 0,161 | 3,501 | 0,25 | 0,024 | 162,40 | 139,20 | 0,5914 | ZE | | | | |
| Z-024RI | 180,00 | 69,00 | 30,40 | 0,90 | | | | | 21,78 | 4,31 | 0,161 | 3,501 | 0,24 | 0,016 | 238,80 | 208,40 | 0,8711 | ZE | | | | |
| Z-024RX | 270,00 | 69,00 | 30,40 | 0,90 | | | | | 21,87 | 4,26 | 0,161 | 3,501 | 0,24 | 0,016 | 239,60 | 209,20 | 0,8747 | ZE | | | | |
| Z-024SI | 4,00 | 0,20 | 4,80 | 180,00 | | | | | 16,00 | 7,70 | 0,60 | 2,34 | 2,68 | 0,241 | 5,181 | 0,56 | 0,645 | 15,36 | 7,66 | 0,0667 | ZD | |
| Z-024SX | | | | 270,00 | | | | | 16,00 | 7,70 | 0,60 | 2,43 | 2,63 | 0,241 | 5,181 | 0,56 | 0,617 | 15,70 | 8,00 | 0,0709 | ZD | |
| Z-024TI | | | | 180,00 | | | | | 20,00 | 9,20 | 0,60 | 3,78 | 2,71 | 0,241 | 5,181 | 0,44 | 0,373 | 22,42 | 13,22 | 0,1052 | ZD | |
| Z-024TX | | | | 270,00 | | | | | 20,00 | 9,20 | 0,60 | 3,87 | 2,66 | 0,241 | 5,181 | 0,44 | 0,364 | 22,77 | 13,57 | 0,1075 | ZD | |
| Z-024UI | | | | 180,00 | | | | | 26,00 | 11,40 | 0,60 | 5,94 | 2,73 | 0,241 | 5,181 | 0,38 | 0,229 | 32,97 | 21,57 | 0,1600 | ZE | |
| Z-024UX | | | | 270,00 | | | | | 26,00 | 11,40 | 0,60 | 6,03 | 2,68 | 0,241 | 5,181 | 0,38 | 0,225 | 33,32 | 21,92 | 0,1624 | ZE | |
| Z-024VI | | | | 180,00 | | | | | 32,00 | 14,60 | 0,60 | 9,18 | 2,71 | 0,241 | 5,181 | 0,34 | 0,145 | 48,70 | 34,10 | 0,2424 | ZE | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|--------|--------|----|
| RZ-024EI | 0,32 | 2,82 | 0,10 | 3,40 | 180,00 | 51,00 | 28,80 | 0,80 | 25,12 | 1,84 | 0,251 | 4,111 | 0,30 | 0,076 | 79,71 | 50,91 | 0,3958 | ZH | | | | |
| RZ-024EX | | | | | 270,00 | 51,00 | 28,80 | 0,80 | 25,20 | 1,80 | 0,251 | 4,111 | 0,30 | 0,076 | 79,87 | 51,07 | 0,3971 | ZH | | | | |
| RZ-024FI | 2,20 | 0,10 | 2,80 | 2,80 | 180,00 | 13,00 | 4,70 | 0,50 | 2,08 | 1,31 | 0,351 | 5,171 | 0,95 | 2,511 | 6,62 | 1,92 | 0,0272 | ZG | | | | |
| RZ-024FX | | | | | 270,00 | 14,00 | 4,70 | 0,50 | 2,16 | 1,27 | 0,351 | 5,171 | 0,93 | 2,401 | 6,71 | 2,01 | 0,0282 | ZG | | | | |
| RZ-024GI | | | | | 180,00 | 17,00 | 6,00 | 0,50 | 3,36 | 1,32 | 0,351 | 5,171 | 0,74 | 1,453 | 9,32 | 3,32 | 0,0423 | ZG | | | | |
| RZ-024GX | | | | | 270,00 | 17,00 | 6,00 | 0,50 | 3,44 | 1,28 | 0,351 | 5,171 | 0,74 | 1,416 | 9,40 | 3,40 | 0,0432 | ZZ | | | | |
| RZ-024HI | | | | | 180,00 | 22,00 | 7,90 | 0,50 | 5,28 | 1,31 | 0,351 | 5,171 | 0,63 | 0,891 | 13,31 | 5,41 | 0,0648 | ZG | | | | |
| RZ-024HX | | | | | 270,00 | 22,00 | 7,90 | 0,50 | 5,36 | 1,27 | 0,351 | 5,171 | 0,63 | 0,877 | 13,40 | 5,50 | 0,0657 | ZG | | | | |
| RZ-024JI | | | | | 180,00 | 27,00 | 10,80 | 0,50 | 8,16 | 1,32 | 0,351 | 5,171 | 0,56 | 0,564 | 19,35 | 8,55 | 0,0986 | ZG | | | | |
| RZ-024JX | | | | | 270,00 | 27,00 | 10,80 | 0,50 | 8,24 | 1,28 | 0,351 | 5,171 | 0,56 | 0,558 | 19,44 | 8,64 | 0,0995 | ZG | | | | |
| RZ-024KI | | | | | 180,00 | 34,00 | 15,60 | 0,50 | 12,96 | 1,32 | 0,351 | 5,171 | 0,51 | 0,350 | 29,39 | 13,79 | 0,1549 | ZG | | | | |
| RZ-024KX | | | | | 270,00 | 34,00 | 15,60 | 0,50 | 13,04 | 1,28 | 0,351 | 5,171 | 0,51 | 0,347 | 29,47 | 13,87 | 0,1559 | ZG | | | | |
| RZ-024LI | | | | | 180,00 | 42,00 | 22,00 | 0,60 | 19,36 | 1,32 | 0,351 | 5,171 | 0,48 | 0,232 | 42,77 | 20,77 | 0,2300 | ZG | | | | |
| RZ-024LX | | | | | 270,00 | 42,00 | 22,00 | 0,60 | 19,44 | 1,28 | 0,351 | 5,171 | 0,48 | 0,231 | 42,85 | 20,85 | 0,2310 | ZG | | | | |
| RZ-024MI | | | | | 0,36 | 6,00 | 0,30 | 6,90 | 180,00 | 22,00 | 11,00 | 0,60 | 2,34 | 4,33 | 0,131 | 2,791 | 0,45 | 0,149 | 28,84 | 17,84 | 0,1034 | ZG |
| RZ-024MX | | | | | | | | | 270,00 | 22,00 | 11,00 | 0,60 | 2,43 | 4,28 | 0,131 | 2,791 | 0,44 | 0,142 | 29,65 | 18,65 | 0,1070 | ZG |
| RZ-024NI | 180,00 | 28,00 | 12,40 | 0,60 | | | | | 3,78 | 4,31 | 0,131 | 2,791 | 0,35 | 0,086 | 43,21 | 30,81 | 0,1604 | ZG | | | | |
| RZ-024NX | 270,00 | 28,00 | 12,40 | 0,60 | | | | | 3,87 | 4,26 | 0,131 | 2,791 | 0,35 | 0,084 | 44,02 | 31,62 | 0,1640 | ZG | | | | |
| RZ-024OI | 180,00 | 35,00 | 14,60 | 0,60 | | | | | 5,94 | 4,33 | 0,131 | 2,791 | 0,30 | 0,053 | 64,87 | 50,27 | 0,2460 | ZG | | | | |
| RZ-024OX | 270,00 | 36,00 | 14,60 | 0,60 | | | | | 6,03 | 4,28 | 0,131 | 2,791 | 0,30 | 0,052 | 65,69 | 51,09 | 0,2496 | ZG | | | | |
| RZ-024PI | 180,00 | 44,00 | 17,80 | 0,70 | | | | | 9,18 | 4,31 | 0,131 | 2,791 | 0,27 | 0,033 | 97,27 | 79,47 | 0,3743 | ZH | | | | |
| RZ-024PX | 270,00 | 45,00 | 17,80 | 0,70 | | | | | 9,27 | 4,26 | 0,131 | 2,791 | 0,27 | 0,033 | 98,08 | 80,28 | 0,3779 | ZH | | | | |
| RZ-024QI | 180,00 | 56,00 | 23,20 | 0,70 | | | | | 14,58 | 4,31 | 0,131 | 2,791 | 0,24 | 0,021 | 151,32 | 128,12 | 0,5883 | ZE | | | | |
| RZ-024QX | 270,00 | 57,00 | 23,20 | 0,70 | | | | | 14,67 | 4,26 | 0,131 | 2,791 | 0,24 | 0,021 | 152,13 | 128,93 | 0,5918 | ZH | | | | |
| RZ-024RI | 180,00 | 69,00 | 30,40 | 0,90 | | | | | 21,78 | 4,31 | 0,131 | 2,791 | 0,23 | 0,014 | 223,39 | 192,99 | 0,8735 | ZH | | | | |
| RZ-024RX | 270,00 | 69,00 | 30,40 | 0,90 | | | | | 21,87 | 4,26 | 0,131 | 2,791 | 0,23 | 0,014 | 224,20 | 193,80 | 0,8770 | ZH | | | | |
| RZ-024SI | 4,00 | 0,20 | 4,80 | 180,00 | | | | | 16,00 | 7,70 | 0,60 | 2,34 | 2,68 | 0,191 | 4,131 | 0,53 | 0,554 | 14,81 | 7,11 | 0,0667 | ZG | |
| RZ-024SX | | | | 270,00 | | | | | 16,00 | 7,70 | 0,60 | 2,43 | 2,63 | 0,191 | 4,131 | 0,53 | 0,530 | 15,13 | 7,43 | 0,0690 | ZG | |
| RZ-024TI | | | | 180,00 | | | | | 20,00 | 9,20 | 0,60 | 3,78 | 2,71 | 0,191 | 4,131 | 0,43 | 0,321 | 21,48 | 12,28 | 0,1035 | ZG | |
| RZ-024TX | | | | 270,00 | | | | | 20,00 | 9,20 | 0,60 | 3,87 | 2,66 | 0,191 | 4,131 | 0,43 | 0,313 | 21,81 | 12,61 | 0,1058 | ZG | |
| RZ-024UI | | | | 180,00 | | | | | 26,00 | 11,40 | 0,60 | 5,94 | 2,73 | 0,191 | 4,131 | 0,36 | 0,197 | 31,44 | 20,04 | 0,1588 | ZH | |
| RZ-024UX | | | | 270,00 | | | | | 26,00 | 11,40 | 0,60 | 6,03 | 2,68 | 0,191 | 4,131 | 0,36 | 0,193 | 31,76 | 20,36 | 0,1611 | ZH | |
| RZ-024VI | | | | 180,00 | | | | | 32,00 | 14,60 | 0,60 | 9,18 | 2,71 | 0,191 | 4,131 | 0,33 | 0,124 | 46,28 | 31,68 | 0,2416 | ZH | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|--------|----|
| RZ-024VX | 0,36 | 4,00 | 0,20 | 4,80 | 270,00 | 32,00 | 14,60 | 0,60 | 9,27 | 2,66 | 0,191 | 4,131 | 0,33 | 0,123 | 46,60 | 32,00 | 0,2439 | ZH | | | |
| RZ-024WI | | | | | 180,00 | 41,00 | 20,00 | 0,70 | 14,58 | 2,71 | 0,191 | 4,131 | 0,30 | 0,077 | 71,07 | 51,07 | 0,3797 | ZH | | | |
| RZ-024WX | | | | | 270,00 | 41,00 | 20,00 | 0,70 | 14,67 | 2,66 | 0,191 | 4,131 | 0,30 | 0,077 | 71,40 | 51,40 | 0,3820 | ZH | | | |
| RZ-024XI | | | | | 180,00 | 50,00 | 27,20 | 0,90 | 21,78 | 2,71 | 0,191 | 4,131 | 0,29 | 0,051 | 104,13 | 76,93 | 0,5637 | ZH | | | |
| RZ-024XX | | | | | 270,00 | 50,00 | 27,20 | 0,90 | 21,87 | 2,66 | 0,191 | 4,131 | 0,29 | 0,051 | 104,46 | 77,26 | 0,5660 | ZH | | | |
| RZ-024YI | 2,50 | 0,10 | 3,20 | 180,00 | 13,00 | 5,30 | 0,50 | 2,34 | 1,48 | 0,611 | 6,421 | 1,14 | 2,727 | 7,43 | 2,13 | 0,0392 | ZG | | | | |
| RZ-024YX | | | | 270,00 | 14,00 | 5,30 | 0,50 | 2,43 | 1,43 | 0,611 | 6,421 | 1,11 | 2,608 | 7,53 | 2,23 | 0,0406 | ZG | | | | |
| RZ-024ZI | | | | 180,00 | 17,00 | 6,80 | 0,50 | 3,78 | 1,51 | 0,611 | 6,421 | 0,89 | 1,579 | 10,48 | 3,68 | 0,0609 | ZG | | | | |
| RZ-024ZX | | | | 270,00 | 17,00 | 6,80 | 0,50 | 3,87 | 1,46 | 0,611 | 6,421 | 0,88 | 1,538 | 10,58 | 3,78 | 0,0622 | ZG | | | | |
| RZ-024AAI | | | | 180,00 | 22,00 | 8,90 | 0,50 | 5,94 | 1,48 | 0,611 | 6,421 | 0,75 | 0,967 | 14,91 | 6,01 | 0,0933 | ZG | | | | |
| RZ-024AAX | | | | 270,00 | 22,00 | 8,90 | 0,50 | 6,03 | 1,43 | 0,611 | 6,421 | 0,75 | 0,952 | 15,00 | 6,10 | 0,0947 | ZG | | | | |
| RZ-024ABI | | | | 180,00 | 27,00 | 12,20 | 0,50 | 9,18 | 1,51 | 0,611 | 6,421 | 0,68 | 0,612 | 21,69 | 9,49 | 0,1420 | ZH | | | | |
| RZ-024ABX | | | | 270,00 | 27,00 | 12,20 | 0,50 | 9,27 | 1,46 | 0,611 | 6,421 | 0,67 | 0,606 | 21,79 | 9,59 | 0,1434 | ZH | | | | |
| RZ-024ACI | | | | 180,00 | 34,00 | 17,60 | 0,60 | 14,58 | 1,51 | 0,611 | 6,421 | 0,62 | 0,380 | 32,91 | 15,31 | 0,2232 | ZH | | | | |
| RZ-024ACX | | | | 270,00 | 35,00 | 17,60 | 0,60 | 14,67 | 1,46 | 0,611 | 6,421 | 0,62 | 0,377 | 33,00 | 15,40 | 0,2246 | ZH | | | | |
| RZ-024ADI | | | | 180,00 | 42,00 | 24,80 | 0,60 | 21,78 | 1,51 | 0,611 | 6,421 | 0,58 | 0,252 | 47,86 | 23,06 | 0,3314 | ZH | | | | |
| RZ-024ADX | | | | 270,00 | 42,00 | 24,80 | 0,60 | 21,87 | 1,46 | 0,611 | 6,421 | 0,58 | 0,251 | 47,95 | 23,15 | 0,3328 | ZH | | | | |
| RZ-024AEI | | | | 0,40 | 7,00 | 0,35 | 8,00 | 180,00 | 23,00 | 12,70 | 0,60 | 2,60 | 5,05 | 0,121 | 3,251 | 0,53 | 0,142 | 34,81 | 22,11 | 0,1494 | ZG |
| RZ-024AEX | | | | | | | | 270,00 | 23,00 | 12,70 | 0,60 | 2,70 | 5,00 | 0,121 | 3,251 | 0,51 | 0,136 | 35,82 | 23,12 | 0,1545 | ZG |
| RZ-024AFI | | | | | | | | 180,00 | 29,00 | 14,30 | 0,60 | 4,20 | 5,05 | 0,121 | 3,251 | 0,41 | 0,082 | 52,49 | 38,19 | 0,2318 | ZH |
| RZ-024AFX | 270,00 | 29,00 | 14,30 | | | | | 0,60 | 4,30 | 5,00 | 0,121 | 3,251 | 0,41 | 0,080 | 53,50 | 39,20 | 0,2369 | ZH | | | |
| RZ-024AGI | 180,00 | 37,00 | 16,70 | | | | | 0,70 | 6,60 | 5,05 | 0,121 | 3,251 | 0,35 | 0,050 | 79,01 | 62,31 | 0,3554 | ZH | | | |
| RZ-024AGX | 270,00 | 37,00 | 16,70 | | | | | 0,70 | 6,70 | 5,00 | 0,121 | 3,251 | 0,35 | 0,049 | 80,02 | 63,32 | 0,3605 | ZH | | | |
| RZ-024AHI | 180,00 | 47,00 | 20,30 | | | | | 0,70 | 10,20 | 5,05 | 0,121 | 3,251 | 0,32 | 0,032 | 118,80 | 98,50 | 0,5408 | ZH | | | |
| RZ-024AHX | 270,00 | 47,00 | 20,30 | | | | | 0,70 | 10,30 | 5,00 | 0,121 | 3,251 | 0,31 | 0,031 | 119,86 | 99,56 | 0,5460 | ZH | | | |
| RZ-024AJI | 180,00 | 59,00 | 26,30 | | | | | 0,90 | 16,20 | 5,05 | 0,121 | 3,251 | 0,29 | 0,020 | 185,10 | 158,80 | 0,8499 | ZH | | | |
| RZ-024AJX | 270,00 | 59,00 | 26,30 | | | | | 0,90 | 16,30 | 5,00 | 0,121 | 3,251 | 0,29 | 0,020 | 186,10 | 159,80 | 0,8550 | ZH | | | |
| RZ-024AKI | 180,00 | 73,00 | 34,30 | | | | | 0,90 | 24,20 | 5,05 | 0,121 | 3,251 | 0,27 | 0,013 | 273,50 | 239,20 | 1,2619 | ZJ | | | |
| RZ-024AKX | 270,00 | 73,00 | 34,30 | | | | | 0,90 | 24,30 | 5,00 | 0,121 | 3,251 | 0,27 | 0,013 | 274,51 | 240,21 | 1,2671 | ZJ | | | |
| RZ-025AI | 5,40 | 0,25 | 6,30 | | | | | 180,00 | 18,00 | 11,80 | 0,60 | 3,80 | 4,00 | 0,231 | 4,191 | 0,38 | 0,211 | 30,60 | 18,80 | 0,1600 | ZD |
| RZ-025AX | | | | | | | | 270,00 | 18,00 | 11,80 | 0,60 | 3,90 | 3,95 | 0,231 | 4,191 | 0,38 | 0,205 | 31,10 | 19,30 | 0,1639 | ZD |
| RZ-025I | | | | | | | | 180,00 | 25,00 | 12,50 | 0,60 | 5,00 | 3,75 | 0,231 | 4,191 | 0,43 | 0,156 | 37,91 | 25,41 | 0,2068 | ZD |
| RZ-025X | | | | 270,00 | 26,00 | 12,50 | 0,60 | 5,10 | 3,70 | 0,231 | 4,191 | 0,42 | 0,153 | 38,46 | 25,96 | 0,2107 | ZG | | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| Z-024VX | 0,36 | 4,00 | 0,20 | 4,80 | 270,00 | 32,00 | 14,60 | 0,60 | 9,27 | 2,66 | 0,241 | 5,181 | 0,34 | 0,143 | 49,05 | 34,45 | 0,2447 | ZE | | | |
| Z-024WI | | | | | 180,00 | 41,00 | 20,00 | 0,70 | 14,58 | 2,71 | 0,241 | 5,181 | 0,32 | 0,090 | 74,98 | 54,98 | 0,3796 | ZE | | | |
| Z-024WX | | | | | 270,00 | 41,00 | 20,00 | 0,70 | 14,67 | 2,66 | 0,241 | 5,181 | 0,32 | 0,089 | 75,33 | 55,33 | 0,3819 | ZE | | | |
| Z-024XI | | | | | 180,00 | 50,00 | 27,20 | 0,90 | 21,78 | 2,71 | 0,241 | 5,181 | 0,30 | 0,060 | 110,02 | 82,82 | 0,5626 | ZE | | | |
| Z-024XX | | | | | 270,00 | 50,00 | 27,20 | 0,90 | 21,87 | 2,66 | 0,241 | 5,181 | 0,30 | 0,059 | 110,37 | 83,17 | 0,5649 | ZE | | | |
| Z-024YI | 2,50 | 0,10 | 3,20 | 180,00 | 13,00 | 5,30 | 0,50 | 2,34 | 1,48 | 0,791 | 8,051 | 1,16 | 3,174 | 7,59 | 2,29 | 0,0404 | ZD | | | | |
| Z-024YX | | | | 270,00 | 14,00 | 5,30 | 0,50 | 2,43 | 1,43 | 0,791 | 8,051 | 1,13 | 3,036 | 7,69 | 2,39 | 0,0470 | ZD | | | | |
| Z-024ZI | | | | 180,00 | 17,00 | 6,80 | 0,50 | 3,78 | 1,51 | 0,791 | 8,051 | 0,92 | 1,838 | 10,75 | 3,95 | 0,0619 | ZD | | | | |
| Z-024ZX | | | | 270,00 | 17,00 | 6,80 | 0,50 | 3,87 | 1,46 | 0,791 | 8,051 | 0,91 | 1,791 | 10,85 | 4,05 | 0,0633 | ZD | | | | |
| Z-024AAI | | | | 180,00 | 22,00 | 8,90 | 0,50 | 5,94 | 1,48 | 0,791 | 8,051 | 0,78 | 1,126 | 15,35 | 6,45 | 0,0943 | ZD | | | | |
| Z-024AAX | | | | 270,00 | 22,00 | 8,90 | 0,50 | 6,03 | 1,43 | 0,791 | 8,051 | 0,78 | 1,109 | 15,45 | 6,55 | 0,0956 | ZD | | | | |
| Z-024ABI | | | | 180,00 | 27,00 | 12,20 | 0,50 | 9,18 | 1,51 | 0,791 | 8,051 | 0,70 | 0,713 | 22,39 | 10,19 | 0,1429 | ZE | | | | |
| Z-024ABX | | | | 270,00 | 27,00 | 12,20 | 0,50 | 9,27 | 1,46 | 0,791 | 8,051 | 0,70 | 0,705 | 22,49 | 10,29 | 0,1441 | ZE | | | | |
| Z-024ACI | | | | 180,00 | 34,00 | 17,60 | 0,60 | 14,58 | 1,51 | 0,791 | 8,051 | 0,64 | 0,442 | 34,03 | 16,43 | 0,2236 | ZE | | | | |
| Z-024ACX | | | | 270,00 | 35,00 | 17,60 | 0,60 | 14,67 | 1,46 | 0,791 | 8,051 | 0,64 | 0,439 | 34,13 | 16,53 | 0,2250 | ZE | | | | |
| Z-024ADI | | | | 180,00 | 42,00 | 24,80 | 0,60 | 21,78 | 1,51 | 0,791 | 8,051 | 0,61 | 0,293 | 49,54 | 24,74 | 0,3315 | ZE | | | | |
| Z-024ADX | | | | 270,00 | 42,00 | 24,80 | 0,60 | 21,87 | 1,46 | 0,791 | 8,051 | 0,61 | 0,292 | 49,65 | 24,85 | 0,3329 | ZE | | | | |
| Z-024AEI | | | | 0,40 | 7,00 | 0,35 | 8,00 | 180,00 | 23,00 | 12,70 | 0,60 | 2,60 | 5,05 | 0,161 | 4,061 | 0,54 | 0,165 | 36,37 | 23,67 | 0,1535 | ZD |
| Z-024AEX | | | | | | | | 270,00 | 23,00 | 12,70 | 0,60 | 2,70 | 5,00 | 0,161 | 4,061 | 0,53 | 0,158 | 37,45 | 24,75 | 0,1585 | ZD |
| Z-024AFI | | | | | | | | 180,00 | 29,00 | 14,30 | 0,60 | 4,20 | 5,05 | 0,161 | 4,061 | 0,43 | 0,095 | 55,18 | 40,88 | 0,2353 | ZE |
| Z-024AFX | 270,00 | 29,00 | 14,30 | | | | | 0,60 | 4,30 | 5,00 | 0,161 | 4,061 | 0,42 | 0,093 | 56,26 | 41,96 | 0,2404 | ZE | | | |
| Z-024AGI | 180,00 | 37,00 | 16,70 | | | | | 0,70 | 6,60 | 5,05 | 0,161 | 4,061 | 0,36 | 0,059 | 83,40 | 66,70 | 0,3581 | ZE | | | |
| Z-024AGX | 270,00 | 37,00 | 16,70 | | | | | 0,70 | 6,70 | 5,00 | 0,161 | 4,061 | 0,36 | 0,058 | 84,48 | 67,78 | 0,3632 | ZE | | | |
| Z-024AHI | 180,00 | 47,00 | 20,30 | | | | | 0,70 | 10,20 | 5,05 | 0,161 | 4,061 | 0,33 | 0,037 | 125,74 | 105,44 | 0,5423 | ZE | | | |
| Z-024AHX | 270,00 | 47,00 | 20,30 | | | | | 0,70 | 10,30 | 5,00 | 0,161 | 4,061 | 0,33 | 0,037 | 126,81 | 106,51 | 0,5474 | ZE | | | |
| Z-024AJI | 180,00 | 59,00 | 26,30 | | | | | 0,90 | 16,20 | 5,05 | 0,161 | 4,061 | 0,30 | 0,023 | 196,29 | 169,99 | 0,8492 | ZE | | | |
| Z-024AJX | 270,00 | 59,00 | 26,30 | | | | | 0,90 | 16,30 | 5,00 | 0,161 | 4,061 | 0,30 | 0,023 | 197,36 | 171,06 | 0,8543 | ZE | | | |
| Z-024AKI | 180,00 | 73,00 | 34,30 | | | | | 0,90 | 24,20 | 5,05 | 0,161 | 4,061 | 0,28 | 0,015 | 290,36 | 256,06 | 1,2580 | ZF | | | |
| Z-024AKX | 270,00 | 73,00 | 34,30 | | | | | 0,90 | 24,30 | 5,00 | 0,161 | 4,061 | 0,28 | 0,015 | 291,43 | 257,13 | 1,2630 | ZF | | | |
| Z-025AI | 5,40 | 0,25 | 6,30 | | | | | 180,00 | 18,00 | 11,80 | 0,60 | 3,80 | 4,00 | 0,291 | 5,231 | 0,38 | 0,245 | 31,90 | 20,10 | 0,1600 | ZD |
| Z-025AX | | | | | | | | 270,00 | 18,00 | 11,80 | 0,60 | 3,90 | 3,95 | 0,291 | 5,231 | 0,38 | 0,238 | 32,50 | 20,70 | 0,1630 | ZD |
| Z-025I | | | | | | | | 180,00 | 25,00 | 12,50 | 0,60 | 5,00 | 3,75 | 0,291 | 5,231 | 0,36 | 0,181 | 39,75 | 27,25 | 0,2093 | ZD |
| Z-025X | | | | 270,00 | 26,00 | 12,50 | 0,60 | 5,10 | 3,70 | 0,291 | 5,231 | 0,36 | 0,178 | 40,34 | 27,84 | 0,2132 | ZD | | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-026I | 0,40 | 5,40 | 0,25 | 6,30 | 180,00 | 37,00 | 17,70 | 0,70 | 10,20 | 3,75 | 0,291 | 5,231 | 0,37 | 0,085 | 75,76 | 58,06 | 0,4110 | ZD |
| Z-026X | | | | | 270,00 | 37,00 | 17,70 | 0,70 | 10,30 | 3,70 | 0,291 | 5,231 | 0,36 | 0,084 | 76,35 | 58,65 | 0,4148 | ZD |
| Z-027I | | | | | 180,00 | 47,00 | 23,70 | 0,70 | 16,20 | 3,75 | 0,291 | 5,231 | 0,34 | 0,053 | 117,30 | 93,60 | 0,6436 | ZE |
| Z-027X | | | | | 270,00 | 47,00 | 23,70 | 0,70 | 16,30 | 3,70 | 0,291 | 5,231 | 0,34 | 0,052 | 117,89 | 94,19 | 0,6474 | ZE |
| Z-027AI | | | | | 180,00 | 55,00 | 29,40 | 0,90 | 21,80 | 3,80 | 0,291 | 5,231 | 0,32 | 0,039 | 156,18 | 126,78 | 0,8607 | ZE |
| Z-027AX | | | | | 270,00 | 55,00 | 29,40 | 0,90 | 21,90 | 3,75 | 0,291 | 5,231 | 0,32 | 0,039 | 156,77 | 127,37 | 0,8645 | ZE |
| Z-027CI | | 4,40 | 0,20 | 5,20 | 180,00 | 17,00 | 9,90 | 0,60 | 3,80 | 3,05 | 0,341 | 6,381 | 0,43 | 0,479 | 22,50 | 12,60 | 0,1280 | ZD |
| Z-027CX | | | | | 270,00 | 17,00 | 9,90 | 0,60 | 3,90 | 3,00 | 0,341 | 6,381 | 0,43 | 0,466 | 22,87 | 12,97 | 0,1311 | ZD |
| Z-028I | | | | | 180,00 | 22,00 | 10,90 | 0,60 | 5,00 | 2,95 | 0,341 | 6,381 | 0,41 | 0,354 | 27,94 | 17,04 | 0,1675 | ZD |
| Z-028X | | | | | 270,00 | 22,00 | 10,90 | 0,60 | 5,10 | 2,90 | 0,341 | 6,381 | 0,41 | 0,347 | 28,31 | 17,41 | 0,1707 | ZD |
| Z-029I | | | | | 180,00 | 32,00 | 16,10 | 0,70 | 10,20 | 2,95 | 0,341 | 6,381 | 0,40 | 0,166 | 52,40 | 36,30 | 0,3289 | ZD |
| Z-029X | | | | | 270,00 | 32,00 | 16,10 | 0,70 | 10,30 | 2,90 | 0,341 | 6,381 | 0,40 | 0,165 | 52,77 | 36,67 | 0,3379 | ZD |
| Z-030I | | | | | 180,00 | 41,00 | 22,10 | 0,70 | 16,20 | 2,95 | 0,341 | 6,381 | 0,38 | 0,103 | 80,63 | 58,53 | 0,5150 | ZE |
| Z-030X | | | | | 270,00 | 41,00 | 22,10 | 0,70 | 16,30 | 2,90 | 0,341 | 6,381 | 0,38 | 0,103 | 81,00 | 58,90 | 0,5182 | ZE |
| Z-030AI | | | | | 180,00 | 44,00 | 25,00 | 0,70 | 19,00 | 3,00 | 0,341 | 6,381 | 0,37 | 0,088 | 93,90 | 68,90 | 0,6019 | ZE |
| Z-030AX | | | | | 270,00 | 44,00 | 25,00 | 0,70 | 19,10 | 2,95 | 0,341 | 6,381 | 0,37 | 0,087 | 94,27 | 69,27 | 0,6050 | ZE |
| Z-030BI | | | | | 180,00 | 47,00 | 27,80 | 0,90 | 21,80 | 3,00 | 0,341 | 6,381 | 0,37 | 0,076 | 107,07 | 79,27 | 0,6888 | ZE |
| Z-030BX | | | | | 270,00 | 47,00 | 27,80 | 0,90 | 21,90 | 2,95 | 0,341 | 6,381 | 0,37 | 0,076 | 107,44 | 79,64 | 0,6919 | ZE |
| Z-030CI | 180,00 | | | | 51,00 | 31,00 | 0,90 | 25,00 | 3,00 | 0,341 | 6,381 | 0,36 | 0,066 | 122,12 | 91,12 | 0,7881 | ZE | |
| Z-030CX | 270,00 | | | | 51,00 | 31,00 | 0,90 | 25,10 | 2,95 | 0,341 | 6,381 | 0,36 | 0,066 | 122,49 | 91,49 | 0,7912 | ZE | |
| Z-030DI | 180,00 | | | | 54,00 | 34,20 | 0,90 | 28,20 | 3,00 | 0,341 | 6,381 | 0,36 | 0,059 | 137,17 | 102,97 | 0,8874 | ZF | |
| Z-030DX | 270,00 | | | | 54,00 | 34,20 | 0,90 | 28,30 | 2,95 | 0,341 | 6,381 | 0,36 | 0,058 | 137,54 | 103,34 | 0,8905 | ZF | |
| Z-030EI | 180,00 | | | | 57,00 | 37,40 | 0,90 | 31,40 | 3,00 | 0,341 | 6,381 | 0,36 | 0,053 | 152,23 | 114,83 | 0,9867 | ZF | |
| Z-030EX | 270,00 | | | | 57,00 | 37,40 | 0,90 | 31,50 | 2,95 | 0,341 | 6,381 | 0,36 | 0,052 | 152,60 | 115,20 | 0,9898 | ZF | |
| Z-031I | 3,60 | 0,15 | 4,40 | 180,00 | 20,00 | 9,60 | 0,50 | 5,00 | 2,30 | 0,551 | 7,721 | 0,64 | 0,692 | 19,96 | 10,36 | 0,1341 | ZD | |
| Z-031X | | | | 270,00 | 20,00 | 9,60 | 0,50 | 5,10 | 2,25 | 0,551 | 7,721 | 0,63 | 0,677 | 20,18 | 10,58 | 0,1366 | ZD | |
| Z-032I | | | | 180,00 | 29,00 | 14,80 | 0,50 | 10,20 | 2,30 | 0,551 | 7,721 | 0,53 | 0,325 | 36,87 | 22,07 | 0,2633 | ZD | |
| Z-032X | | | | 270,00 | 29,00 | 14,80 | 0,50 | 10,30 | 2,25 | 0,551 | 7,721 | 0,53 | 0,322 | 37,10 | 22,30 | 0,2658 | ZD | |
| Z-033I | | | | 180,00 | 36,00 | 20,80 | 0,60 | 16,20 | 2,30 | 0,551 | 7,721 | 0,48 | 0,201 | 56,38 | 35,58 | 0,4123 | ZD | |
| Z-033X | | | | 270,00 | 36,00 | 20,80 | 0,60 | 16,30 | 2,25 | 0,551 | 7,721 | 0,48 | 0,200 | 56,61 | 35,81 | 0,4148 | ZD | |
| Z-033AI | | | | 180,00 | 39,00 | 23,70 | 0,60 | 19,00 | 2,35 | 0,551 | 7,721 | 0,47 | 0,171 | 65,59 | 41,89 | 0,4819 | ZE | |
| Z-033AX | | | | 270,00 | 39,00 | 23,70 | 0,60 | 19,10 | 2,30 | 0,551 | 7,721 | 0,47 | 0,170 | 65,81 | 42,11 | 0,4844 | ZE | |
| Z-033BI | | | | 180,00 | 42,00 | 26,50 | 0,80 | 21,80 | 2,35 | 0,551 | 7,721 | 0,46 | 0,149 | 74,70 | 48,20 | 0,5514 | ZE | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-026I | 0,40 | 5,40 | 0,25 | 6,30 | 180,00 | 37,00 | 17,70 | 0,70 | 10,20 | 3,75 | 0,231 | 4,191 | 0,35 | 0,073 | 71,83 | 54,13 | 0,4097 | ZG | | |
| RZ-026X | | | | | 270,00 | 37,00 | 17,70 | 0,70 | 10,30 | 3,70 | 0,231 | 4,191 | 0,35 | 0,072 | 72,38 | 54,68 | 0,4136 | ZG | | |
| RZ-027I | | | | | 180,00 | 47,00 | 23,70 | 0,70 | 16,20 | 3,75 | 0,231 | 4,191 | 0,32 | 0,045 | 110,96 | 87,26 | 0,6438 | ZH | | |
| RZ-027X | | | | | 270,00 | 47,00 | 23,70 | 0,70 | 16,30 | 3,70 | 0,231 | 4,191 | 0,32 | 0,045 | 111,52 | 87,82 | 0,6477 | ZH | | |
| RZ-027AI | | | | | 180,00 | 55,00 | 29,40 | 0,90 | 21,80 | 3,80 | 0,231 | 4,191 | 0,31 | 0,033 | 147,59 | 118,19 | 0,8623 | ZH | | |
| RZ-027AX | | | | | 270,00 | 55,00 | 29,40 | 0,90 | 21,90 | 3,75 | 0,231 | 4,191 | 0,31 | 0,033 | 148,14 | 118,74 | 0,8662 | ZH | | |
| RZ-027CI | 4,40 | 0,20 | 5,20 | 180,00 | 17,00 | 9,90 | 0,60 | 3,80 | 3,05 | 0,271 | 5,101 | 0,52 | 0,412 | 21,63 | 11,73 | 0,1280 | ZG | | | |
| RZ-027CX | | | | 270,00 | 17,00 | 9,90 | 0,60 | 3,90 | 3,00 | 0,271 | 5,101 | 0,52 | 0,400 | 21,98 | 12,08 | 0,1311 | ZG | | | |
| RZ-028I | | | | 180,00 | 22,00 | 10,90 | 0,60 | 5,00 | 2,95 | 0,271 | 5,101 | 0,48 | 0,304 | 26,78 | 15,88 | 0,1654 | ZG | | | |
| RZ-028X | | | | 270,00 | 22,00 | 10,90 | 0,60 | 5,10 | 2,90 | 0,271 | 5,101 | 0,48 | 0,298 | 27,13 | 16,23 | 0,1686 | ZG | | | |
| RZ-029I | | | | 180,00 | 32,00 | 16,10 | 0,70 | 10,20 | 2,95 | 0,271 | 5,101 | 0,40 | 0,143 | 49,94 | 33,84 | 0,3278 | ZG | | | |
| RZ-029X | | | | 270,00 | 32,00 | 16,10 | 0,70 | 10,30 | 2,90 | 0,271 | 5,101 | 0,40 | 0,141 | 50,28 | 34,18 | 0,3309 | ZG | | | |
| RZ-030I | | | | 180,00 | 41,00 | 22,10 | 0,70 | 16,20 | 2,95 | 0,271 | 5,101 | 0,36 | 0,089 | 76,66 | 54,56 | 0,5151 | ZH | | | |
| RZ-030X | | | | 270,00 | 41,00 | 22,10 | 0,70 | 16,30 | 2,90 | 0,271 | 5,101 | 0,36 | 0,088 | 77,00 | 54,90 | 0,5182 | ZH | | | |
| RZ-030AI | | | | 180,00 | 44,00 | 25,00 | 0,70 | 19,00 | 3,00 | 0,271 | 5,101 | 0,36 | 0,075 | 89,23 | 64,23 | 0,6025 | ZH | | | |
| RZ-030AX | | | | 270,00 | 44,00 | 25,00 | 0,70 | 19,10 | 2,95 | 0,271 | 5,101 | 0,35 | 0,075 | 89,57 | 64,57 | 0,6056 | ZH | | | |
| RZ-030BI | | | | 180,00 | 47,00 | 27,80 | 0,90 | 21,80 | 3,00 | 0,271 | 5,101 | 0,35 | 0,065 | 101,69 | 73,89 | 0,6899 | ZH | | | |
| RZ-030BX | | | | 270,00 | 47,00 | 27,80 | 0,90 | 21,90 | 2,95 | 0,271 | 5,101 | 0,35 | 0,065 | 102,04 | 74,24 | 0,6930 | ZH | | | |
| RZ-030CI | | | | 180,00 | 51,00 | 31,00 | 0,90 | 25,00 | 3,00 | 0,271 | 5,101 | 0,34 | 0,057 | 115,94 | 84,94 | 0,7898 | ZH | | | |
| RZ-030CX | | | | 270,00 | 51,00 | 31,00 | 0,90 | 25,10 | 2,95 | 0,271 | 5,101 | 0,34 | 0,057 | 116,29 | 85,29 | 0,7929 | ZH | | | |
| RZ-030DI | | | | 180,00 | 54,00 | 34,20 | 0,90 | 28,20 | 3,00 | 0,271 | 5,101 | 0,34 | 0,050 | 130,19 | 95,99 | 0,8897 | ZJ | | | |
| RZ-030DX | | | | 270,00 | 54,00 | 34,20 | 0,90 | 28,30 | 2,95 | 0,271 | 5,101 | 0,34 | 0,050 | 130,54 | 96,34 | 0,8928 | ZJ | | | |
| RZ-030EI | | | | 180,00 | 57,00 | 37,40 | 0,90 | 31,40 | 3,00 | 0,271 | 5,101 | 0,34 | 0,045 | 144,44 | 107,04 | 0,9895 | ZJ | | | |
| RZ-030EX | | | | 270,00 | 57,00 | 37,40 | 0,90 | 31,50 | 2,95 | 0,271 | 5,101 | 0,34 | 0,045 | 144,79 | 107,39 | 0,9927 | ZJ | | | |
| RZ-031I | | | | 3,60 | 0,15 | 4,40 | 180,00 | 20,00 | 9,60 | 0,50 | 5,00 | 2,30 | 0,441 | 6,181 | 0,61 | 0,594 | 19,25 | 9,65 | 0,1324 | ZG |
| RZ-031X | | | | | | | 270,00 | 20,00 | 9,60 | 0,50 | 5,10 | 2,25 | 0,441 | 6,181 | 0,61 | 0,582 | 19,46 | 9,86 | 0,1349 | ZG |
| RZ-032I | | | | | | | 180,00 | 29,00 | 14,80 | 0,50 | 10,20 | 2,30 | 0,441 | 6,181 | 0,50 | 0,279 | 35,37 | 20,57 | 0,2622 | ZG |
| RZ-032X | | | | | | | 270,00 | 29,00 | 14,80 | 0,50 | 10,30 | 2,25 | 0,441 | 6,181 | 0,50 | 0,276 | 35,58 | 20,78 | 0,2647 | ZG |
| RZ-033I | | | | | | | 180,00 | 36,00 | 20,80 | 0,60 | 16,20 | 2,30 | 0,441 | 6,181 | 0,46 | 0,173 | 53,96 | 33,16 | 0,4121 | ZG |
| RZ-033X | | | | | | | 270,00 | 36,00 | 20,80 | 0,60 | 16,30 | 2,25 | 0,441 | 6,181 | 0,46 | 0,172 | 54,17 | 33,37 | 0,4145 | ZG |
| RZ-033AI | 180,00 | 39,00 | 23,70 | | | | 0,60 | 19,00 | 2,35 | 0,441 | 6,181 | 0,45 | 0,147 | 62,73 | 39,03 | 0,4820 | ZH | | | |
| RZ-033AX | 270,00 | 39,00 | 23,70 | | | | 0,60 | 19,10 | 2,30 | 0,441 | 6,181 | 0,45 | 0,146 | 62,94 | 39,24 | 0,4845 | ZH | | | |
| RZ-033BI | 180,00 | 42,00 | 26,50 | | | | 0,80 | 21,80 | 2,35 | 0,441 | 6,181 | 0,44 | 0,128 | 71,41 | 44,91 | 0,5519 | ZH | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|--------|----|
| RZ-033BX | 0,40 | 3,60 | 0,15 | 4,40 | 270,00 | 42,00 | 26,50 | 0,80 | 21,90 | 2,30 | 0,441 | 6,181 | 0,44 | 0,127 | 71,62 | 45,12 | 0,5544 | ZH | | | |
| RZ-033CI | | | | | 180,00 | 45,00 | 29,70 | 0,80 | 25,00 | 2,35 | 0,441 | 6,181 | 0,44 | 0,111 | 81,33 | 51,63 | 0,6318 | ZH | | | |
| RZ-033CX | | | | | 270,00 | 45,00 | 29,70 | 0,80 | 25,10 | 2,30 | 0,441 | 6,181 | 0,44 | 0,111 | 81,54 | 51,84 | 0,6343 | ZH | | | |
| RZ-033DI | | | | | 180,00 | 48,00 | 32,90 | 0,80 | 28,20 | 2,35 | 0,441 | 6,181 | 0,43 | 0,098 | 91,24 | 58,34 | 0,7117 | ZH | | | |
| RZ-033DX | | | | | 270,00 | 48,00 | 32,90 | 0,80 | 28,30 | 2,30 | 0,441 | 6,181 | 0,43 | 0,098 | 91,45 | 58,55 | 0,7142 | ZH | | | |
| RZ-033EI | | | | | 180,00 | 51,00 | 36,10 | 0,80 | 31,40 | 2,35 | 0,441 | 6,181 | 0,43 | 0,088 | 101,16 | 65,06 | 0,7916 | ZJ | | | |
| RZ-033EX | | | | | 270,00 | 51,00 | 36,10 | 0,80 | 31,50 | 2,30 | 0,441 | 6,181 | 0,43 | 0,088 | 101,37 | 65,27 | 0,7941 | ZJ | | | |
| RZ-034I | 2,90 | 0,10 | 3,60 | 180,00 | 19,00 | 8,50 | 0,50 | 5,00 | 1,75 | 0,611 | 7,551 | 0,91 | 1,247 | 14,07 | 5,57 | 0,1034 | ZG | | | | |
| RZ-034X | | | | 270,00 | 19,00 | 8,50 | 0,50 | 5,10 | 1,70 | 0,611 | 7,551 | 0,90 | 1,220 | 14,19 | 5,69 | 0,1054 | ZG | | | | |
| RZ-035I | | | | 180,00 | 27,00 | 13,70 | 0,50 | 10,20 | 1,75 | 0,611 | 7,551 | 0,74 | 0,585 | 25,57 | 11,87 | 0,2049 | ZG | | | | |
| RZ-035X | | | | 270,00 | 27,00 | 13,70 | 0,50 | 10,30 | 1,70 | 0,611 | 7,551 | 0,74 | 0,579 | 25,69 | 11,99 | 0,2068 | ZG | | | | |
| RZ-036I | | | | 180,00 | 35,00 | 19,70 | 0,60 | 16,20 | 1,75 | 0,611 | 7,551 | 0,68 | 0,363 | 38,84 | 19,14 | 0,3219 | ZG | | | | |
| RZ-036X | | | | 270,00 | 35,00 | 19,70 | 0,60 | 16,30 | 1,70 | 0,611 | 7,551 | 0,68 | 0,361 | 38,96 | 19,26 | 0,3239 | ZG | | | | |
| RZ-036AI | | | | 180,00 | 38,00 | 22,60 | 0,60 | 19,00 | 1,80 | 0,611 | 7,551 | 0,66 | 0,308 | 45,13 | 22,53 | 0,3765 | ZH | | | | |
| RZ-036AX | | | | 270,00 | 38,00 | 22,60 | 0,60 | 19,10 | 1,75 | 0,611 | 7,551 | 0,66 | 0,307 | 45,25 | 22,65 | 0,3785 | ZH | | | | |
| RZ-036BI | | | | 180,00 | 40,00 | 25,30 | 0,80 | 21,80 | 1,75 | 0,611 | 7,551 | 0,61 | 0,268 | 51,22 | 25,92 | 0,4312 | ZH | | | | |
| RZ-036BX | | | | 270,00 | 40,00 | 25,30 | 0,80 | 21,90 | 1,70 | 0,611 | 7,551 | 0,64 | 0,267 | 51,34 | 26,04 | 0,4331 | ZH | | | | |
| RZ-036CI | | | | 180,00 | 43,00 | 28,50 | 0,80 | 25,00 | 1,75 | 0,611 | 7,551 | 0,64 | 0,233 | 58,30 | 29,80 | 0,4936 | ZH | | | | |
| RZ-036CX | | | | 270,00 | 43,00 | 28,50 | 0,80 | 25,10 | 1,70 | 0,611 | 7,551 | 0,64 | 0,232 | 58,42 | 29,92 | 0,4956 | ZH | | | | |
| RZ-036DI | | | | 180,00 | 46,00 | 31,70 | 0,80 | 28,20 | 1,75 | 0,611 | 7,551 | 0,63 | 0,206 | 65,38 | 33,68 | 0,5560 | ZH | | | | |
| RZ-036DX | | | | 270,00 | 46,00 | 31,70 | 0,80 | 28,30 | 1,70 | 0,611 | 7,551 | 0,63 | 0,206 | 65,50 | 33,80 | 0,5580 | ZH | | | | |
| RZ-036EI | | | | 180,00 | 49,00 | 34,90 | 0,80 | 31,40 | 1,75 | 0,611 | 7,551 | 0,62 | 0,185 | 72,45 | 37,55 | 0,6185 | ZH | | | | |
| RZ-036EX | | | | 270,00 | 49,00 | 34,90 | 0,80 | 31,50 | 1,70 | 0,611 | 7,551 | 0,62 | 0,184 | 72,57 | 37,67 | 0,6204 | ZH | | | | |
| RZ-036FI | | | | 0,45 | 7,50 | 0,35 | 8,60 | 180,00 | 22,00 | 13,70 | 0,60 | 2,93 | 5,38 | 0,211 | 4,271 | 0,66 | 0,186 | 35,49 | 21,79 | 0,2022 | ZG |
| RZ-036FX | | | | | | | | 270,00 | 22,00 | 13,70 | 0,60 | 3,04 | 5,33 | 0,211 | 4,271 | 0,64 | 0,178 | 36,48 | 22,78 | 0,2091 | ZG |
| RZ-036GI | | | | | | | | 180,00 | 28,00 | 15,50 | 0,60 | 4,73 | 5,38 | 0,211 | 4,271 | 0,52 | 0,108 | 53,13 | 37,63 | 0,3137 | ZG |
| RZ-036GX | | | | | | | | 270,00 | 28,00 | 15,50 | 0,60 | 4,84 | 5,33 | 0,211 | 4,271 | 0,51 | 0,105 | 54,12 | 38,62 | 0,3205 | ZG |
| RZ-036HI | 180,00 | 35,00 | 18,20 | | | | | 0,70 | 7,42 | 5,38 | 0,211 | 4,271 | 0,44 | 0,066 | 79,60 | 61,40 | 0,4802 | ZH | | | |
| RZ-036HX | 270,00 | 36,00 | 18,20 | | | | | 0,70 | 7,54 | 5,33 | 0,211 | 4,271 | 0,44 | 0,065 | 80,59 | 62,39 | 0,4876 | ZH | | | |
| RZ-036JI | 180,00 | 45,00 | 22,30 | | | | | 0,70 | 11,92 | 5,19 | 0,211 | 4,271 | 0,39 | 0,040 | 123,31 | 101,01 | 0,7587 | ZH | | | |
| RZ-036JX | 270,00 | 46,00 | 22,30 | | | | | 0,70 | 12,04 | 5,13 | 0,211 | 4,271 | 0,39 | 0,040 | 124,30 | 102,00 | 0,7661 | ZH | | | |
| RZ-036KI | 180,00 | 56,00 | 29,00 | | | | | 0,90 | 18,22 | 5,38 | 0,211 | 4,271 | 0,36 | 0,026 | 185,47 | 156,47 | 1,1486 | ZH | | | |
| RZ-036KX | 270,00 | 57,00 | 29,00 | | | | | 0,90 | 18,34 | 5,33 | 0,211 | 4,271 | 0,36 | 0,026 | 186,46 | 157,46 | 1,1561 | ZH | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| Z-033BX | 0,40 | 3,60 | 0,15 | 4,40 | 270,00 | 42,00 | 26,50 | 0,80 | 21,90 | 2,30 | 0,551 | 7,721 | 0,46 | 0,148 | 74,92 | 48,42 | 0,5539 | ZE | | | |
| Z-033CI | | | | | 180,00 | 45,00 | 29,70 | 0,80 | 25,00 | 2,35 | 0,551 | 7,721 | 0,46 | 0,129 | 85,10 | 55,40 | 0,6309 | ZE | | | |
| Z-033CX | | | | | 270,00 | 45,00 | 29,70 | 0,80 | 25,10 | 2,30 | 0,551 | 7,721 | 0,46 | 0,129 | 85,33 | 55,63 | 0,6334 | ZE | | | |
| Z-033DI | | | | | 180,00 | 48,00 | 32,90 | 0,80 | 28,20 | 2,35 | 0,551 | 7,721 | 0,45 | 0,115 | 95,51 | 62,61 | 0,7105 | ZE | | | |
| Z-033DX | | | | | 270,00 | 48,00 | 32,90 | 0,80 | 28,30 | 2,30 | 0,551 | 7,721 | 0,45 | 0,114 | 95,73 | 62,83 | 0,7129 | ZE | | | |
| Z-033EI | | | | | 180,00 | 51,00 | 36,10 | 0,80 | 31,40 | 2,35 | 0,551 | 7,721 | 0,45 | 0,103 | 105,92 | 69,82 | 0,7899 | ZF | | | |
| Z-033EX | | | | | 270,00 | 51,00 | 36,10 | 0,80 | 31,50 | 2,30 | 0,551 | 7,721 | 0,45 | 0,102 | 106,14 | 70,04 | 0,7924 | ZF | | | |
| Z-034I | 2,90 | 0,10 | 3,60 | 180,00 | 19,00 | 8,50 | 0,50 | 5,00 | 1,75 | 0,771 | 9,441 | 0,94 | 1,451 | 14,47 | 5,97 | 0,1049 | ZD | | | | |
| Z-034X | | | | 270,00 | 19,00 | 8,50 | 0,50 | 5,10 | 1,70 | 0,771 | 9,441 | 0,93 | 1,421 | 14,60 | 6,10 | 0,1068 | ZD | | | | |
| Z-035I | | | | 180,00 | 27,00 | 13,70 | 0,50 | 10,20 | 1,75 | 0,771 | 9,441 | 0,77 | 0,681 | 26,43 | 12,73 | 0,2059 | ZD | | | | |
| Z-035X | | | | 270,00 | 27,00 | 13,70 | 0,50 | 10,30 | 1,70 | 0,771 | 9,441 | 0,77 | 0,674 | 26,56 | 12,86 | 0,2078 | ZD | | | | |
| Z-036I | | | | 180,00 | 35,00 | 19,70 | 0,60 | 16,20 | 1,75 | 0,771 | 9,441 | 0,70 | 0,423 | 40,22 | 20,52 | 0,3225 | ZD | | | | |
| Z-036X | | | | 270,00 | 35,00 | 19,70 | 0,60 | 16,30 | 1,70 | 0,771 | 9,441 | 0,70 | 0,420 | 40,35 | 20,65 | 0,3244 | ZD | | | | |
| Z-036AI | | | | 180,00 | 38,00 | 22,60 | 0,60 | 19,00 | 1,80 | 0,771 | 9,441 | 0,69 | 0,359 | 46,76 | 24,16 | 0,3769 | ZE | | | | |
| Z-036AX | | | | 270,00 | 38,00 | 22,60 | 0,60 | 19,10 | 1,75 | 0,771 | 9,441 | 0,68 | 0,357 | 46,89 | 24,29 | 0,3789 | ZE | | | | |
| Z-036BI | | | | 180,00 | 40,00 | 25,30 | 0,80 | 21,80 | 1,75 | 0,771 | 9,441 | 0,67 | 0,312 | 53,09 | 27,79 | 0,4313 | ZE | | | | |
| Z-036BX | | | | 270,00 | 40,00 | 25,30 | 0,80 | 21,90 | 1,70 | 0,771 | 9,441 | 0,67 | 0,311 | 53,22 | 27,92 | 0,4333 | ZE | | | | |
| Z-036CI | | | | 180,00 | 43,00 | 28,50 | 0,80 | 25,00 | 1,75 | 0,771 | 9,441 | 0,76 | 0,271 | 60,45 | 31,95 | 0,4935 | ZE | | | | |
| Z-036CX | | | | 270,00 | 43,00 | 28,50 | 0,80 | 25,10 | 1,70 | 0,771 | 9,441 | 0,66 | 0,270 | 60,58 | 32,08 | 0,4954 | ZE | | | | |
| Z-036DI | | | | 180,00 | 46,00 | 31,70 | 0,80 | 28,20 | 1,75 | 0,771 | 9,441 | 0,66 | 0,240 | 67,81 | 36,11 | 0,5557 | ZE | | | | |
| Z-036DX | | | | 270,00 | 46,00 | 31,70 | 0,80 | 28,30 | 1,70 | 0,771 | 9,441 | 0,66 | 0,239 | 67,94 | 36,24 | 0,5576 | ZE | | | | |
| Z-036EI | | | | 180,00 | 49,00 | 34,90 | 0,80 | 31,40 | 1,75 | 0,771 | 9,441 | 0,65 | 0,215 | 75,16 | 40,26 | 0,6178 | ZE | | | | |
| Z-036EX | | | | 270,00 | 49,00 | 34,90 | 0,80 | 31,50 | 1,70 | 0,771 | 9,441 | 0,65 | 0,215 | 75,29 | 40,39 | 0,6198 | ZE | | | | |
| Z-036FI | | | | 0,45 | 7,50 | 0,35 | 8,60 | 180,00 | 22,00 | 13,70 | 0,60 | 2,93 | 5,38 | 0,251 | 5,311 | 0,67 | 0,217 | 37,05 | 23,35 | 0,2075 | ZD |
| Z-036FX | | | | | | | | 270,00 | 22,00 | 13,70 | 0,60 | 3,04 | 5,33 | 0,251 | 5,311 | 0,66 | 0,207 | 38,11 | 24,41 | 0,2144 | ZD |
| Z-036GI | | | | | | | | 180,00 | 28,00 | 15,50 | 0,60 | 4,73 | 5,38 | 0,251 | 5,311 | 0,53 | 0,125 | 55,83 | 40,33 | 0,3181 | ZD |
| Z-036GX | | | | | | | | 270,00 | 28,00 | 15,50 | 0,60 | 4,84 | 5,33 | 0,251 | 5,311 | 0,53 | 0,122 | 56,89 | 41,39 | 0,3251 | ZD |
| Z-036HI | 180,00 | 35,00 | 18,20 | | | | | 0,70 | 7,42 | 5,38 | 0,251 | 5,311 | 0,46 | 0,077 | 84,00 | 65,80 | 0,4842 | ZE | | | |
| Z-036HX | 270,00 | 36,00 | 18,20 | | | | | 0,70 | 7,54 | 5,33 | 0,251 | 5,311 | 0,45 | 0,076 | 85,06 | 66,86 | 0,4910 | ZE | | | |
| Z-036JI | 180,00 | 45,00 | 22,30 | | | | | 0,70 | 11,92 | 5,19 | 0,251 | 5,311 | 0,41 | 0,047 | 130,55 | 108,25 | 0,7608 | ZE | | | |
| Z-036JX | 270,00 | 46,00 | 22,30 | | | | | 0,70 | 12,04 | 5,13 | 0,251 | 5,311 | 0,41 | 0,046 | 131,61 | 109,31 | 0,7677 | ZE | | | |
| Z-036KI | 180,00 | 56,00 | 29,00 | | | | | 0,90 | 18,22 | 5,38 | 0,251 | 5,311 | 0,38 | 0,030 | 196,68 | 167,68 | 1,1480 | ZE | | | |
| Z-036KX | 270,00 | 57,00 | 29,00 | | | | | 0,90 | 18,34 | 5,33 | 0,251 | 5,311 | 0,38 | 0,030 | 197,74 | 168,74 | 1,1550 | ZE | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|--------|----|
| Z-036LI | 0,45 | 7,50 | 0,35 | 8,60 | 180,00 | 69,00 | 38,00 | 0,90 | 27,22 | 5,38 | 0,251 | 5,311 | 0,36 | 0,020 | 290,58 | 252,58 | 1,7010 | ZE | | | |
| Z-036LX | | | | | 270,00 | 69,00 | 38,00 | 0,90 | 27,34 | 5,33 | 0,251 | 5,311 | 0,36 | 0,020 | 291,64 | 253,64 | 1,7080 | ZF | | | |
| Z-036MI | 5,00 | 0,25 | 6,00 | 6,00 | 180,00 | 16,00 | 9,70 | 0,60 | 2,93 | 3,83 | 0,441 | 7,871 | 0,82 | 0,806 | 18,91 | 9,21 | 0,1340 | ZD | | | |
| Z-036MX | | | | | 270,00 | 16,00 | 9,70 | 0,60 | 3,04 | 3,33 | 0,441 | 7,871 | 0,80 | 0,771 | 19,33 | 9,63 | 0,1385 | ZD | | | |
| Z-036NI | | | | | 180,00 | 20,00 | 11,50 | 0,60 | 4,73 | 3,83 | 0,441 | 7,871 | 0,65 | 0,467 | 27,42 | 15,92 | 0,2055 | ZD | | | |
| Z-036NX | | | | | 270,00 | 20,00 | 11,50 | 0,60 | 4,84 | 3,33 | 0,441 | 7,871 | 0,65 | 0,455 | 27,85 | 16,35 | 0,2099 | ZD | | | |
| Z-036OI | | | | | 180,00 | 26,00 | 14,20 | 0,60 | 7,42 | 3,38 | 0,441 | 7,871 | 0,56 | 0,286 | 40,17 | 25,97 | 0,3126 | ZD | | | |
| Z-036OX | | | | | 270,00 | 26,00 | 14,20 | 0,60 | 7,54 | 3,33 | 0,441 | 7,871 | 0,56 | 0,282 | 40,59 | 26,39 | 0,3171 | ZD | | | |
| Z-036PI | | | | | 180,00 | 32,00 | 18,30 | 0,70 | 11,48 | 3,41 | 0,441 | 7,871 | 0,51 | 0,181 | 59,34 | 41,04 | 0,4734 | ZE | | | |
| Z-036PX | | | | | 270,00 | 32,00 | 18,30 | 0,70 | 11,59 | 3,35 | 0,441 | 7,871 | 0,51 | 0,179 | 59,76 | 41,46 | 0,4779 | ZE | | | |
| Z-036QI | | | | | 180,00 | 41,00 | 25,00 | 0,70 | 18,22 | 3,38 | 0,441 | 7,871 | 0,47 | 0,112 | 91,17 | 66,17 | 0,7415 | ZE | | | |
| Z-036QX | | | | | 270,00 | 41,00 | 25,00 | 0,70 | 18,34 | 3,33 | 0,441 | 7,871 | 0,47 | 0,112 | 91,59 | 66,59 | 0,7460 | ZE | | | |
| Z-036RI | | | | | 180,00 | 50,00 | 34,00 | 0,90 | 27,22 | 3,83 | 0,441 | 7,871 | 0,44 | 0,075 | 133,68 | 99,68 | 1,0980 | ZE | | | |
| Z-036RX | | | | | 270,00 | 50,00 | 34,00 | 0,90 | 27,34 | 3,33 | 0,441 | 7,871 | 0,44 | 0,074 | 134,10 | 100,10 | 1,1030 | ZE | | | |
| Z-036SI | | | | | 3,20 | 0,15 | 4,10 | 180,00 | 13,00 | 6,80 | 0,50 | 2,93 | 1,93 | 1,111 | 11,960 | 1,62 | 3,652 | 9,77 | 2,97 | 0,0120 | ZD |
| Z-036SX | | | | | | | | 270,00 | 14,00 | 6,80 | 0,50 | 3,04 | 1,88 | 1,111 | 11,960 | 1,58 | 3,493 | 9,91 | 3,11 | 0,0838 | ZD |
| Z-036TI | 180,00 | 17,00 | 8,60 | 0,50 | | | | 4,73 | 1,93 | 1,111 | 11,960 | 1,28 | 2,114 | 13,74 | 5,14 | 0,1243 | ZD | | | | |
| Z-036TX | 270,00 | 17,00 | 8,60 | 0,50 | | | | 4,84 | 1,88 | 1,111 | 11,960 | 1,27 | 2,060 | 13,87 | 5,27 | 0,1271 | ZD | | | | |
| Z-036UI | 180,00 | 22,00 | 11,30 | 0,50 | | | | 7,42 | 1,93 | 1,111 | 11,960 | 1,09 | 1,296 | 19,68 | 8,38 | 0,1893 | ZD | | | | |
| Z-036UX | 270,00 | 22,00 | 11,30 | 0,50 | | | | 7,54 | 1,88 | 1,111 | 11,960 | 1,09 | 1,275 | 19,82 | 8,52 | 0,1920 | ZD | | | | |
| Z-036VI | 180,00 | 27,00 | 15,40 | 0,50 | | | | 11,48 | 1,96 | 1,111 | 11,960 | 0,98 | 0,820 | 28,65 | 13,25 | 0,2868 | ZD | | | | |
| Z-036VX | 270,00 | 27,00 | 15,40 | 0,50 | | | | 11,59 | 1,90 | 1,111 | 11,960 | 0,98 | 0,812 | 28,78 | 13,38 | 0,2894 | ZD | | | | |
| Z-036WI | 180,00 | 35,00 | 22,10 | 0,60 | | | | 18,22 | 1,93 | 1,111 | 11,960 | 0,90 | 0,509 | 43,46 | 21,36 | 0,4491 | ZE | | | | |
| Z-036WX | 270,00 | 35,00 | 22,10 | 0,60 | | | | 18,34 | 1,88 | 1,111 | 11,960 | 0,90 | 0,505 | 43,60 | 21,50 | 0,4517 | ZE | | | | |
| Z-036XI | 180,00 | 42,00 | 31,30 | 0,80 | | | | 27,22 | 2,03 | 1,111 | 11,960 | 0,85 | 0,338 | 63,48 | 32,18 | 0,6654 | ZE | | | | |
| Z-036XX | 270,00 | 42,00 | 31,30 | 0,80 | | | | 27,34 | 1,98 | 1,111 | 11,960 | 0,85 | 0,336 | 63,61 | 32,31 | 0,6682 | ZE | | | | |
| Z-036X-01I | 0,50 | 10,00 | 0,35 | 11,10 | | | | 180,00 | 30,00 | 18,50 | 0,70 | 3,75 | 7,38 | 0,021 | 5,401 | 0,48 | 0,114 | 65,59 | 47,09 | 0,3800 | ZE |
| Z-036X-01X | | | | | | | | 270,00 | 30,00 | 18,50 | 0,70 | 3,88 | 7,31 | 0,021 | 5,401 | 0,48 | 0,110 | 67,40 | 48,90 | 0,3800 | ZE |
| Z-036AAI | | | | | 180,00 | 34,00 | 20,00 | 0,70 | 5,25 | 7,37 | 0,021 | 5,401 | 0,45 | 0,078 | 88,79 | 68,79 | 0,5291 | ZE | | | |
| Z-036AAX | | | | | 270,00 | 34,00 | 20,00 | 0,70 | 5,38 | 7,31 | 0,021 | 5,401 | 0,45 | 0,076 | 90,59 | 70,59 | 0,5407 | ZE | | | |
| Z-036ABI | | | | | 180,00 | 49,00 | 25,50 | 0,90 | 10,75 | 7,37 | 0,021 | 5,401 | 0,42 | 0,036 | 173,92 | 148,42 | 1,0350 | ZE | | | |
| Z-036ABX | | | | | 270,00 | 50,00 | 25,50 | 0,90 | 10,88 | 7,31 | 0,021 | 5,401 | 0,42 | 0,036 | 175,73 | 150,23 | 1,0460 | ZE | | | |
| Z-036ACI | | | | | 180,00 | 71,00 | 36,50 | 0,90 | 21,75 | 7,37 | 0,021 | 5,401 | 0,40 | 0,017 | 344,19 | 307,69 | 2,0470 | ZE | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|--------|----|
| RZ-036LI | 0,45 | 7,50 | 0,35 | 8,60 | 180,00 | 69,00 | 38,00 | 0,90 | 27,22 | 5,38 | 0,211 | 4,271 | 0,34 | 0,017 | 273,70 | 235,70 | 1,7057 | ZJ | | | |
| RZ-036LX | | | | | 270,00 | 69,00 | 38,00 | 0,90 | 27,34 | 5,33 | 0,211 | 4,271 | 0,34 | 0,017 | 274,69 | 236,69 | 1,7131 | ZJ | | | |
| RZ-036MI | 5,00 | 0,25 | 6,00 | 6,00 | 180,00 | 16,00 | 9,70 | 0,60 | 2,93 | 3,83 | 0,351 | 6,321 | 0,79 | 0,691 | 18,32 | 8,62 | 0,1305 | ZG | | | |
| RZ-036MX | | | | | 270,00 | 16,00 | 9,70 | 0,60 | 3,04 | 3,33 | 0,351 | 6,321 | 0,77 | 0,662 | 18,71 | 9,01 | 0,1349 | ZG | | | |
| RZ-036NI | | | | | 180,00 | 20,00 | 11,50 | 0,60 | 4,73 | 3,83 | 0,351 | 6,321 | 0,63 | 0,400 | 26,39 | 14,89 | 0,2024 | ZG | | | |
| RZ-036NX | | | | | 270,00 | 20,00 | 11,50 | 0,60 | 4,84 | 3,33 | 0,351 | 6,321 | 0,62 | 0,390 | 26,79 | 15,29 | 0,2068 | ZG | | | |
| RZ-036OI | | | | | 180,00 | 26,00 | 14,20 | 0,60 | 7,42 | 3,38 | 0,351 | 6,321 | 0,54 | 0,246 | 38,50 | 24,30 | 0,3099 | ZG | | | |
| RZ-036OX | | | | | 270,00 | 26,00 | 14,20 | 0,60 | 7,54 | 3,33 | 0,351 | 6,321 | 0,54 | 0,242 | 38,89 | 24,69 | 0,3147 | ZG | | | |
| RZ-036PI | | | | | 180,00 | 32,00 | 18,30 | 0,70 | 11,48 | 3,41 | 0,351 | 6,321 | 0,48 | 0,155 | 56,71 | 38,41 | 0,4721 | ZH | | | |
| RZ-036PX | | | | | 270,00 | 32,00 | 18,30 | 0,70 | 11,59 | 3,35 | 0,351 | 6,321 | 0,48 | 0,154 | 57,10 | 38,80 | 0,4765 | ZH | | | |
| RZ-036QI | | | | | 180,00 | 41,00 | 25,00 | 0,70 | 18,22 | 3,38 | 0,351 | 6,321 | 0,44 | 0,096 | 86,93 | 61,93 | 0,7413 | ZH | | | |
| RZ-036QX | | | | | 270,00 | 41,00 | 25,00 | 0,70 | 18,34 | 3,33 | 0,351 | 6,321 | 0,44 | 0,096 | 87,32 | 62,32 | 0,7461 | ZH | | | |
| RZ-036RI | | | | | 180,00 | 50,00 | 34,00 | 0,90 | 27,22 | 3,83 | 0,351 | 6,321 | 0,42 | 0,064 | 127,28 | 93,28 | 1,1008 | ZH | | | |
| RZ-036RX | | | | | 270,00 | 50,00 | 34,00 | 0,90 | 27,34 | 3,33 | 0,351 | 6,321 | 0,42 | 0,064 | 127,68 | 93,68 | 1,1056 | ZH | | | |
| RZ-036SI | | | | | 3,20 | 0,15 | 4,10 | 180,00 | 13,00 | 6,80 | 0,50 | 2,93 | 1,93 | 0,881 | 9,611 | 1,58 | 3,131 | 9,59 | 2,79 | 0,0789 | ZG |
| RZ-036SX | | | | | | | | 270,00 | 14,00 | 6,80 | 0,50 | 3,04 | 1,88 | 0,881 | 9,611 | 1,54 | 2,998 | 9,71 | 2,91 | 0,0815 | ZG |
| RZ-036TI | 180,00 | 17,00 | 8,60 | 0,50 | | | | 4,73 | 1,93 | 0,881 | 9,611 | 1,24 | 1,814 | 13,41 | 4,81 | 0,1223 | ZG | | | | |
| RZ-036TX | 270,00 | 17,00 | 8,60 | 0,50 | | | | 4,84 | 1,88 | 0,881 | 9,611 | 1,23 | 1,769 | 13,54 | 4,94 | 0,1250 | ZG | | | | |
| RZ-036UI | 180,00 | 22,00 | 11,30 | 0,50 | | | | 7,42 | 1,93 | 0,881 | 9,611 | 1,05 | 1,114 | 19,15 | 7,85 | 0,1873 | ZG | | | | |
| RZ-036UX | 270,00 | 22,00 | 11,30 | 0,50 | | | | 7,54 | 1,88 | 0,881 | 9,611 | 1,05 | 1,095 | 19,28 | 7,98 | 0,1902 | ZG | | | | |
| RZ-036VI | 180,00 | 27,00 | 15,40 | 0,50 | | | | 11,48 | 1,96 | 0,881 | 9,611 | 0,95 | 0,704 | 27,81 | 12,41 | 0,2853 | ZG | | | | |
| RZ-036VX | 270,00 | 27,00 | 15,40 | 0,50 | | | | 11,59 | 1,90 | 0,881 | 9,611 | 0,94 | 0,697 | 27,94 | 12,54 | 0,2880 | ZG | | | | |
| RZ-036WI | 180,00 | 35,00 | 22,10 | 0,60 | | | | 18,22 | 1,93 | 0,881 | 9,611 | 0,86 | 0,437 | 42,11 | 20,01 | 0,4480 | ZH | | | | |
| RZ-036WX | 270,00 | 35,00 | 22,10 | 0,60 | | | | 18,34 | 1,88 | 0,881 | 9,611 | 0,86 | 0,434 | 42,23 | 20,13 | 0,4509 | ZH | | | | |
| RZ-036XI | 180,00 | 42,00 | 31,30 | 0,80 | | | | 27,22 | 2,03 | 0,881 | 9,611 | 0,82 | 0,290 | 61,44 | 30,14 | 0,6653 | ZH | | | | |
| RZ-036XX | 270,00 | 42,00 | 31,30 | 0,80 | | | | 27,34 | 1,98 | 0,881 | 9,611 | 0,81 | 0,289 | 61,56 | 30,26 | 0,6682 | ZH | | | | |
| RZ-036X-01I | 0,50 | 10,00 | 0,35 | 11,10 | | | | 180,00 | 30,00 | 18,50 | 0,70 | 3,75 | 7,38 | 0,011 | 4,351 | 0,60 | 0,098 | 62,73 | 44,23 | 0,3823 | ZH |
| RZ-036X-01X | | | | | | | | 270,00 | 30,00 | 18,50 | 0,70 | 3,88 | 7,31 | 0,011 | 4,351 | 0,60 | 0,094 | 64,50 | 46,00 | 0,3943 | ZH |
| RZ-036AAI | | | | | 180,00 | 34,00 | 20,00 | 0,70 | 5,25 | 7,37 | 0,011 | 4,351 | 0,56 | 0,067 | 84,67 | 64,67 | 0,5213 | ZH | | | |
| RZ-036AAX | | | | | 270,00 | 34,00 | 20,00 | 0,70 | 5,38 | 7,31 | 0,011 | 4,351 | 0,56 | 0,065 | 86,37 | 66,37 | 0,5333 | ZH | | | |
| RZ-036ABI | | | | | 180,00 | 49,00 | 25,50 | 0,90 | 10,75 | 7,37 | 0,011 | 4,351 | 0,45 | 0,031 | 165,04 | 139,54 | 1,0310 | ZH | | | |
| RZ-036ABX | | | | | 270,00 | 50,00 | 25,50 | 0,90 | 10,88 | 7,31 | 0,011 | 4,351 | 0,44 | 0,031 | 166,75 | 141,25 | 1,0430 | ZH | | | |
| RZ-036ACI | | | | | 180,00 | 71,00 | 36,50 | 0,90 | 21,75 | 7,37 | 0,011 | 4,351 | 0,39 | 0,015 | 325,80 | 289,30 | 2,0504 | ZH | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-036ACX | 0,50 | 10,00 | 0,35 | 11,10 | 270,00 | 71,00 | 36,50 | 0,90 | 21,88 | 7,31 | 0,011 | 4,351 | 0,39 | 0,015 | 327,50 | 291,00 | 2,0624 | ZH | | |
| RZ-036A-01I | | | | | 180,00 | 82,00 | 42,00 | 1,30 | 26,76 | 7,62 | 0,011 | 4,351 | 0,38 | 0,012 | 399,30 | 357,30 | 2,5147 | ZH | | |
| RZ-036A-01X | | | | | 270,00 | 82,00 | 42,00 | 1,30 | 26,88 | 7,56 | 0,011 | 4,351 | 0,38 | 0,012 | 401,00 | 359,00 | 2,5258 | ZH | | |
| RZ-036ADI | | | | | 180,00 | 87,00 | 47,50 | 1,30 | 32,75 | 7,37 | 0,011 | 4,351 | 0,37 | 0,010 | 486,55 | 439,05 | 3,0698 | ZH | | |
| RZ-036ADX | | | | | 270,00 | 88,00 | 47,50 | 1,30 | 32,88 | 7,31 | 0,011 | 4,351 | 0,37 | 0,010 | 488,25 | 440,75 | 3,0818 | ZH | | |
| RZ-036AEI | | | | | 180,00 | 101,00 | 58,50 | 1,30 | 43,75 | 7,37 | 0,011 | 4,351 | 0,36 | 0,007 | 647,31 | 588,81 | 4,0892 | ZH | | |
| RZ-036AEX | | | | | 270,00 | 101,00 | 58,50 | 1,30 | 43,88 | 7,31 | 0,011 | 4,351 | 0,36 | 0,007 | 649,01 | 590,51 | 4,1012 | ZH | | |
| RZ-036BAI | 8,00 | 0,35 | 9,10 | 180,00 | 27,00 | 16,70 | 0,70 | 5,25 | 5,72 | 0,221 | 5,421 | 0,63 | 0,136 | 54,78 | 38,08 | 0,4115 | ZH | | | |
| RZ-036BAX | | | | 270,00 | 27,00 | 16,70 | 0,70 | 5,38 | 5,66 | 0,221 | 5,421 | 0,62 | 0,133 | 55,78 | 39,08 | 0,4211 | ZH | | | |
| RZ-036BBI | | | | 180,00 | 39,00 | 22,20 | 0,70 | 10,75 | 5,72 | 0,221 | 5,421 | 0,50 | 0,063 | 104,36 | 82,16 | 0,8139 | ZH | | | |
| RZ-036BBX | | | | 270,00 | 39,00 | 22,20 | 0,70 | 10,88 | 5,66 | 0,221 | 5,421 | 0,50 | 0,062 | 105,36 | 83,16 | 0,8234 | ZH | | | |
| RZ-036BCI | | | | 180,00 | 56,00 | 33,20 | 0,90 | 21,75 | 5,72 | 0,221 | 5,421 | 0,43 | 0,031 | 203,54 | 170,34 | 1,6187 | ZH | | | |
| RZ-036BCX | | | | 270,00 | 56,00 | 33,20 | 0,90 | 21,88 | 5,66 | 0,221 | 5,421 | 0,43 | 0,030 | 204,54 | 171,34 | 1,6282 | ZH | | | |
| RZ-036BDI | | | | 180,00 | 69,00 | 44,20 | 1,30 | 32,75 | 5,72 | 0,221 | 5,421 | 0,41 | 0,020 | 302,71 | 258,51 | 2,4235 | ZH | | | |
| RZ-036BDX | | | | 270,00 | 70,00 | 44,20 | 1,30 | 32,88 | 5,66 | 0,221 | 5,421 | 0,41 | 0,020 | 303,71 | 259,51 | 2,4330 | ZH | | | |
| RZ-036BEI | | | | 180,00 | 80,00 | 55,20 | 1,30 | 43,75 | 5,72 | 0,221 | 5,421 | 0,40 | 0,015 | 401,89 | 346,69 | 3,2283 | ZH | | | |
| RZ-036BEX | | | | 270,00 | 80,00 | 55,20 | 1,30 | 43,88 | 5,66 | 0,221 | 5,421 | 0,40 | 0,015 | 402,89 | 347,69 | 3,2378 | ZH | | | |
| RZ-037I | | | | 6,80 | 0,25 | 7,80 | 180,00 | 26,00 | 15,70 | 0,60 | 6,25 | 4,72 | 0,311 | 6,351 | 0,62 | 0,190 | 47,43 | 31,73 | 0,4072 | ZG |
| RZ-037X | | | | | | | 270,00 | 26,00 | 15,70 | 0,60 | 6,38 | 4,66 | 0,311 | 6,351 | 0,62 | 0,186 | 48,12 | 32,42 | 0,4151 | ZG |
| RZ-038I | | | | | | | 180,00 | 37,00 | 22,20 | 0,70 | 12,75 | 4,72 | 0,311 | 6,351 | 0,51 | 0,089 | 89,79 | 67,59 | 0,8066 | ZH |
| RZ-038X | | | | | | | 270,00 | 37,00 | 22,20 | 0,70 | 12,88 | 4,66 | 0,311 | 6,351 | 0,51 | 0,088 | 90,48 | 68,28 | 0,8146 | ZH |
| RZ-039I | 180,00 | 47,00 | 29,70 | | | | 0,90 | 20,25 | 4,72 | 0,311 | 6,351 | 0,47 | 0,055 | 138,68 | 108,98 | 1,2675 | ZH | | | |
| RZ-039X | 270,00 | 47,00 | 29,70 | | | | 0,90 | 20,38 | 4,66 | 0,311 | 6,351 | 0,47 | 0,055 | 139,37 | 109,67 | 1,2755 | ZH | | | |
| RZ-039AI | 180,00 | 55,00 | 36,80 | | | | 0,90 | 27,25 | 4,77 | 0,311 | 6,351 | 0,45 | 0,041 | 184,40 | 147,60 | 1,6977 | ZH | | | |
| RZ-039AX | 270,00 | 55,00 | 36,80 | | | | 0,90 | 27,38 | 4,71 | 0,311 | 6,351 | 0,45 | 0,041 | 185,09 | 148,29 | 1,7057 | ZH | | | |
| RZ-040I | 5,50 | 0,25 | 6,50 | | | | 180,00 | 22,00 | 13,70 | 0,60 | 6,25 | 3,72 | 0,511 | 7,781 | 0,71 | 0,380 | 32,82 | 19,12 | 0,3231 | ZG |
| RZ-040X | | | | | | | 270,00 | 22,00 | 13,70 | 0,60 | 6,38 | 3,66 | 0,511 | 7,781 | 0,71 | 0,372 | 33,24 | 19,54 | 0,3295 | ZG |
| RZ-040AI | | | | | | | 180,00 | 23,00 | 14,20 | 0,60 | 6,75 | 3,72 | 0,511 | 7,781 | 0,69 | 0,350 | 34,99 | 20,79 | 0,3475 | ZG |
| RZ-040AX | | | | | | | 270,00 | 23,00 | 14,20 | 0,60 | 6,88 | 3,66 | 0,511 | 7,781 | 0,69 | 0,343 | 35,40 | 21,20 | 0,3539 | ZG |
| RZ-041I | | | | | | | 180,00 | 32,00 | 20,20 | 0,70 | 12,75 | 3,72 | 0,511 | 7,781 | 0,59 | 0,179 | 60,94 | 40,74 | 0,6402 | ZG |
| RZ-041X | | | | | | | 270,00 | 32,00 | 20,20 | 0,70 | 12,88 | 3,66 | 0,511 | 7,781 | 0,59 | 0,177 | 61,36 | 41,16 | 0,6465 | ZG |
| RZ-042I | | | | 180,00 | 41,00 | 27,70 | 0,90 | 20,25 | 3,72 | 0,511 | 7,781 | 0,54 | 0,111 | 93,39 | 65,69 | 1,0060 | ZH | | | |
| RZ-042X | | | | 270,00 | 41,00 | 27,70 | 0,90 | 20,38 | 3,66 | 0,511 | 7,781 | 0,54 | 0,110 | 93,80 | 66,10 | 1,0123 | ZH | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-036ACX | 0,50 | 10,00 | 0,35 | 11,10 | 270,00 | 71,00 | 36,50 | 0,90 | 21,88 | 7,31 | 0,021 | 5,401 | 0,40 | 0,017 | 346,00 | 309,50 | 2,0590 | ZE | | |
| Z-036A-011 | | | | | 180,00 | 82,00 | 42,00 | 1,30 | 26,76 | 7,62 | 0,021 | 5,401 | 0,40 | 0,014 | 422,30 | 380,30 | 2,5200 | ZE | | |
| Z-036A-01X | | | | | 270,00 | 82,00 | 42,00 | 1,30 | 26,88 | 7,56 | 0,021 | 5,401 | 0,40 | 0,014 | 424,10 | 382,10 | 2,5200 | ZE | | |
| Z-036ADI | | | | | 180,00 | 87,00 | 47,50 | 1,30 | 32,75 | 7,37 | 0,021 | 5,401 | 0,38 | 0,012 | 514,46 | 466,96 | 3,0600 | ZE | | |
| Z-036ADX | | | | | 270,00 | 88,00 | 47,50 | 1,30 | 32,88 | 7,31 | 0,021 | 5,401 | 0,38 | 0,011 | 516,27 | 468,77 | 3,0710 | ZE | | |
| Z-036AEI | | | | | 180,00 | 101,00 | 58,50 | 1,30 | 43,75 | 7,37 | 0,021 | 5,401 | 0,37 | 0,009 | 684,74 | 626,24 | 4,0720 | ZE | | |
| Z-036AEX | | | | | 270,00 | 101,00 | 58,50 | 1,30 | 43,88 | 7,31 | 0,021 | 5,401 | 0,37 | 0,009 | 686,55 | 628,05 | 4,0840 | ZE | | |
| Z-036BAI | 8,00 | 0,35 | 9,10 | 180,00 | 27,00 | 16,70 | 0,70 | 5,25 | 5,72 | 0,281 | 6,721 | 0,65 | 0,159 | 57,21 | 40,51 | 0,4179 | ZE | | | |
| Z-036BAX | | | | 270,00 | 27,00 | 16,70 | 0,70 | 5,38 | 5,66 | 0,281 | 6,721 | 0,64 | 0,155 | 58,27 | 41,57 | 0,4271 | ZE | | | |
| Z-036BBI | | | | 180,00 | 39,00 | 22,20 | 0,70 | 10,75 | 5,72 | 0,281 | 6,721 | 0,52 | 0,074 | 109,61 | 87,41 | 0,8175 | ZE | | | |
| Z-036BBX | | | | 270,00 | 39,00 | 22,20 | 0,70 | 10,88 | 5,66 | 0,281 | 6,721 | 0,52 | 0,073 | 110,68 | 88,48 | 0,8266 | ZE | | | |
| Z-036BCI | | | | 180,00 | 56,00 | 33,20 | 0,90 | 21,75 | 5,72 | 0,281 | 6,721 | 0,45 | 0,036 | 214,42 | 181,22 | 1,6170 | ZE | | | |
| Z-036BCX | | | | 270,00 | 56,00 | 33,20 | 0,90 | 21,88 | 5,66 | 0,281 | 6,721 | 0,45 | 0,035 | 215,48 | 182,28 | 1,6260 | ZE | | | |
| Z-036BDI | | | | 180,00 | 69,00 | 44,20 | 1,30 | 32,75 | 5,72 | 0,281 | 6,721 | 0,43 | 0,023 | 319,22 | 275,02 | 2,4160 | ZE | | | |
| Z-036BDX | | | | 270,00 | 70,00 | 44,20 | 1,30 | 32,88 | 5,66 | 0,281 | 6,721 | 0,43 | 0,023 | 320,29 | 276,09 | 2,4250 | ZE | | | |
| Z-036BEI | | | | 180,00 | 80,00 | 55,20 | 1,30 | 43,75 | 5,72 | 0,281 | 6,721 | 0,42 | 0,017 | 424,03 | 368,83 | 3,2150 | ZE | | | |
| Z-036BEX | | | | 270,00 | 80,00 | 55,20 | 1,30 | 43,88 | 5,66 | 0,281 | 6,721 | 0,42 | 0,017 | 425,10 | 369,90 | 3,2250 | ZE | | | |
| Z-037I | | | | 6,80 | 0,25 | 7,80 | 180,00 | 26,00 | 15,70 | 0,60 | 6,25 | 4,72 | 0,391 | 7,871 | 0,65 | 0,221 | 49,47 | 33,77 | 0,4122 | ZD |
| Z-037X | | | | | | | 270,00 | 26,00 | 15,70 | 0,60 | 6,38 | 4,66 | 0,391 | 7,871 | 0,64 | 0,217 | 50,20 | 34,50 | 0,4197 | ZD |
| Z-038I | | | | | | | 180,00 | 37,00 | 22,20 | 0,70 | 12,75 | 4,72 | 0,391 | 7,871 | 0,54 | 0,104 | 94,14 | 71,94 | 0,8091 | ZE |
| Z-038X | | | | | | | 270,00 | 37,00 | 22,20 | 0,70 | 12,88 | 4,66 | 0,391 | 7,871 | 0,53 | 0,103 | 94,87 | 72,67 | 0,8199 | ZE |
| Z-039I | 180,00 | 47,00 | 29,70 | | | | 0,90 | 20,25 | 4,72 | 0,391 | 7,871 | 0,49 | 0,064 | 145,68 | 115,98 | 1,2670 | ZE | | | |
| Z-039X | 270,00 | 47,00 | 29,70 | | | | 0,90 | 20,38 | 4,66 | 0,391 | 7,871 | 0,49 | 0,064 | 146,41 | 116,71 | 1,2740 | ZE | | | |
| Z-039AI | 180,00 | 55,00 | 36,80 | | | | 0,90 | 27,25 | 4,77 | 0,391 | 7,871 | 0,47 | 0,048 | 193,89 | 157,09 | 1,6940 | ZE | | | |
| Z-039AX | 270,00 | 55,00 | 36,80 | | | | 0,90 | 27,38 | 4,71 | 0,391 | 7,871 | 0,47 | 0,047 | 194,62 | 157,82 | 1,7020 | ZE | | | |
| Z-040I | 5,50 | 0,25 | 6,50 | | | | 180,00 | 22,00 | 13,70 | 0,60 | 6,25 | 3,72 | 0,661 | 9,651 | 0,74 | 0,443 | 34,01 | 20,31 | 0,3272 | ZD |
| Z-040X | | | | | | | 270,00 | 22,00 | 13,70 | 0,60 | 6,38 | 3,66 | 0,661 | 9,651 | 0,74 | 0,434 | 34,45 | 20,75 | 0,3332 | ZD |
| Z-040AI | | | | | | | 180,00 | 23,00 | 14,20 | 0,60 | 6,75 | 3,72 | 0,661 | 9,651 | 0,72 | 0,408 | 36,27 | 22,07 | 0,3514 | ZD |
| Z-040AX | | | | | | | 270,00 | 23,00 | 14,20 | 0,60 | 6,88 | 3,66 | 0,661 | 9,651 | 0,72 | 0,400 | 36,71 | 22,51 | 0,3574 | ZD |
| Z-041I | | | | | | | 180,00 | 32,00 | 20,20 | 0,70 | 12,75 | 3,72 | 0,661 | 9,651 | 0,61 | 0,208 | 63,46 | 43,26 | 0,6423 | ZD |
| Z-041X | | | | | | | 270,00 | 32,00 | 20,20 | 0,70 | 12,88 | 3,66 | 0,661 | 9,651 | 0,61 | 0,206 | 63,90 | 43,70 | 0,6484 | ZD |
| Z-042I | | | | 180,00 | 41,00 | 27,70 | 0,90 | 20,25 | 3,72 | 0,661 | 9,661 | 0,57 | 0,129 | 97,45 | 69,75 | 1,0060 | ZE | | | |
| Z-042X | | | | 270,00 | 41,00 | 27,70 | 0,90 | 20,38 | 3,66 | 0,661 | 9,661 | 0,57 | 0,128 | 97,89 | 70,19 | 1,0120 | ZE | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-042AI | 0,50 | 5,50 | 0,25 | 6,50 | 180,00 | 44,00 | 31,20 | 0,90 | 23,75 | 3,72 | 0,661 | 9,651 | 0,55 | 0,110 | 113,31 | 82,11 | 1,1750 | ZE |
| Z-042AX | | | | | 270,00 | 44,00 | 31,20 | 0,90 | 23,88 | 3,66 | 0,661 | 9,651 | 0,55 | 0,109 | 113,75 | 82,55 | 1,1810 | ZE |
| Z-042BI | | | | | 180,00 | 47,00 | 34,70 | 0,90 | 27,25 | 3,72 | 0,661 | 9,651 | 0,54 | 0,095 | 129,17 | 94,47 | 1,3450 | ZE |
| Z-042BX | | | | | 270,00 | 47,00 | 34,70 | 0,90 | 27,38 | 3,66 | 0,661 | 9,651 | 0,54 | 0,095 | 129,61 | 94,91 | 1,3510 | ZE |
| Z-042CI | | | | | 180,00 | 51,00 | 38,70 | 0,90 | 31,25 | 3,72 | 0,661 | 9,651 | 0,54 | 0,083 | 147,29 | 108,59 | 1,5390 | ZE |
| Z-042CX | | | | | 270,00 | 51,00 | 38,70 | 0,90 | 31,38 | 3,66 | 0,661 | 9,651 | 0,54 | 0,082 | 147,73 | 109,03 | 1,5450 | ZE |
| Z-042DI | | | | | 180,00 | 54,00 | 42,70 | 1,30 | 35,25 | 3,72 | 0,661 | 9,651 | 0,53 | 0,073 | 165,42 | 122,72 | 1,7330 | ZF |
| Z-042DX | | | | | 270,00 | 54,00 | 42,70 | 1,30 | 35,38 | 3,66 | 0,661 | 9,651 | 0,53 | 0,073 | 165,86 | 123,16 | 1,7390 | ZF |
| Z-042EI | | | | | 180,00 | 57,00 | 46,70 | 1,30 | 39,25 | 3,72 | 0,661 | 9,651 | 0,53 | 0,066 | 183,55 | 136,85 | 1,9270 | ZF |
| Z-042EX | | | | | 270,00 | 57,00 | 46,70 | 1,30 | 39,38 | 3,66 | 0,661 | 9,651 | 0,53 | 0,066 | 183,99 | 137,29 | 1,9330 | ZF |
| Z-042FI | 5,00 | 0,25 | 6,00 | 180,00 | 19,00 | 11,90 | 0,60 | 5,25 | 3,32 | 0,771 | 10,570 | 0,87 | 0,736 | 25,23 | 13,33 | 0,2509 | ZD | |
| Z-042FX | | | | 270,00 | 19,00 | 11,90 | 0,60 | 5,38 | 3,26 | 0,771 | 10,570 | 0,86 | 0,717 | 25,58 | 13,68 | 0,2563 | ZD | |
| Z-042GI | | | | 180,00 | 28,00 | 17,40 | 0,70 | 10,75 | 3,32 | 0,771 | 10,570 | 0,70 | 0,341 | 46,17 | 28,77 | 0,4909 | ZD | |
| Z-042GX | | | | 270,00 | 28,00 | 17,40 | 0,70 | 10,88 | 3,26 | 0,771 | 10,570 | 0,70 | 0,337 | 46,52 | 29,12 | 0,4965 | ZD | |
| Z-042HI | | | | 180,00 | 36,00 | 25,00 | 0,70 | 18,25 | 3,37 | 0,771 | 10,580 | 0,63 | 0,197 | 74,82 | 49,82 | 0,8183 | ZD | |
| Z-042HX | | | | 270,00 | 37,00 | 25,00 | 0,70 | 18,38 | 3,31 | 0,771 | 10,580 | 0,63 | 0,195 | 75,17 | 50,17 | 0,8239 | ZD | |
| Z-042JI | | | | 180,00 | 40,00 | 28,40 | 0,90 | 21,75 | 3,32 | 0,771 | 10,580 | 0,62 | 0,164 | 88,04 | 59,64 | 0,9710 | ZE | |
| Z-042JX | | | | 270,00 | 40,00 | 28,40 | 0,90 | 21,88 | 3,26 | 0,771 | 10,580 | 0,62 | 0,163 | 88,39 | 59,99 | 0,9766 | ZE | |
| Z-042KI | | | | 180,00 | 41,00 | 30,00 | 0,90 | 23,25 | 3,37 | 0,771 | 10,580 | 0,61 | 0,154 | 93,85 | 63,85 | 1,0360 | ZE | |
| Z-042KX | | | | 270,00 | 41,00 | 30,00 | 0,90 | 23,38 | 3,31 | 0,771 | 10,580 | 0,61 | 0,153 | 94,20 | 64,20 | 1,0420 | ZE | |
| Z-042LI | 180,00 | 49,00 | 39,40 | 0,90 | 32,75 | 3,32 | 0,771 | 10,580 | 0,59 | 0,108 | 129,91 | 90,51 | 1,4540 | ZE | | | | |
| Z-042LX | 270,00 | 49,00 | 39,40 | 0,90 | 32,88 | 3,26 | 0,771 | 10,580 | 0,59 | 0,108 | 130,26 | 90,86 | 1,4560 | ZE | | | | |
| Z-042MI | 180,00 | 57,00 | 50,40 | 1,30 | 43,75 | 3,32 | 0,771 | 10,580 | 0,57 | 0,081 | 171,78 | 121,38 | 1,9310 | ZE | | | | |
| Z-042MX | 270,00 | 57,00 | 50,40 | 1,30 | 43,88 | 3,26 | 0,771 | 10,580 | 0,57 | 0,081 | 172,13 | 121,73 | 1,9360 | ZE | | | | |
| Z-043AI | 4,50 | 0,15 | 5,40 | 180,00 | 16,00 | 10,10 | 0,40 | 4,25 | 2,93 | 0,881 | 11,690 | 0,81 | 1,326 | 18,25 | 8,15 | 0,1800 | ZD | |
| Z-043AX | | | | 270,00 | 16,00 | 10,10 | 0,40 | 4,38 | 2,86 | 0,881 | 11,690 | 0,81 | 1,284 | 18,52 | 8,42 | 0,1850 | ZD | |
| Z-043I | | | | 180,00 | 20,00 | 12,10 | 0,50 | 6,25 | 2,92 | 0,881 | 11,690 | 0,80 | 0,865 | 24,59 | 12,49 | 0,2619 | ZD | |
| Z-043X | | | | 270,00 | 20,00 | 12,10 | 0,50 | 6,38 | 2,83 | 0,881 | 11,690 | 0,80 | 0,847 | 24,86 | 12,76 | 0,2668 | ZD | |
| Z-044I | | | | 180,00 | 29,00 | 18,60 | 0,60 | 12,75 | 2,92 | 0,881 | 11,690 | 0,73 | 0,406 | 45,21 | 26,61 | 0,5142 | ZD | |
| Z-044X | | | | 270,00 | 29,00 | 18,60 | 0,60 | 12,88 | 2,86 | 0,881 | 11,690 | 0,73 | 0,402 | 45,48 | 26,88 | 0,5191 | ZD | |
| Z-045I | | | | 180,00 | 36,00 | 26,10 | 0,80 | 20,25 | 2,92 | 0,881 | 11,690 | 0,71 | 0,252 | 69,00 | 42,90 | 0,8054 | ZD | |
| Z-045X | | | | 270,00 | 36,00 | 26,10 | 0,80 | 20,38 | 2,86 | 0,881 | 11,690 | 0,71 | 0,250 | 69,27 | 43,17 | 0,8101 | ZD | |
| Z-045AI | | | | 180,00 | 39,00 | 29,60 | 0,80 | 23,75 | 2,92 | 0,881 | 11,690 | 0,70 | 0,214 | 80,11 | 50,51 | 0,9411 | ZE | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-042AI | 0,50 | 5,50 | 0,25 | 6,50 | 180,00 | 44,00 | 31,20 | 0,90 | 23,75 | 3,72 | 0,511 | 7,781 | 0,52 | 0,094 | 108,53 | 77,33 | 1,1767 | ZH |
| RZ-042AX | | | | | 270,00 | 44,00 | 31,20 | 0,90 | 23,88 | 3,66 | 0,511 | 7,781 | 0,52 | 0,094 | 108,94 | 77,74 | 1,1830 | ZH |
| RZ-042BI | | | | | 180,00 | 47,00 | 34,70 | 0,90 | 27,25 | 3,72 | 0,511 | 7,781 | 0,51 | 0,082 | 123,67 | 88,97 | 1,3474 | ZH |
| RZ-042BX | | | | | 270,00 | 47,00 | 34,70 | 0,90 | 27,38 | 3,66 | 0,511 | 7,781 | 0,51 | 0,081 | 124,08 | 89,38 | 1,3538 | ZH |
| RZ-042CI | | | | | 180,00 | 51,00 | 38,70 | 0,90 | 31,25 | 3,72 | 0,511 | 7,781 | 0,51 | 0,071 | 140,97 | 102,27 | 1,5425 | ZH |
| RZ-042CX | | | | | 270,00 | 51,00 | 38,70 | 0,90 | 31,38 | 3,66 | 0,511 | 7,781 | 0,51 | 0,071 | 141,39 | 102,69 | 1,5489 | ZH |
| RZ-042DI | | | | | 180,00 | 54,00 | 42,70 | 1,30 | 35,25 | 3,72 | 0,511 | 7,781 | 0,53 | 0,063 | 158,28 | 115,58 | 1,7376 | ZJ |
| RZ-042DX | | | | | 270,00 | 54,00 | 42,70 | 1,30 | 35,38 | 3,66 | 0,511 | 7,781 | 0,50 | 0,063 | 158,69 | 115,99 | 1,7440 | ZJ |
| RZ-042EI | | | | | 180,00 | 57,00 | 46,70 | 1,30 | 39,25 | 3,72 | 0,511 | 7,781 | 0,50 | 0,056 | 175,58 | 128,88 | 1,9327 | ZJ |
| RZ-042EX | | | | | 270,00 | 57,00 | 46,70 | 1,30 | 39,38 | 3,66 | 0,511 | 7,781 | 0,50 | 0,056 | 176,00 | 129,30 | 1,9391 | ZJ |
| RZ-042FI | 5,00 | 0,25 | 6,00 | 180,00 | 19,00 | 11,90 | 0,60 | 5,25 | 3,32 | 0,611 | 8,531 | 0,84 | 0,632 | 24,43 | 12,53 | 0,2469 | ZG | |
| RZ-042FX | | | | 270,00 | 19,00 | 11,90 | 0,60 | 5,38 | 3,26 | 0,611 | 8,531 | 0,83 | 0,615 | 24,76 | 12,86 | 0,2526 | ZG | |
| RZ-042GI | | | | 180,00 | 28,00 | 17,40 | 0,70 | 10,75 | 3,32 | 0,611 | 8,531 | 0,67 | 0,293 | 44,45 | 27,05 | 0,4884 | ZG | |
| RZ-042GX | | | | 270,00 | 28,00 | 17,40 | 0,70 | 10,88 | 3,26 | 0,611 | 8,531 | 0,67 | 0,289 | 44,78 | 27,38 | 0,4941 | ZG | |
| RZ-042HI | | | | 180,00 | 36,00 | 25,00 | 0,70 | 18,25 | 3,37 | 0,611 | 8,531 | 0,60 | 0,169 | 71,84 | 46,84 | 0,8176 | ZG | |
| RZ-042HX | | | | 270,00 | 37,00 | 25,00 | 0,70 | 18,38 | 3,31 | 0,611 | 8,531 | 0,60 | 0,168 | 72,17 | 47,17 | 0,8233 | ZG | |
| RZ-042JI | | | | 180,00 | 40,00 | 28,40 | 0,90 | 21,75 | 3,32 | 0,611 | 8,531 | 0,59 | 0,141 | 84,47 | 56,07 | 0,9712 | ZH | |
| RZ-042JX | | | | 270,00 | 40,00 | 28,40 | 0,90 | 21,88 | 3,26 | 0,611 | 8,531 | 0,59 | 0,140 | 84,80 | 56,40 | 0,9769 | ZH | |
| RZ-042KI | | | | 180,00 | 41,00 | 30,00 | 0,90 | 23,25 | 3,37 | 0,611 | 8,531 | 0,58 | 0,132 | 90,03 | 60,03 | 1,0371 | ZH | |
| RZ-042KX | | | | 270,00 | 41,00 | 30,00 | 0,90 | 23,38 | 3,31 | 0,611 | 8,531 | 0,58 | 0,131 | 90,36 | 60,36 | 1,0428 | ZH | |
| RZ-042LI | 4,50 | 0,15 | 5,40 | 180,00 | 16,00 | 10,10 | 0,40 | 4,25 | 2,93 | 0,711 | 9,421 | 0,94 | 1,139 | 17,75 | 7,65 | 0,1805 | ZG | |
| RZ-043AX | | | | 270,00 | 16,00 | 10,10 | 0,40 | 4,38 | 2,86 | 0,711 | 9,421 | 0,94 | 1,101 | 18,00 | 7,90 | 0,1855 | ZG | |
| RZ-043I | | | | 180,00 | 20,00 | 12,10 | 0,50 | 6,25 | 2,92 | 0,711 | 9,421 | 0,90 | 0,743 | 23,83 | 11,73 | 0,2585 | ZG | |
| RZ-043X | | | | 270,00 | 20,00 | 12,10 | 0,50 | 6,38 | 2,83 | 0,711 | 9,421 | 0,90 | 0,727 | 24,08 | 11,98 | 0,2636 | ZG | |
| RZ-044I | | | | 180,00 | 29,00 | 18,60 | 0,60 | 12,75 | 2,92 | 0,711 | 9,421 | 0,74 | 0,349 | 43,58 | 24,98 | 0,5121 | ZG | |
| RZ-044X | | | | 270,00 | 29,00 | 18,60 | 0,60 | 12,88 | 2,86 | 0,711 | 9,421 | 0,74 | 0,345 | 43,84 | 25,24 | 0,5172 | ZG | |
| RZ-045I | | | | 180,00 | 36,00 | 26,10 | 0,80 | 20,25 | 2,92 | 0,711 | 9,421 | 0,68 | 0,216 | 66,38 | 40,28 | 0,8048 | ZG | |
| RZ-045X | | | | 270,00 | 36,00 | 26,10 | 0,80 | 20,38 | 2,86 | 0,711 | 9,421 | 0,68 | 0,215 | 66,64 | 40,54 | 0,8099 | ZG | |
| RZ-045AI | | | | 180,00 | 39,00 | 29,60 | 0,80 | 23,75 | 2,92 | 0,711 | 9,421 | 0,66 | 0,184 | 77,02 | 47,42 | 0,9414 | ZH | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-045AX | 0,50 | 4,50 | 0,15 | 5,40 | 270,00 | 39,00 | 29,60 | 0,80 | 23,88 | 2,86 | 0,711 | 9,421 | 0,66 | 0,183 | 77,27 | 47,67 | 0,9464 | ZH |
| RZ-045BI | | | | | 180,00 | 42,00 | 33,10 | 0,80 | 27,25 | 2,92 | 0,711 | 9,421 | 0,65 | 0,160 | 87,66 | 54,56 | 1,0779 | ZH |
| RZ-045BX | | | | | 270,00 | 42,00 | 33,10 | 0,80 | 27,38 | 2,86 | 0,711 | 9,421 | 0,65 | 0,159 | 87,91 | 54,81 | 1,0830 | ZH |
| RZ-045CI | | | | | 180,00 | 45,00 | 37,10 | 0,80 | 31,25 | 2,92 | 0,711 | 9,421 | 0,64 | 0,139 | 99,82 | 62,72 | 1,2340 | ZH |
| RZ-045CX | | | | | 270,00 | 45,00 | 37,10 | 0,80 | 31,38 | 2,86 | 0,711 | 9,421 | 0,64 | 0,138 | 100,07 | 62,97 | 1,2391 | ZH |
| RZ-045DI | | | | | 180,00 | 48,00 | 41,10 | 1,10 | 35,25 | 2,92 | 0,711 | 9,421 | 0,64 | 0,123 | 111,97 | 70,87 | 1,3901 | ZH |
| RZ-045DX | | | | | 270,00 | 48,00 | 41,10 | 1,10 | 35,38 | 2,86 | 0,711 | 9,421 | 0,64 | 0,122 | 112,23 | 71,13 | 1,3952 | ZH |
| RZ-045EI | | | | | 180,00 | 51,00 | 45,10 | 1,10 | 39,25 | 2,92 | 0,711 | 9,421 | 0,63 | 0,110 | 124,13 | 79,03 | 1,5462 | ZH |
| RZ-045EX | | | | | 270,00 | 51,00 | 45,10 | 1,10 | 39,38 | 2,86 | 0,711 | 9,421 | 0,63 | 0,110 | 124,39 | 79,29 | 1,5512 | ZH |
| RZ-045E-011 | | | | | 4,00 | 0,15 | 4,90 | 180,00 | 18,00 | 10,50 | 0,50 | 5,25 | 2,63 | 0,811 | 10,520 | 0,95 | 1,343 | 17,73 |
| RZ-045E-01X | 270,00 | 18,00 | 10,50 | 0,50 | | | | 5,38 | 2,56 | 0,811 | 10,520 | 0,95 | 1,307 | 17,93 | 7,43 | 0,1965 | ZG | |
| RZ-045E-021 | 180,00 | 23,00 | 15,00 | 0,50 | | | | 9,75 | 2,63 | 0,811 | 10,520 | 0,89 | 0,689 | 29,10 | 14,10 | 0,3457 | ZG | |
| RZ-045E-02X | 270,00 | 23,00 | 15,00 | 0,50 | | | | 9,88 | 2,56 | 0,811 | 10,520 | 0,89 | 0,680 | 29,30 | 14,30 | 0,3501 | ZG | |
| RZ-045FI | 180,00 | 30,00 | 20,00 | 0,60 | | | | 14,75 | 2,62 | 0,811 | 10,520 | 0,87 | 0,448 | 41,70 | 21,70 | 0,5164 | ZG | |
| RZ-045FX | 270,00 | 30,00 | 20,00 | 0,60 | | | | 14,88 | 2,56 | 0,811 | 10,520 | 0,87 | 0,444 | 41,89 | 21,89 | 0,5208 | ZG | |
| RZ-045GI | 180,00 | 35,00 | 25,00 | 0,60 | | | | 19,75 | 2,62 | 0,811 | 10,520 | 0,83 | 0,331 | 54,32 | 29,32 | 0,6871 | ZG | |
| RZ-045GX | 270,00 | 35,00 | 25,00 | 0,60 | | | | 19,88 | 2,56 | 0,811 | 10,520 | 0,83 | 0,329 | 54,50 | 29,50 | 0,6916 | ZG | |
| RZ-045HI | 180,00 | 39,00 | 30,00 | 0,80 | | | | 24,75 | 2,62 | 0,811 | 10,520 | 0,80 | 0,263 | 66,93 | 36,93 | 0,8578 | ZG | |
| RZ-045HX | 270,00 | 39,00 | 30,00 | 0,80 | | | | 24,88 | 2,56 | 0,811 | 10,520 | 0,80 | 0,262 | 67,13 | 37,13 | 0,8623 | ZG | |
| RZ-045JI | 180,00 | 47,00 | 40,00 | 0,80 | 34,75 | 2,62 | 0,811 | 10,520 | 0,77 | 0,186 | 92,17 | 52,17 | 1,1993 | ZH | | | | |
| RZ-045JX | 270,00 | 47,00 | 40,00 | 0,80 | 34,88 | 2,56 | 0,811 | 10,520 | 0,77 | 0,186 | 92,36 | 52,36 | 1,2037 | ZH | | | | |
| RZ-046I | 3,70 | 0,15 | 4,60 | 180,00 | 19,00 | 10,80 | 0,50 | 6,25 | 2,27 | 0,881 | 11,310 | 1,28 | 1,451 | 17,99 | 7,19 | 0,2068 | ZG | |
| RZ-046X | | | | 270,00 | 19,00 | 10,80 | 0,50 | 6,38 | 2,21 | 0,881 | 11,310 | 1,27 | 1,419 | 18,14 | 7,34 | 0,2109 | ZG | |
| RZ-047I | | | | 180,00 | 27,00 | 17,30 | 0,60 | 12,75 | 2,27 | 0,881 | 11,310 | 1,05 | 0,681 | 32,61 | 15,31 | 0,4097 | ZG | |
| RZ-047X | | | | 270,00 | 28,00 | 17,30 | 0,60 | 12,88 | 2,21 | 0,881 | 11,310 | 1,04 | 0,674 | 32,77 | 15,47 | 0,4138 | ZG | |
| RZ-048I | | | | 180,00 | 35,00 | 24,80 | 0,60 | 20,25 | 2,27 | 0,881 | 11,310 | 0,96 | 0,423 | 49,49 | 24,69 | 0,6438 | ZG | |
| RZ-048X | | | | 270,00 | 35,00 | 24,80 | 0,60 | 20,38 | 2,21 | 0,881 | 11,310 | 0,95 | 0,420 | 49,64 | 24,84 | 0,6479 | ZG | |
| RZ-048AI | | | | 180,00 | 38,00 | 28,30 | 0,80 | 23,75 | 2,27 | 0,881 | 11,310 | 0,93 | 0,359 | 57,36 | 29,06 | 0,7531 | ZG | |
| RZ-048AX | | | | 270,00 | 38,00 | 28,30 | 0,80 | 23,88 | 2,21 | 0,881 | 11,310 | 0,93 | 0,357 | 57,52 | 29,22 | 0,7571 | ZG | |
| RZ-048BI | | | | 180,00 | 41,00 | 31,80 | 0,80 | 27,25 | 2,27 | 0,881 | 11,310 | 0,91 | 0,312 | 65,24 | 33,44 | 0,8623 | ZG | |
| RZ-048BX | | | | 270,00 | 41,00 | 31,80 | 0,80 | 27,38 | 2,21 | 0,881 | 11,310 | 0,91 | 0,310 | 65,39 | 33,59 | 0,8664 | ZG | |
| RZ-048CI | | | | 180,00 | 43,00 | 35,80 | 0,80 | 31,25 | 2,27 | 0,881 | 11,310 | 0,90 | 0,271 | 74,24 | 38,44 | 0,9872 | ZG | |
| RZ-048CX | | | | 270,00 | 44,00 | 35,80 | 0,80 | 31,38 | 2,21 | 0,881 | 11,310 | 0,90 | 0,270 | 74,39 | 38,59 | 0,9913 | ZG | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-045AX | 0,50 | 4,50 | 0,15 | 5,40 | 270,00 | 39,00 | 29,60 | 0,80 | 23,88 | 2,86 | 0,881 | 11,690 | 0,70 | 0,213 | 80,38 | 50,78 | 0,9461 | ZE |
| Z-045BI | | | | | 180,00 | 42,00 | 33,10 | 0,80 | 27,25 | 2,92 | 0,881 | 11,690 | 0,68 | 0,186 | 91,21 | 58,11 | 1,0760 | ZE |
| Z-045BX | | | | | 270,00 | 42,00 | 33,10 | 0,80 | 27,38 | 2,86 | 0,881 | 11,690 | 0,68 | 0,185 | 91,48 | 58,38 | 1,0810 | ZE |
| Z-045CI | | | | | 180,00 | 45,00 | 37,10 | 0,80 | 31,25 | 2,92 | 0,881 | 11,690 | 0,68 | 0,162 | 103,90 | 66,80 | 1,2320 | ZE |
| Z-045CX | | | | | 270,00 | 45,00 | 37,10 | 0,80 | 31,38 | 2,86 | 0,881 | 11,690 | 0,68 | 0,161 | 104,17 | 67,07 | 1,2370 | ZE |
| Z-045DI | | | | | 180,00 | 48,00 | 41,10 | 1,10 | 35,25 | 2,92 | 0,881 | 11,690 | 0,67 | 0,143 | 116,59 | 75,49 | 1,3870 | ZE |
| Z-045DX | | | | | 270,00 | 48,00 | 41,10 | 1,10 | 35,38 | 2,86 | 0,881 | 11,690 | 0,67 | 0,143 | 116,86 | 75,76 | 1,3920 | ZE |
| Z-045EI | | | | | 180,00 | 51,00 | 45,10 | 1,10 | 39,25 | 2,92 | 0,881 | 11,690 | 0,66 | 0,128 | 129,28 | 84,18 | 1,5420 | ZE |
| Z-045EX | | | | | 270,00 | 51,00 | 45,10 | 1,10 | 39,38 | 2,86 | 0,881 | 11,690 | 0,66 | 0,128 | 129,55 | 84,45 | 1,5470 | ZE |
| Z-045E-011 | | | | | 4,00 | 0,15 | 4,90 | 180,00 | 18,00 | 10,50 | 0,50 | 5,25 | 2,63 | 1,001 | 13,050 | 0,95 | 1,563 | 18,20 |
| Z-045E-01X | 270,00 | 18,00 | 10,50 | 0,50 | | | | 5,38 | 2,56 | 1,001 | 13,050 | 0,95 | 1,523 | 18,40 | 7,90 | 0,1965 | ZD | |
| Z-045E-02I | 180,00 | 23,00 | 15,00 | 0,50 | | | | 9,75 | 2,63 | 1,001 | 13,050 | 0,89 | 0,803 | 30,00 | 15,00 | 0,3457 | ZD | |
| Z-045E-02X | 270,00 | 23,00 | 15,00 | 0,50 | | | | 9,88 | 2,56 | 1,001 | 13,050 | 0,89 | 0,792 | 30,20 | 15,20 | 0,3501 | ZD | |
| Z-045FI | 180,00 | 30,00 | 20,00 | 0,60 | | | | 14,75 | 2,62 | 1,001 | 13,050 | 0,87 | 0,521 | 43,12 | 23,12 | 0,5182 | ZD | |
| Z-045FX | 270,00 | 30,00 | 20,00 | 0,60 | | | | 14,88 | 2,56 | 1,001 | 13,050 | 0,87 | 0,517 | 43,33 | 23,33 | 0,5224 | ZD | |
| Z-045GI | 180,00 | 35,00 | 25,00 | 0,60 | | | | 19,75 | 2,62 | 1,001 | 13,050 | 0,87 | 0,386 | 56,24 | 31,24 | 0,6881 | ZD | |
| Z-045GX | 270,00 | 35,00 | 25,00 | 0,60 | | | | 19,88 | 2,56 | 1,001 | 13,050 | 0,86 | 0,383 | 56,44 | 31,44 | 0,6924 | ZD | |
| Z-045HI | 180,00 | 39,00 | 30,00 | 0,80 | | | | 24,75 | 2,62 | 1,001 | 13,050 | 0,83 | 0,306 | 69,35 | 39,35 | 0,8579 | ZD | |
| Z-045HX | 270,00 | 39,00 | 30,00 | 0,80 | | | | 24,88 | 2,56 | 1,001 | 13,050 | 0,83 | 0,305 | 69,55 | 39,55 | 0,8622 | ZD | |
| Z-045JI | 180,00 | 47,00 | 40,00 | 0,80 | 34,75 | 2,62 | 1,001 | 13,050 | 0,81 | 0,217 | 95,58 | 55,58 | 1,1970 | ZE | | | | |
| Z-045JX | 270,00 | 47,00 | 40,00 | 0,80 | 34,88 | 2,56 | 1,001 | 13,050 | 0,81 | 0,216 | 95,78 | 55,78 | 1,2020 | ZE | | | | |
| Z-046I | 3,70 | 0,15 | 4,60 | 180,00 | 19,00 | 10,80 | 0,50 | 6,25 | 2,27 | 1,111 | 14,020 | 1,32 | 1,690 | 18,44 | 7,64 | 0,2098 | ZD | |
| Z-046X | | | | 270,00 | 19,00 | 10,80 | 0,50 | 6,38 | 2,21 | 1,111 | 14,020 | 1,31 | 1,654 | 18,61 | 7,81 | 0,2136 | ZD | |
| Z-047I | | | | 180,00 | 27,00 | 17,30 | 0,60 | 12,75 | 2,27 | 1,111 | 14,020 | 1,09 | 0,793 | 33,58 | 16,28 | 0,4118 | ZD | |
| Z-047X | | | | 270,00 | 28,00 | 17,30 | 0,60 | 12,88 | 2,21 | 1,111 | 14,020 | 1,08 | 0,785 | 33,75 | 16,45 | 0,4157 | ZD | |
| Z-048I | | | | 180,00 | 35,00 | 24,80 | 0,60 | 20,25 | 2,27 | 1,111 | 14,020 | 1,00 | 0,492 | 51,06 | 26,26 | 0,6449 | ZD | |
| Z-048X | | | | 270,00 | 35,00 | 24,80 | 0,60 | 20,38 | 2,21 | 1,111 | 14,020 | 0,99 | 0,489 | 51,22 | 26,42 | 0,6488 | ZD | |
| Z-048AI | | | | 180,00 | 38,00 | 28,30 | 0,80 | 23,75 | 2,27 | 1,111 | 14,020 | 0,97 | 0,418 | 59,21 | 30,91 | 0,7537 | ZD | |
| Z-048AX | | | | 270,00 | 38,00 | 28,30 | 0,80 | 23,88 | 2,21 | 1,111 | 14,020 | 0,97 | 0,416 | 59,37 | 31,07 | 0,7576 | ZD | |
| Z-048BI | | | | 180,00 | 41,00 | 31,80 | 0,80 | 27,25 | 2,27 | 1,111 | 14,020 | 0,95 | 0,363 | 67,36 | 35,56 | 0,8625 | ZD | |
| Z-048BX | | | | 270,00 | 41,00 | 31,80 | 0,80 | 27,38 | 2,21 | 1,111 | 14,020 | 0,95 | 0,362 | 67,53 | 35,73 | 0,8664 | ZD | |
| Z-048CI | 180,00 | 43,00 | 35,80 | 0,80 | 31,25 | 2,27 | 1,111 | 14,020 | 0,94 | 0,316 | 76,68 | 40,88 | 0,9869 | ZD | | | | |
| Z-048CX | 270,00 | 44,00 | 35,80 | 0,80 | 31,38 | 2,21 | 1,111 | 14,020 | 0,94 | 0,315 | 76,84 | 41,04 | 0,9980 | ZD | | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-048DI | 0,50 | 3,70 | 0,15 | 4,60 | 180,00 | 46,00 | 39,80 | 0,80 | 35,25 | 2,27 | 1,111 | 14,020 | 0,93 | 0,280 | 86,00 | 46,20 | 1,1110 | ZE | | |
| Z-048DX | | | | | 270,00 | 46,00 | 39,80 | 0,80 | 35,38 | 2,21 | 1,111 | 14,020 | 0,93 | 0,279 | 86,16 | 46,36 | 1,1150 | ZE | | |
| Z-048EI | | | | | 180,00 | 49,00 | 43,80 | 1,10 | 39,25 | 2,27 | 1,111 | 14,020 | 0,92 | 0,251 | 95,31 | 51,51 | 1,2350 | ZE | | |
| Z-048EX | | | | | 270,00 | 49,00 | 43,80 | 1,10 | 39,38 | 2,21 | 1,111 | 14,020 | 0,92 | 0,250 | 95,48 | 51,68 | 1,2390 | ZE | | |
| Z-049I | 3,00 | 0,10 | 3,90 | 180,00 | 18,00 | 9,70 | 0,50 | 6,25 | 1,72 | 1,221 | 16,930 | 2,10 | 3,543 | 14,14 | 4,44 | 0,1642 | ZD | | | |
| Z-049X | | | | 270,00 | 18,00 | 9,70 | 0,50 | 6,38 | 1,66 | 1,221 | 16,930 | 2,08 | 3,468 | 14,23 | 4,53 | 0,1672 | ZD | | | |
| Z-050I | | | | 180,00 | 26,00 | 16,20 | 0,60 | 12,75 | 1,72 | 1,221 | 16,930 | 1,71 | 1,663 | 25,65 | 9,45 | 0,3223 | ZD | | | |
| Z-050X | | | | 270,00 | 27,00 | 16,20 | 0,60 | 12,88 | 1,66 | 1,221 | 16,930 | 1,71 | 1,646 | 25,75 | 9,55 | 0,3254 | ZD | | | |
| Z-051I | | | | 180,00 | 34,00 | 23,70 | 0,60 | 20,25 | 1,72 | 1,221 | 16,930 | 1,56 | 1,032 | 38,94 | 15,24 | 0,5048 | ZD | | | |
| Z-051X | | | | 270,00 | 34,00 | 23,70 | 0,60 | 20,38 | 1,66 | 1,221 | 16,930 | 1,56 | 1,025 | 39,04 | 15,34 | 0,5079 | ZD | | | |
| Z-051AI | | | | 180,00 | 37,00 | 28,00 | 0,80 | 24,75 | 1,62 | 1,221 | 16,930 | 1,50 | 0,840 | 46,72 | 18,72 | 0,6142 | ZD | | | |
| Z-051AX | | | | 270,00 | 37,00 | 28,00 | 0,80 | 24,88 | 1,56 | 1,221 | 16,930 | 1,50 | 0,836 | 46,81 | 18,81 | 0,6173 | ZD | | | |
| Z-051BI | | | | 180,00 | 40,00 | 31,50 | 0,80 | 28,25 | 1,62 | 1,221 | 16,930 | 1,48 | 0,734 | 52,92 | 21,42 | 0,6995 | ZD | | | |
| Z-051BX | | | | 270,00 | 40,00 | 31,50 | 0,80 | 28,38 | 1,56 | 1,221 | 16,930 | 1,48 | 0,731 | 53,01 | 21,51 | 0,7025 | ZD | | | |
| Z-051CI | | | | 180,00 | 43,00 | 35,50 | 0,80 | 32,25 | 1,62 | 1,221 | 16,930 | 1,46 | 0,642 | 60,01 | 24,51 | 0,7967 | ZD | | | |
| Z-051CX | | | | 270,00 | 43,00 | 35,50 | 0,80 | 32,38 | 1,56 | 1,221 | 16,930 | 1,46 | 0,639 | 60,10 | 24,60 | 0,7998 | ZD | | | |
| Z-051DI | | | | 180,00 | 45,00 | 39,50 | 0,80 | 36,25 | 1,62 | 1,221 | 16,930 | 1,45 | 0,570 | 67,09 | 27,59 | 0,8941 | ZD | | | |
| Z-051DX | | | | 270,00 | 45,00 | 39,50 | 0,80 | 36,38 | 1,56 | 1,221 | 16,930 | 1,45 | 0,568 | 67,19 | 27,69 | 0,8971 | ZD | | | |
| Z-051EI | | | | 180,00 | 48,00 | 43,50 | 1,10 | 40,25 | 1,62 | 1,221 | 16,930 | 1,43 | 0,513 | 74,18 | 30,68 | 0,9914 | ZE | | | |
| Z-051EX | | | | 270,00 | 48,00 | 43,50 | 1,10 | 40,38 | 1,56 | 1,221 | 16,930 | 1,43 | 0,513 | 74,28 | 30,78 | 0,9945 | ZE | | | |
| Z-051E-01I | | | | 2,50 | 0,20 | 3,50 | 180,00 | 20,00 | 10,40 | 0,50 | 7,75 | 1,32 | 1,771 | 19,790 | 2,60 | 5,489 | 13,69 | 3,29 | 0,1609 | ZD |
| Z-051E-01X | | | | | | | 270,00 | 20,00 | 10,40 | 0,50 | 7,88 | 1,26 | 1,771 | 19,790 | 2,60 | 5,396 | 13,74 | 3,34 | 0,1634 | ZD |
| Z-051E-02I | | | | | | | 180,00 | 24,00 | 13,40 | 0,50 | 10,75 | 1,32 | 1,771 | 19,790 | 2,50 | 3,882 | 18,05 | 4,65 | 0,2195 | ZD |
| Z-051E-02X | | | | | | | 270,00 | 24,00 | 13,40 | 0,50 | 10,88 | 1,26 | 1,771 | 19,790 | 2,50 | 3,836 | 18,10 | 4,70 | 0,2200 | ZD |
| Z-051E-03I | 180,00 | 28,00 | 17,40 | | | | 0,60 | 14,75 | 1,32 | 1,771 | 19,790 | 2,45 | 2,793 | 23,86 | 6,46 | 0,2975 | ZD | | | |
| Z-051E-03X | 270,00 | 28,00 | 17,40 | | | | 0,60 | 14,88 | 1,26 | 1,771 | 19,790 | 2,45 | 2,768 | 23,92 | 6,52 | 0,2999 | ZD | | | |
| Z-051E-04I | 180,00 | 30,00 | 21,90 | | | | 0,60 | 19,25 | 1,33 | 1,771 | 19,790 | 2,40 | 2,122 | 30,39 | 8,49 | 0,3830 | ZD | | | |
| Z-051E-04X | 270,00 | 30,00 | 21,90 | | | | 0,60 | 19,38 | 1,26 | 1,771 | 19,790 | 2,40 | 2,108 | 30,45 | 8,55 | 0,3850 | ZD | | | |
| Z-051E-20I | 0,55 | 6,00 | 0,25 | 7,10 | 180,00 | 17,00 | 12,40 | 0,60 | 4,13 | 4,14 | 0,881 | 11,660 | 0,80 | 0,886 | 24,57 | 12,17 | 0,2660 | ZD | | |
| Z-051E-20X | | | | | 270,00 | 17,00 | 12,40 | 0,60 | 4,26 | 4,07 | 0,881 | 11,660 | 0,80 | 0,853 | 25,03 | 12,63 | 0,2730 | ZD | | |
| Z-051FI | | | | | 180,00 | 20,00 | 13,90 | 0,60 | 5,78 | 4,06 | 0,881 | 11,660 | 0,94 | 0,606 | 31,68 | 17,78 | 0,3676 | ZD | | |
| Z-051FX | | | | | 270,00 | 20,00 | 13,90 | 0,60 | 5,91 | 3,99 | 0,881 | 11,660 | 0,93 | 0,591 | 32,15 | 18,25 | 0,3756 | ZD | | |
| Z-051GI | | | | | 180,00 | 25,00 | 17,20 | 0,70 | 9,08 | 4,06 | 0,881 | 11,660 | 0,81 | 0,372 | 46,21 | 29,01 | 0,5595 | ZD | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-048DI | 0,50 | 3,70 | 0,15 | 4,60 | 180,00 | 46,00 | 39,80 | 0,80 | 35,25 | 2,27 | 0,881 | 11,310 | 0,89 | 0,240 | 83,24 | 43,44 | 1,1121 | ZH | | |
| RZ-048DX | | | | | 270,00 | 46,00 | 39,80 | 0,80 | 35,38 | 2,21 | 0,881 | 11,310 | 0,89 | 0,239 | 83,39 | 43,59 | 1,1161 | ZH | | |
| RZ-048EI | | | | | 180,00 | 49,00 | 43,80 | 1,10 | 39,25 | 2,27 | 0,881 | 11,310 | 0,88 | 0,215 | 92,24 | 48,44 | 1,2369 | ZH | | |
| RZ-048EX | | | | | 270,00 | 49,00 | 43,80 | 1,10 | 39,38 | 2,21 | 0,881 | 11,310 | 0,88 | 0,215 | 92,39 | 48,59 | 1,2410 | ZH | | |
| RZ-049I | 3,00 | 0,10 | 3,90 | 180,00 | 18,00 | 9,70 | 0,50 | 6,25 | 1,72 | 0,971 | 13,660 | 2,05 | 3,043 | 13,87 | 4,17 | 0,1616 | ZG | | | |
| RZ-049X | | | | 270,00 | 18,00 | 9,70 | 0,50 | 6,38 | 1,66 | 0,971 | 13,660 | 2,03 | 2,976 | 13,96 | 4,26 | 0,1647 | ZG | | | |
| RZ-050I | | | | 180,00 | 26,00 | 16,20 | 0,60 | 12,75 | 1,72 | 0,971 | 13,660 | 1,66 | 1,429 | 25,09 | 8,89 | 0,3201 | ZG | | | |
| RZ-050X | | | | 270,00 | 27,00 | 16,20 | 0,60 | 12,88 | 1,66 | 0,971 | 13,660 | 1,66 | 1,414 | 25,18 | 8,98 | 0,3233 | ZG | | | |
| RZ-051I | | | | 180,00 | 34,00 | 23,70 | 0,60 | 20,25 | 1,72 | 0,971 | 13,660 | 1,51 | 0,886 | 38,03 | 14,33 | 0,5030 | ZG | | | |
| RZ-051X | | | | 270,00 | 34,00 | 23,70 | 0,60 | 20,38 | 1,66 | 0,971 | 13,660 | 1,51 | 0,880 | 38,12 | 14,42 | 0,5062 | ZG | | | |
| RZ-051AI | | | | 180,00 | 37,00 | 28,00 | 0,80 | 24,75 | 1,62 | 0,971 | 13,660 | 1,45 | 0,722 | 45,73 | 17,73 | 0,6127 | ZG | | | |
| RZ-051AX | | | | 270,00 | 37,00 | 28,00 | 0,80 | 24,88 | 1,56 | 0,971 | 13,660 | 1,45 | 0,718 | 45,68 | 17,68 | 0,6159 | ZG | | | |
| RZ-051BI | | | | 180,00 | 40,00 | 31,50 | 0,80 | 28,25 | 1,62 | 0,971 | 13,660 | 1,43 | 0,631 | 51,63 | 20,13 | 0,6981 | ZG | | | |
| RZ-051BX | | | | 270,00 | 40,00 | 31,50 | 0,80 | 28,38 | 1,56 | 0,971 | 13,660 | 1,43 | 0,628 | 51,72 | 20,22 | 0,7013 | ZG | | | |
| RZ-051CI | | | | 180,00 | 43,00 | 35,50 | 0,80 | 32,25 | 1,62 | 0,971 | 13,660 | 1,41 | 0,551 | 58,53 | 23,03 | 0,7956 | ZG | | | |
| RZ-051CX | | | | 270,00 | 43,00 | 35,50 | 0,80 | 32,38 | 1,56 | 0,971 | 13,660 | 1,41 | 0,549 | 58,62 | 23,12 | 0,7988 | ZG | | | |
| RZ-051DI | | | | 180,00 | 45,00 | 39,50 | 0,80 | 36,25 | 1,62 | 0,971 | 13,660 | 1,40 | 0,490 | 65,40 | 25,90 | 0,8932 | ZG | | | |
| RZ-051DX | | | | 270,00 | 45,00 | 39,50 | 0,80 | 36,38 | 1,56 | 0,971 | 13,660 | 1,40 | 0,488 | 65,53 | 26,03 | 0,8964 | ZG | | | |
| RZ-051EI | | | | 180,00 | 48,00 | 43,50 | 1,10 | 40,25 | 1,62 | 0,971 | 13,660 | 1,39 | 0,440 | 72,34 | 28,84 | 0,9907 | ZH | | | |
| RZ-051EX | | | | 270,00 | 48,00 | 43,50 | 1,10 | 40,38 | 1,56 | 0,971 | 13,660 | 1,38 | 0,439 | 72,43 | 28,93 | 0,9939 | ZH | | | |
| RZ-051E-01I | | | | 2,50 | 0,20 | 3,50 | 180,00 | 20,00 | 10,40 | 0,50 | 7,75 | 1,32 | 1,410 | 15,960 | 2,98 | 4,714 | 13,49 | 3,09 | 0,1585 | ZG |
| RZ-051E-01X | | | | | | | 270,00 | 20,00 | 10,40 | 0,50 | 7,88 | 1,26 | 1,410 | 15,960 | 2,96 | 4,631 | 13,54 | 3,14 | 0,1611 | ZG |
| RZ-051E-02I | | | | | | | 180,00 | 24,00 | 13,40 | 0,50 | 10,75 | 1,32 | 1,410 | 15,960 | 2,71 | 3,335 | 17,77 | 4,37 | 0,2170 | ZG |
| RZ-051E-02X | | | | | | | 270,00 | 24,00 | 13,40 | 0,50 | 10,88 | 1,26 | 1,410 | 15,960 | 2,71 | 3,293 | 17,82 | 4,42 | 0,2196 | ZG |
| RZ-051E-03I | 180,00 | 28,00 | 17,40 | | | | 0,60 | 14,75 | 1,32 | 1,410 | 15,960 | 2,51 | 2,399 | 23,47 | 6,07 | 0,2951 | ZG | | | |
| RZ-051E-03X | 270,00 | 28,00 | 17,40 | | | | 0,60 | 14,88 | 1,26 | 1,410 | 15,960 | 2,51 | 2,377 | 23,53 | 6,13 | 0,2976 | ZG | | | |
| RZ-051E-04I | 180,00 | 30,00 | 21,90 | | | | 0,60 | 19,25 | 1,33 | 1,410 | 15,960 | 2,40 | 1,823 | 29,90 | 8,00 | 0,3829 | ZG | | | |
| RZ-051E-04X | 270,00 | 30,00 | 21,90 | | | | 0,60 | 19,38 | 1,26 | 1,410 | 15,960 | 2,40 | 1,810 | 29,90 | 8,00 | 0,3854 | ZG | | | |
| RZ-051E-20I | 6,00 | 0,25 | 7,10 | | | | 180,00 | 17,00 | 12,40 | 0,60 | 4,13 | 4,14 | 0,711 | 9,431 | 0,95 | 0,760 | 23,90 | 11,50 | 0,2657 | ZG |
| RZ-051E-20X | | | | | | | 270,00 | 17,00 | 12,40 | 0,60 | 4,26 | 4,07 | 0,711 | 9,431 | 0,95 | 0,733 | 24,30 | 11,90 | 0,2733 | ZG |
| RZ-051FI | | | | 180,00 | 20,00 | 13,90 | 0,60 | 5,78 | 4,06 | 0,711 | 9,431 | 0,91 | 0,520 | 30,65 | 16,75 | 0,3621 | ZG | | | |
| RZ-051FX | | | | 270,00 | 20,00 | 13,90 | 0,60 | 5,91 | 3,99 | 0,711 | 9,431 | 0,90 | 0,508 | 31,09 | 17,19 | 0,3697 | ZG | | | |
| RZ-051GI | | | | 180,00 | 25,00 | 17,20 | 0,70 | 9,08 | 4,06 | 0,711 | 9,431 | 0,77 | 0,319 | 44,53 | 27,33 | 0,5551 | ZG | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-051GX | 0,55 | 6,00 | 0,25 | 7,10 | 270,00 | 26,00 | 17,20 | 0,70 | 9,21 | 3,99 | 0,711 | 9,431 | 0,77 | 0,314 | 44,98 | 27,78 | 0,5627 | ZG | | |
| RZ-051HI | | | | | 180,00 | 32,00 | 22,10 | 0,70 | 14,03 | 4,03 | 0,711 | 9,431 | 0,70 | 0,202 | 65,31 | 43,21 | 0,8446 | ZH | | |
| RZ-051HX | | | | | 270,00 | 32,00 | 22,10 | 0,70 | 14,16 | 3,96 | 0,711 | 9,431 | 0,70 | 0,200 | 65,75 | 43,65 | 0,8522 | ZH | | |
| RZ-051JI | | | | | 180,00 | 40,00 | 30,40 | 0,90 | 22,28 | 4,06 | 0,711 | 9,431 | 0,64 | 0,125 | 100,16 | 69,76 | 1,3271 | ZH | | |
| RZ-051JX | | | | | 270,00 | 41,00 | 30,40 | 0,90 | 22,41 | 3,99 | 0,711 | 9,431 | 0,64 | 0,124 | 100,72 | 70,32 | 1,3347 | ZH | | |
| RZ-051KI | | | | | 180,00 | 50,00 | 41,40 | 1,30 | 33,28 | 4,06 | 0,711 | 9,431 | 0,61 | 0,083 | 146,46 | 105,06 | 1,9704 | ZG | | |
| RZ-051KX | | | | | 270,00 | 50,00 | 41,40 | 1,30 | 33,41 | 3,99 | 0,711 | 9,431 | 0,61 | 0,083 | 146,77 | 105,37 | 1,9780 | ZG | | |
| RZ-051LI | 4,00 | 0,15 | 5,00 | 180,00 | 17,00 | 10,70 | 0,50 | 5,78 | 2,46 | 1,251 | 13,810 | 1,68 | 2,051 | 16,82 | 6,12 | 0,2292 | ZG | | | |
| RZ-051LX | | | | 270,00 | 17,00 | 10,70 | 0,50 | 5,91 | 2,39 | 1,251 | 13,810 | 1,66 | 2,001 | 16,98 | 6,28 | 0,2341 | ZG | | | |
| RZ-051MI | | | | 180,00 | 22,00 | 14,00 | 0,50 | 9,08 | 2,46 | 1,251 | 13,810 | 1,42 | 1,257 | 23,99 | 9,99 | 0,3514 | ZG | | | |
| RZ-051MX | | | | 270,00 | 22,00 | 14,00 | 0,50 | 9,21 | 2,39 | 1,251 | 13,810 | 1,42 | 1,238 | 24,15 | 10,15 | 0,3562 | ZG | | | |
| RZ-051NI | | | | 180,00 | 27,00 | 18,90 | 0,60 | 14,03 | 2,43 | 1,251 | 13,810 | 1,28 | 0,796 | 34,69 | 15,79 | 0,5347 | ZH | | | |
| RZ-051NX | | | | 270,00 | 27,00 | 18,90 | 0,60 | 14,16 | 2,36 | 1,251 | 13,810 | 1,28 | 0,788 | 34,85 | 15,95 | 0,5395 | ZH | | | |
| RZ-051OI | | | | 180,00 | 35,00 | 27,20 | 0,80 | 22,28 | 2,46 | 1,251 | 13,810 | 1,17 | 0,494 | 52,65 | 25,45 | 0,8401 | ZH | | | |
| RZ-051OX | | | | 270,00 | 35,00 | 27,20 | 0,80 | 22,41 | 2,39 | 1,251 | 13,810 | 1,17 | 0,491 | 52,81 | 25,61 | 0,8449 | ZH | | | |
| RZ-051PI | | | | 180,00 | 43,00 | 38,20 | 0,80 | 33,28 | 2,46 | 1,251 | 13,810 | 1,10 | 0,328 | 76,54 | 38,34 | 1,2473 | ZG | | | |
| RZ-051PX | | | | 270,00 | 43,00 | 38,20 | 0,80 | 33,41 | 2,39 | 1,251 | 13,810 | 1,10 | 0,326 | 76,76 | 38,56 | 1,2521 | ZG | | | |
| RZ-051QI | | | | 3,50 | 0,15 | 4,50 | 180,00 | 17,00 | 9,80 | 0,50 | 5,78 | 2,01 | 1,511 | 15,590 | 2,26 | 3,280 | 14,09 | 4,29 | 0,1960 | ZG |
| RZ-051QX | | | | | | | 270,00 | 17,00 | 9,80 | 0,50 | 5,91 | 1,94 | 1,511 | 15,590 | 2,23 | 3,200 | 14,20 | 4,40 | 0,2001 | ZG |
| RZ-051RI | | | | | | | 180,00 | 21,00 | 13,20 | 0,50 | 9,08 | 2,06 | 1,511 | 15,590 | 1,91 | 2,011 | 20,20 | 7,00 | 0,3005 | ZG |
| RZ-051RX | | | | | | | 270,00 | 21,00 | 13,20 | 0,50 | 9,21 | 1,99 | 1,511 | 15,590 | 1,90 | 1,981 | 20,31 | 7,11 | 0,3046 | ZG |
| RZ-051SI | 180,00 | 27,00 | 18,10 | | | | 0,60 | 14,03 | 2,03 | 1,511 | 15,590 | 1,71 | 1,273 | 29,16 | 11,06 | 0,4572 | ZH | | | |
| RZ-051SX | 270,00 | 27,00 | 18,10 | | | | 0,60 | 14,16 | 1,96 | 1,511 | 15,590 | 1,70 | 1,260 | 29,27 | 11,17 | 0,4613 | ZH | | | |
| RZ-051TI | 180,00 | 34,00 | 26,40 | | | | 0,80 | 22,28 | 2,06 | 1,511 | 15,590 | 1,56 | 0,789 | 44,23 | 17,83 | 0,7183 | ZG | | | |
| RZ-051TX | 270,00 | 34,00 | 26,40 | | | | 0,80 | 22,41 | 1,99 | 1,511 | 15,590 | 1,55 | 0,785 | 44,35 | 17,95 | 0,7224 | ZG | | | |
| RZ-051UI | 2,80 | 0,10 | 3,80 | 180,00 | 16,00 | 8,70 | 0,50 | 5,78 | 1,46 | 2,211 | 18,900 | 3,92 | 7,392 | 10,96 | 2,26 | 0,1495 | ZG | | | |
| RZ-051UX | | | | 270,00 | 16,00 | 8,70 | 0,50 | 5,91 | 1,39 | 2,211 | 18,900 | 3,87 | 7,213 | 11,02 | 2,32 | 0,1526 | ZG | | | |
| RZ-051VI | | | | 180,00 | 21,00 | 12,10 | 0,50 | 9,08 | 1,51 | 2,211 | 18,900 | 3,29 | 4,532 | 15,78 | 3,68 | 0,2292 | ZG | | | |
| RZ-051VX | | | | 270,00 | 21,00 | 12,10 | 0,50 | 9,21 | 1,44 | 2,211 | 18,900 | 3,28 | 4,464 | 15,84 | 3,74 | 0,2323 | ZG | | | |
| RZ-051WI | | | | 180,00 | 26,00 | 17,00 | 0,60 | 14,03 | 1,48 | 2,211 | 18,900 | 2,93 | 2,868 | 22,82 | 5,82 | 0,3487 | ZG | | | |
| RZ-051WX | | | | 270,00 | 26,00 | 17,00 | 0,60 | 14,16 | 1,41 | 2,211 | 18,900 | 2,92 | 2,841 | 22,88 | 5,88 | 0,3518 | ZG | | | |
| RZ-051XI | | | | 180,00 | 33,00 | 25,30 | 0,80 | 22,28 | 1,51 | 2,211 | 18,900 | 2,66 | 1,779 | 34,69 | 9,39 | 0,5479 | ZH | | | |
| RZ-051XX | | | | 270,00 | 33,00 | 25,30 | 0,80 | 22,41 | 1,44 | 2,211 | 18,900 | 2,65 | 1,769 | 34,75 | 9,45 | 0,5510 | ZH | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-051GX | 0,55 | 6,00 | 0,25 | 7,10 | 270,00 | 26,00 | 17,20 | 0,70 | 9,21 | 3,99 | 0,881 | 11,660 | 0,80 | 0,366 | 46,68 | 29,48 | 0,5675 | ZD | | |
| Z-051HI | | | | | 180,00 | 32,00 | 22,10 | 0,70 | 14,03 | 4,03 | 0,881 | 11,660 | 0,73 | 0,235 | 67,96 | 45,86 | 0,8473 | ZE | | |
| Z-051HX | | | | | 270,00 | 32,00 | 22,10 | 0,70 | 14,16 | 3,96 | 0,881 | 11,660 | 0,73 | 0,233 | 68,43 | 46,33 | 0,8551 | ZE | | |
| Z-051JI | | | | | 180,00 | 40,00 | 30,40 | 0,90 | 22,28 | 4,06 | 0,881 | 11,660 | 0,67 | 0,146 | 104,34 | 73,94 | 1,3260 | ZE | | |
| Z-051JX | | | | | 270,00 | 41,00 | 30,40 | 0,90 | 22,41 | 3,99 | 0,881 | 11,660 | 0,67 | 0,145 | 104,80 | 74,40 | 1,3340 | ZE | | |
| Z-051KI | | | | | 180,00 | 50,00 | 41,40 | 1,30 | 33,28 | 4,06 | 0,881 | 11,660 | 0,64 | 0,097 | 152,77 | 111,37 | 1,9660 | ZD | | |
| Z-051KX | | | | | 270,00 | 50,00 | 41,40 | 1,30 | 33,41 | 3,99 | 0,881 | 11,660 | 0,64 | 0,096 | 153,24 | 111,84 | 1,9740 | ZD | | |
| Z-051LI | 4,00 | 0,15 | 5,00 | 180,00 | 17,00 | 10,70 | 0,50 | 5,78 | 2,46 | 1,571 | 17,070 | 1,73 | 2,390 | 17,19 | 6,49 | 0,2331 | ZD | | | |
| Z-051LX | | | | 270,00 | 17,00 | 10,70 | 0,50 | 5,91 | 2,39 | 1,571 | 17,070 | 1,71 | 2,328 | 17,36 | 6,66 | 0,2382 | ZD | | | |
| Z-051MI | | | | 180,00 | 22,00 | 14,00 | 0,50 | 9,08 | 2,46 | 1,571 | 17,070 | 1,47 | 1,465 | 24,59 | 10,59 | 0,3547 | ZD | | | |
| Z-051MX | | | | 270,00 | 22,00 | 14,00 | 0,50 | 9,21 | 2,39 | 1,571 | 17,070 | 1,47 | 1,441 | 24,76 | 10,76 | 0,3598 | ZD | | | |
| Z-051NI | | | | 180,00 | 27,00 | 18,90 | 0,60 | 14,03 | 2,43 | 1,571 | 17,070 | 1,33 | 0,927 | 35,63 | 16,73 | 0,5373 | ZE | | | |
| Z-051NX | | | | 270,00 | 27,00 | 18,90 | 0,60 | 14,16 | 2,36 | 1,571 | 17,070 | 1,32 | 0,917 | 35,80 | 16,90 | 0,5424 | ZE | | | |
| Z-051OI | | | | 180,00 | 35,00 | 27,20 | 0,80 | 22,28 | 2,46 | 1,571 | 17,070 | 1,22 | 0,575 | 54,18 | 26,98 | 0,8415 | ZE | | | |
| Z-051OX | | | | 270,00 | 35,00 | 27,20 | 0,80 | 22,41 | 2,39 | 1,571 | 17,070 | 1,22 | 0,571 | 54,35 | 27,15 | 0,8465 | ZE | | | |
| Z-051PI | | | | 180,00 | 43,00 | 38,20 | 0,80 | 33,28 | 2,46 | 1,571 | 17,070 | 1,15 | 0,382 | 78,83 | 40,63 | 1,2470 | ZD | | | |
| Z-051PX | | | | 270,00 | 43,00 | 38,20 | 0,80 | 33,41 | 2,39 | 1,571 | 17,070 | 1,15 | 0,380 | 79,01 | 40,81 | 1,2520 | ZD | | | |
| Z-051QI | | | | 3,50 | 0,15 | 4,50 | 180,00 | 17,00 | 9,80 | 0,50 | 5,78 | 2,01 | 1,881 | 19,260 | 2,31 | 3,822 | 14,35 | 4,55 | 0,1996 | ZD |
| Z-051QX | | | | | | | 270,00 | 17,00 | 9,80 | 0,50 | 5,91 | 1,94 | 1,881 | 19,260 | 2,29 | 3,724 | 14,47 | 4,67 | 0,2038 | ZD |
| Z-051RI | | | | | | | 180,00 | 21,00 | 13,20 | 0,50 | 9,08 | 2,06 | 1,881 | 19,260 | 1,96 | 2,343 | 20,62 | 7,42 | 0,3036 | ZD |
| Z-051RX | | | | | | | 270,00 | 21,00 | 13,20 | 0,50 | 9,21 | 1,99 | 1,881 | 19,260 | 1,96 | 2,306 | 20,74 | 7,54 | 0,3079 | ZD |
| Z-051SI | 180,00 | 27,00 | 18,10 | | | | 0,60 | 14,03 | 2,03 | 1,881 | 19,260 | 1,76 | 1,482 | 29,83 | 11,73 | 0,4599 | ZE | | | |
| Z-051SX | 270,00 | 27,00 | 18,10 | | | | 0,60 | 14,16 | 1,96 | 1,881 | 19,260 | 1,76 | 1,467 | 29,95 | 11,85 | 0,4642 | ZE | | | |
| Z-051TI | 180,00 | 34,00 | 26,40 | | | | 0,80 | 22,28 | 2,06 | 1,881 | 19,260 | 1,61 | 0,919 | 45,32 | 18,92 | 0,7203 | ZD | | | |
| Z-051TX | 270,00 | 34,00 | 26,40 | | | | 0,80 | 22,41 | 1,99 | 1,881 | 19,260 | 1,61 | 0,914 | 45,44 | 19,04 | 0,7246 | ZD | | | |
| Z-051UI | 2,80 | 0,10 | 3,80 | 180,00 | 16,00 | 8,70 | 0,50 | 5,78 | 1,46 | 2,771 | 23,360 | 3,99 | 8,615 | 11,09 | 2,39 | 0,1526 | ZD | | | |
| Z-051UX | | | | 270,00 | 16,00 | 8,70 | 0,50 | 5,91 | 1,39 | 2,771 | 23,360 | 3,94 | 8,394 | 11,16 | 2,46 | 0,1540 | ZD | | | |
| Z-051VI | | | | 180,00 | 21,00 | 12,10 | 0,50 | 9,08 | 1,51 | 2,771 | 23,360 | 3,36 | 5,280 | 16,00 | 3,90 | 0,2322 | ZD | | | |
| Z-051VX | | | | 270,00 | 21,00 | 12,10 | 0,50 | 9,21 | 1,44 | 2,771 | 23,360 | 3,34 | 5,196 | 16,07 | 3,97 | 0,2356 | ZD | | | |
| Z-051WI | | | | 180,00 | 26,00 | 17,00 | 0,60 | 14,03 | 1,48 | 2,771 | 23,360 | 3,00 | 3,340 | 23,17 | 6,17 | 0,3517 | ZD | | | |
| Z-051WX | | | | 270,00 | 26,00 | 17,00 | 0,60 | 14,16 | 1,41 | 2,771 | 23,360 | 2,99 | 3,307 | 23,23 | 6,23 | 0,3551 | ZD | | | |
| Z-051XI | | | | 180,00 | 33,00 | 25,30 | 0,80 | 22,28 | 1,51 | 2,771 | 23,360 | 2,72 | 2,072 | 35,25 | 9,95 | 0,5509 | ZE | | | |
| Z-051XX | | | | 270,00 | 33,00 | 25,30 | 0,80 | 22,41 | 1,44 | 2,771 | 23,360 | 2,72 | 2,059 | 35,31 | 10,01 | 0,5543 | ZE | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|--------|----|
| Z-051YI | 0,55 | 2,80 | 0,10 | 3,80 | 180,00 | 40,00 | 36,30 | 0,80 | 33,28 | 1,51 | 2,771 | 23,360 | 2,57 | 1,375 | 51,28 | 14,98 | 0,8165 | ZE | | | |
| Z-051YX | | | | | 270,00 | 40,00 | 36,30 | 0,80 | 33,41 | 1,44 | 2,771 | 23,360 | 2,57 | 1,370 | 51,35 | 15,05 | 0,8199 | ZE | | | |
| Z-052I | 0,63 | 8,60 | 0,30 | 9,90 | 180,00 | 26,00 | 19,90 | 0,70 | 7,88 | 6,01 | 0,791 | 12,130 | 0,97 | 0,276 | 61,05 | 41,15 | 0,8276 | ZD | | | |
| Z-052X | | | | | 270,00 | 26,00 | 19,90 | 0,70 | 8,03 | 5,93 | 0,791 | 12,130 | 0,96 | 0,270 | 61,94 | 42,04 | 0,8430 | ZD | | | |
| Z-053I | | | | | 180,00 | 37,00 | 28,10 | 0,90 | 16,07 | 6,01 | 0,791 | 12,130 | 0,80 | 0,129 | 115,76 | 87,66 | 1,6240 | ZE | | | |
| Z-053X | | | | | 270,00 | 38,00 | 28,10 | 0,90 | 16,22 | 5,93 | 0,791 | 12,130 | 0,80 | 0,128 | 116,66 | 88,56 | 1,6400 | ZE | | | |
| Z-054I | | | | | 180,00 | 47,00 | 37,60 | 0,90 | 25,52 | 6,04 | 0,791 | 12,130 | 0,74 | 0,080 | 178,93 | 141,33 | 2,5440 | ZE | | | |
| Z-054X | | | | | 270,00 | 48,00 | 37,60 | 0,90 | 25,67 | 5,96 | 0,791 | 12,130 | 0,74 | 0,080 | 179,83 | 142,23 | 2,5590 | ZE | | | |
| Z-054AI | | | | | 180,00 | 55,00 | 46,40 | 1,30 | 34,34 | 6,03 | 0,791 | 12,130 | 0,71 | 0,059 | 237,83 | 191,43 | 3,4030 | ZE | | | |
| Z-054AX | | | | | 270,00 | 55,00 | 46,40 | 1,30 | 34,49 | 5,95 | 0,791 | 12,130 | 0,70 | 0,059 | 238,72 | 192,32 | 3,4180 | ZE | | | |
| Z-055AI | | | | | 6,90 | 0,25 | 8,10 | 180,00 | 19,00 | 14,80 | 0,60 | 5,36 | 4,72 | 0,981 | 15,000 | 0,97 | 0,868 | 30,95 | 16,15 | 0,4490 | ZD |
| Z-055AX | | | | | | | | 270,00 | 19,00 | 14,80 | 0,60 | 5,51 | 4,65 | 0,981 | 15,000 | 0,97 | 0,840 | 31,49 | 16,69 | 0,4610 | ZD |
| Z-055I | 180,00 | 22,00 | 17,20 | 0,70 | | | | 7,88 | 4,66 | 0,981 | 15,000 | 1,11 | 0,566 | 41,97 | 24,77 | 0,6514 | ZD | | | | |
| Z-055X | 270,00 | 22,00 | 17,20 | 0,70 | | | | 8,03 | 4,58 | 0,981 | 15,000 | 1,10 | 0,554 | 42,51 | 25,31 | 0,6634 | ZD | | | | |
| Z-056I | 180,00 | 32,00 | 25,40 | 0,90 | | | | 16,07 | 4,66 | 0,981 | 15,000 | 0,92 | 0,266 | 78,18 | 52,78 | 1,2780 | ZE | | | | |
| Z-056X | 270,00 | 32,00 | 25,40 | 0,90 | | | | 16,22 | 4,58 | 0,981 | 15,000 | 0,92 | 0,263 | 78,72 | 53,32 | 1,2900 | ZE | | | | |
| Z-057I | 180,00 | 41,00 | 34,90 | 0,90 | | | | 25,52 | 4,69 | 0,981 | 15,000 | 0,85 | 0,165 | 119,99 | 85,09 | 2,0020 | ZE | | | | |
| Z-057X | 270,00 | 41,00 | 34,90 | 0,90 | | | | 25,67 | 4,61 | 0,981 | 15,000 | 0,85 | 0,164 | 120,53 | 85,63 | 2,0140 | ZE | | | | |
| Z-057AI | 180,00 | 44,00 | 39,20 | 0,90 | | | | 29,93 | 4,63 | 0,981 | 15,000 | 0,83 | 0,140 | 139,37 | 100,17 | 2,3400 | ZE | | | | |
| Z-057AX | 270,00 | 44,00 | 39,20 | 0,90 | | | | 30,08 | 4,55 | 0,981 | 15,000 | 0,83 | 0,139 | 139,91 | 100,71 | 2,3520 | ZE | | | | |
| Z-057BI | 180,00 | 47,00 | 43,60 | 1,30 | | | | 34,34 | 4,63 | 0,981 | 15,000 | 0,82 | 0,122 | 158,85 | 115,25 | 2,6780 | ZE | | | | |
| Z-057BX | 270,00 | 47,00 | 43,60 | 1,30 | | | | 34,49 | 4,55 | 0,981 | 15,000 | 0,82 | 0,121 | 159,39 | 115,79 | 2,6900 | ZE | | | | |
| Z-057CI | 180,00 | 51,00 | 48,70 | 1,30 | | | | 39,38 | 4,66 | 0,981 | 15,000 | 0,81 | 0,106 | 181,18 | 132,48 | 3,0640 | ZE | | | | |
| Z-057CX | 270,00 | 51,00 | 48,70 | 1,30 | | | | 39,53 | 4,58 | 0,981 | 15,000 | 0,81 | 0,105 | 181,72 | 133,02 | 3,0760 | ZE | | | | |
| Z-057DI | 180,00 | 54,00 | 53,70 | 1,30 | | | | 44,42 | 4,64 | 0,981 | 15,000 | 0,80 | 0,094 | 203,42 | 149,72 | 3,4500 | ZE | | | | |
| Z-057DX | 270,00 | 54,00 | 53,70 | 1,30 | | | | 44,57 | 4,56 | 0,981 | 15,000 | 0,80 | 0,093 | 203,96 | 150,26 | 3,4620 | ZE | | | | |
| Z-057EI | 180,00 | 57,00 | 58,80 | 1,30 | | | | 49,46 | 4,67 | 0,981 | 15,000 | 0,79 | 0,084 | 225,75 | 166,95 | 3,8360 | ZF | | | | |
| Z-057EX | 270,00 | 57,00 | 58,80 | 1,30 | | | | 49,61 | 4,59 | 0,981 | 15,000 | 0,79 | 0,084 | 226,29 | 167,49 | 3,8480 | ZF | | | | |
| Z-057EAI | 6,30 | 0,25 | 7,50 | 180,00 | | | | 20,00 | 15,50 | 0,60 | 7,25 | 4,13 | 1,181 | 16,370 | 1,10 | 0,838 | 33,60 | 18,10 | 0,5380 | ZE | |
| Z-057EAX | | | | 270,00 | | | | 20,00 | 15,50 | 0,60 | 7,40 | 4,05 | 1,181 | 16,370 | 1,10 | 0,819 | 34,05 | 18,55 | 0,5480 | ZE | |
| Z-057E-01I | | | | 180,00 | 27,00 | 21,00 | 0,70 | 12,92 | 4,04 | 1,181 | 16,370 | 1,00 | 0,451 | 54,64 | 33,64 | 0,9384 | ZE | | | | |
| Z-057E-01X | | | | 270,00 | 27,00 | 21,00 | 0,70 | 13,07 | 3,96 | 1,181 | 16,370 | 1,00 | 0,446 | 55,07 | 34,07 | 0,9495 | ZE | | | | |
| Z-057FI | | | | 180,00 | 43,00 | 40,80 | 1,30 | 32,45 | 4,17 | 1,181 | 16,370 | 0,90 | 0,174 | 127,92 | 87,12 | 2,2910 | ZE | | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| RZ-051YI | 0,55 | 2,80 | 0,10 | 3,80 | 180,00 | 40,00 | 36,30 | 0,80 | 33,28 | 1,51 | 2,211 | 18,900 | 2,50 | 1,181 | 50,44 | 14,14 | 0,8135 | ZH | | | |
| RZ-051YX | | | | | 270,00 | 40,00 | 36,30 | 0,80 | 33,41 | 1,44 | 2,211 | 18,900 | 2,50 | 1,177 | 50,50 | 14,20 | 0,8166 | ZH | | | |
| RZ-052I | 0,63 | 8,60 | 0,30 | 9,90 | 180,00 | 26,00 | 19,90 | 0,70 | 7,88 | 6,01 | 0,631 | 9,861 | 0,93 | 0,237 | 58,87 | 38,97 | 0,8182 | ZG | | | |
| RZ-052X | | | | | 270,00 | 26,00 | 19,90 | 0,70 | 8,03 | 5,93 | 0,631 | 9,861 | 0,92 | 0,232 | 59,72 | 39,82 | 0,8329 | ZG | | | |
| RZ-053I | | | | | 180,00 | 37,00 | 28,10 | 0,90 | 16,07 | 6,01 | 0,631 | 9,861 | 0,77 | 0,111 | 111,13 | 83,03 | 1,6205 | ZH | | | |
| RZ-053X | | | | | 270,00 | 38,00 | 28,10 | 0,90 | 16,22 | 5,93 | 0,631 | 9,861 | 0,76 | 0,110 | 111,98 | 83,88 | 1,6352 | ZH | | | |
| RZ-054I | | | | | 180,00 | 47,00 | 37,60 | 0,90 | 25,52 | 6,04 | 0,631 | 9,861 | 0,70 | 0,069 | 171,47 | 133,87 | 2,5463 | ZH | | | |
| RZ-054X | | | | | 270,00 | 48,00 | 37,60 | 0,90 | 25,67 | 5,96 | 0,631 | 9,861 | 0,70 | 0,069 | 172,32 | 134,72 | 2,5610 | ZH | | | |
| RZ-054AI | | | | | 180,00 | 55,00 | 46,40 | 1,30 | 34,34 | 6,03 | 0,631 | 9,861 | 0,67 | 0,051 | 227,72 | 181,32 | 3,4103 | ZH | | | |
| RZ-054AX | | | | | 270,00 | 55,00 | 46,40 | 1,30 | 34,49 | 5,95 | 0,631 | 9,861 | 0,67 | 0,051 | 228,56 | 182,16 | 3,4250 | ZH | | | |
| RZ-055AI | | | | | 6,90 | 0,25 | 8,10 | 180,00 | 19,00 | 14,80 | 0,60 | 5,36 | 4,72 | 0,781 | 12,190 | 1,15 | 0,745 | 30,10 | 15,30 | 0,4495 | ZG |
| RZ-055AX | | | | | | | | 270,00 | 19,00 | 14,80 | 0,60 | 5,51 | 4,65 | 0,781 | 12,190 | 1,15 | 0,722 | 30,60 | 15,80 | 0,4611 | ZG |
| RZ-055I | 180,00 | 22,00 | 17,20 | 0,70 | | | | 7,88 | 4,66 | 0,781 | 12,190 | 1,07 | 0,486 | 40,67 | 23,47 | 0,6437 | ZG | | | | |
| RZ-055X | 270,00 | 22,00 | 17,20 | 0,70 | | | | 8,03 | 4,58 | 0,781 | 12,190 | 1,06 | 0,476 | 41,18 | 23,98 | 0,6553 | ZG | | | | |
| RZ-056I | 180,00 | 32,00 | 25,40 | 0,90 | | | | 16,07 | 4,66 | 0,781 | 12,190 | 0,88 | 0,228 | 75,40 | 50,00 | 1,2749 | ZH | | | | |
| RZ-056X | 270,00 | 32,00 | 25,40 | 0,90 | | | | 16,22 | 4,58 | 0,781 | 12,190 | 0,88 | 0,226 | 75,91 | 50,51 | 1,2864 | ZH | | | | |
| RZ-057I | 180,00 | 41,00 | 34,90 | 0,90 | | | | 25,52 | 4,69 | 0,781 | 12,190 | 0,81 | 0,142 | 115,51 | 80,61 | 2,0032 | ZH | | | | |
| RZ-057X | 270,00 | 41,00 | 34,90 | 0,90 | | | | 25,67 | 4,61 | 0,781 | 12,190 | 0,81 | 0,141 | 116,02 | 81,12 | 2,0147 | ZH | | | | |
| RZ-057AI | 180,00 | 44,00 | 39,20 | 0,90 | | | | 29,93 | 4,63 | 0,781 | 12,190 | 0,79 | 0,120 | 134,09 | 94,89 | 2,3430 | ZH | | | | |
| RZ-057AX | 270,00 | 44,00 | 39,20 | 0,90 | | | | 30,08 | 4,55 | 0,781 | 12,190 | 0,79 | 0,120 | 134,60 | 95,40 | 2,3546 | ZH | | | | |
| RZ-057BI | 180,00 | 47,00 | 43,60 | 1,30 | | | | 34,34 | 4,63 | 0,781 | 12,190 | 0,77 | 0,105 | 152,78 | 109,18 | 2,6829 | ZH | | | | |
| RZ-057BX | 270,00 | 47,00 | 43,60 | 1,30 | | | | 34,49 | 4,55 | 0,781 | 12,190 | 0,77 | 0,104 | 153,29 | 109,69 | 2,6944 | ZH | | | | |
| RZ-057CI | 180,00 | 51,00 | 48,70 | 1,30 | | | | 39,38 | 4,66 | 0,781 | 12,190 | 0,77 | 0,091 | 174,20 | 125,50 | 3,0713 | ZH | | | | |
| RZ-057CX | 270,00 | 51,00 | 48,70 | 1,30 | | | | 39,53 | 4,58 | 0,781 | 12,190 | 0,77 | 0,091 | 174,71 | 126,01 | 3,0829 | ZH | | | | |
| RZ-057DI | 180,00 | 54,00 | 53,70 | 1,30 | | | | 44,42 | 4,64 | 0,781 | 12,190 | 0,76 | 0,080 | 195,53 | 141,83 | 3,4597 | ZH | | | | |
| RZ-057DX | 270,00 | 54,00 | 53,70 | 1,30 | | | | 44,57 | 4,56 | 0,781 | 12,190 | 0,76 | 0,080 | 196,04 | 142,34 | 3,4713 | ZH | | | | |
| RZ-057EI | 180,00 | 57,00 | 58,80 | 1,30 | | | | 49,46 | 4,67 | 0,781 | 12,190 | 0,75 | 0,072 | 216,96 | 158,16 | 3,8481 | ZH | | | | |
| RZ-057EX | 270,00 | 57,00 | 58,80 | 1,30 | | | | 49,61 | 4,59 | 0,781 | 12,190 | 0,75 | 0,072 | 217,47 | 158,67 | 3,8597 | ZH | | | | |
| RZ-057EAI | 6,30 | 0,25 | 7,50 | 180,00 | 20,00 | 15,50 | 0,60 | 7,25 | 4,13 | 0,941 | 13,300 | 1,10 | 0,720 | 32,70 | 17,20 | 0,5382 | ZH | | | | |
| RZ-057EAX | | | | 270,00 | 20,00 | 15,50 | 0,60 | 7,40 | 4,05 | 0,941 | 13,300 | 1,10 | 0,704 | 33,10 | 17,60 | 0,5486 | ZH | | | | |
| RZ-057E-01I | | | | 180,00 | 27,00 | 21,00 | 0,70 | 12,92 | 4,04 | 0,941 | 13,300 | 1,01 | 0,388 | 52,87 | 31,87 | 0,9333 | ZH | | | | |
| RZ-057E-01X | | | | 270,00 | 27,00 | 21,00 | 0,70 | 13,07 | 3,96 | 0,941 | 13,300 | 1,01 | 0,383 | 53,28 | 32,28 | 0,9438 | ZH | | | | |
| RZ-057FI | | | | 180,00 | 43,00 | 40,80 | 1,30 | 32,45 | 4,17 | 0,941 | 13,300 | 0,85 | 0,150 | 123,34 | 82,54 | 2,2944 | ZH | | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-057FX | 0,63 | 6,30 | 0,25 | 7,50 | 270,00 | 44,00 | 40,80 | 1,30 | 32,60 | 4,09 | 0,941 | 13,300 | 0,85 | 0,149 | 123,75 | 82,95 | 2,3049 | ZH |
| RZ-057GI | | | | | 180,00 | 51,00 | 53,40 | 1,30 | 45,05 | 4,17 | 0,941 | 13,300 | 0,83 | 0,107 | 168,63 | 115,23 | 3,1725 | ZH |
| RZ-057GX | | | | | 270,00 | 51,00 | 53,40 | 1,30 | 45,20 | 4,09 | 0,941 | 13,300 | 0,83 | 0,107 | 169,04 | 115,64 | 3,1830 | ZH |
| RZ-057HI | | | | | 180,00 | 59,00 | 67,20 | 1,80 | 58,91 | 4,14 | 0,941 | 13,300 | 0,81 | 0,082 | 218,38 | 151,18 | 4,1385 | ZH |
| RZ-057HX | | | | | 270,00 | 59,00 | 67,20 | 1,80 | 59,06 | 4,06 | 0,941 | 13,300 | 0,81 | 0,082 | 218,79 | 151,59 | 4,1489 | ZH |
| RZ-057JI | | | | | 180,00 | 64,00 | 78,60 | 1,80 | 70,24 | 4,17 | 0,941 | 13,300 | 0,80 | 0,068 | 259,20 | 180,60 | 4,9281 | ZJ |
| RZ-057JX | | | | | 270,00 | 64,00 | 78,60 | 1,80 | 70,40 | 4,09 | 0,941 | 13,300 | 0,80 | 0,068 | 259,61 | 181,01 | 4,9392 | ZJ |
| RZ-057KI | 6,00 | 0,25 | 7,20 | 180,00 | 18,00 | 15,30 | 0,60 | 7,25 | 4,03 | 1,111 | 13,930 | 1,10 | 0,847 | 30,40 | 15,10 | 0,5097 | ZG | |
| RZ-057KX | | | | 270,00 | 18,00 | 15,30 | 0,60 | 7,40 | 3,95 | 1,111 | 13,930 | 1,10 | 0,828 | 30,80 | 15,50 | 0,5196 | ZG | |
| RZ-057LI | | | | 180,00 | 23,00 | 19,80 | 0,70 | 11,66 | 4,07 | 1,111 | 13,930 | 1,02 | 0,508 | 45,00 | 25,20 | 0,8008 | ZG | |
| RZ-057LX | | | | 270,00 | 23,00 | 19,80 | 0,70 | 11,81 | 4,00 | 1,111 | 13,930 | 1,02 | 0,502 | 45,40 | 25,60 | 0,8107 | ZG | |
| RZ-057MX | | | | 270,00 | 30,00 | 24,80 | 0,70 | 16,85 | 3,83 | 1,111 | 13,930 | 1,00 | 0,346 | 61,90 | 37,10 | 1,1434 | ZH | |
| RZ-057MI | | | | 180,00 | 30,00 | 24,80 | 0,70 | 16,70 | 4,05 | 1,111 | 13,930 | 1,00 | 0,349 | 61,50 | 36,70 | 1,1335 | ZH | |
| RZ-057E-10X | | | | 270,00 | 35,00 | 30,00 | 0,90 | 22,37 | 3,81 | 1,111 | 13,930 | 0,96 | 0,258 | 79,69 | 49,69 | 1,5077 | ZH | |
| RZ-057E-10I | | | | 180,00 | 35,00 | 30,00 | 0,90 | 22,52 | 3,73 | 1,111 | 13,930 | 0,96 | 0,256 | 80,05 | 50,05 | 1,5176 | ZH | |
| RZ-057E-11X | | | | 270,00 | 42,00 | 40,00 | 0,90 | 31,81 | 4,09 | 1,111 | 13,930 | 0,91 | 0,180 | 111,29 | 71,29 | 2,1308 | ZH | |
| RZ-057E-11I | | | | 180,00 | 42,00 | 40,00 | 0,90 | 31,97 | 4,01 | 1,111 | 13,930 | 0,91 | 0,179 | 111,65 | 71,65 | 2,1413 | ZH | |
| RZ-057E-12X | | | | 270,00 | 48,00 | 50,00 | 1,30 | 41,90 | 4,05 | 1,111 | 13,930 | 0,89 | 0,136 | 144,34 | 94,34 | 2,7968 | ZH | |
| RZ-057E-12I | | | | 180,00 | 48,00 | 50,00 | 1,30 | 42,05 | 3,97 | 1,111 | 13,930 | 0,89 | 0,135 | 144,70 | 94,70 | 2,8067 | ZH | |
| RZ-057E-13X | | | | 270,00 | 54,00 | 60,00 | 1,30 | 51,98 | 4,01 | 1,111 | 13,930 | 0,87 | 0,109 | 177,38 | 117,38 | 3,4621 | ZJ | |
| RZ-057E-13I | | | | 180,00 | 54,00 | 60,00 | 1,30 | 52,13 | 3,93 | 1,111 | 13,930 | 0,87 | 0,109 | 177,74 | 117,74 | 3,4720 | ZJ | |
| RZ-058I | 5,60 | 0,20 | 6,80 | 180,00 | 20,00 | 15,10 | 0,50 | 7,88 | 3,61 | 1,111 | 14,870 | 1,37 | 0,976 | 29,19 | 14,09 | 0,5102 | ZG | |
| RZ-058X | | | | 270,00 | 20,00 | 15,10 | 0,50 | 8,03 | 3,53 | 1,111 | 14,870 | 1,36 | 0,956 | 29,50 | 14,40 | 0,5194 | ZG | |
| RZ-059I | | | | 180,00 | 28,00 | 23,30 | 0,60 | 16,07 | 3,61 | 1,111 | 14,870 | 1,13 | 0,458 | 53,32 | 30,02 | 1,0105 | ZG | |
| RZ-059X | | | | 270,00 | 29,00 | 23,30 | 0,60 | 16,22 | 3,53 | 1,111 | 14,870 | 1,13 | 0,454 | 53,63 | 30,33 | 1,0197 | ZG | |
| RZ-060I | | | | 180,00 | 36,00 | 32,80 | 0,80 | 25,52 | 3,64 | 1,111 | 14,870 | 1,04 | 0,284 | 81,20 | 48,40 | 1,5878 | ZH | |
| RZ-060X | | | | 270,00 | 36,00 | 32,80 | 0,80 | 25,67 | 3,56 | 1,111 | 14,870 | 1,04 | 0,282 | 81,51 | 48,71 | 1,5970 | ZH | |
| RZ-060AI | | | | 180,00 | 39,00 | 37,20 | 0,80 | 29,93 | 3,63 | 1,111 | 14,870 | 1,01 | 0,241 | 94,18 | 56,98 | 1,8572 | ZH | |
| RZ-060AX | | | | 270,00 | 39,00 | 37,20 | 0,80 | 30,08 | 3,55 | 1,111 | 14,870 | 1,01 | 0,240 | 94,49 | 57,29 | 1,8664 | ZH | |
| RZ-060BI | | | | 180,00 | 42,00 | 41,60 | 1,10 | 34,34 | 3,63 | 1,111 | 14,870 | 0,99 | 0,210 | 107,16 | 65,56 | 2,1266 | ZH | |
| RZ-060BX | | | | 270,00 | 42,00 | 41,60 | 1,10 | 34,49 | 3,55 | 1,111 | 14,870 | 0,99 | 0,209 | 107,47 | 65,87 | 2,1358 | ZH | |
| RZ-060CI | | | | 180,00 | 45,00 | 46,70 | 1,10 | 39,38 | 3,66 | 1,111 | 14,870 | 0,98 | 0,183 | 122,06 | 75,36 | 2,4345 | ZH | |
| RZ-060CX | | | | 270,00 | 45,00 | 46,70 | 1,10 | 39,53 | 3,58 | 1,111 | 14,870 | 0,98 | 0,182 | 122,37 | 75,67 | 2,4437 | ZH | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-057FX | 0,63 | 6,30 | 0,25 | 7,50 | 270,00 | 44,00 | 40,80 | 1,30 | 32,60 | 4,09 | 1,181 | 16,370 | 0,90 | 0,173 | 128,35 | 87,55 | 2,3020 | ZE | | |
| Z-057GI | | | | | 180,00 | 51,00 | 53,40 | 1,30 | 45,05 | 4,17 | 1,181 | 16,370 | 0,88 | 0,125 | 175,04 | 121,64 | 3,1650 | ZE | | |
| Z-057GX | | | | | 270,00 | 51,00 | 53,40 | 1,30 | 45,20 | 4,09 | 1,181 | 16,370 | 0,88 | 0,124 | 175,45 | 122,05 | 3,1750 | ZE | | |
| Z-057HI | | | | | 180,00 | 59,00 | 67,20 | 1,80 | 58,91 | 4,14 | 1,181 | 16,370 | 0,86 | 0,095 | 226,80 | 159,60 | 4,1250 | ZE | | |
| Z-057HX | | | | | 270,00 | 59,00 | 67,20 | 1,80 | 59,06 | 4,06 | 1,181 | 16,370 | 0,86 | 0,095 | 227,20 | 160,00 | 4,1360 | ZE | | |
| Z-057JI | | | | | 180,00 | 64,00 | 78,60 | 1,80 | 70,24 | 4,17 | 1,181 | 16,370 | 0,85 | 0,080 | 269,20 | 190,60 | 4,9110 | ZF | | |
| Z-057JX | | | | | 270,00 | 64,00 | 78,60 | 1,80 | 70,40 | 4,09 | 1,181 | 16,370 | 0,85 | 0,079 | 269,65 | 191,05 | 4,9220 | ZF | | |
| Z-057KI | 6,00 | 0,25 | 7,20 | 180,00 | 18,00 | 15,30 | 0,60 | 7,25 | 4,03 | 1,331 | 17,150 | 1,10 | 0,987 | 31,33 | 16,03 | 0,5090 | ZE | | | |
| Z-057KX | | | | 270,00 | 18,00 | 15,30 | 0,60 | 7,40 | 3,95 | 1,331 | 17,150 | 1,10 | 0,964 | 31,70 | 16,40 | 0,5200 | ZE | | | |
| Z-057LI | | | | 180,00 | 23,00 | 19,80 | 0,70 | 11,66 | 4,07 | 1,331 | 17,150 | 1,02 | 0,592 | 46,50 | 26,70 | 0,8000 | ZE | | | |
| Z-057LX | | | | 270,00 | 23,00 | 19,80 | 0,70 | 11,81 | 4,00 | 1,331 | 17,150 | 1,02 | 0,584 | 46,85 | 27,05 | 0,8110 | ZE | | | |
| Z-057MI | | | | 180,00 | 30,00 | 24,80 | 0,70 | 16,70 | 4,05 | 1,331 | 17,150 | 1,00 | 0,406 | 63,70 | 38,90 | 1,1330 | ZE | | | |
| Z-057MX | | | | 270,00 | 30,00 | 24,80 | 0,70 | 16,85 | 3,83 | 1,331 | 17,150 | 1,00 | 0,402 | 64,10 | 39,30 | 1,1430 | ZE | | | |
| Z-057E-10I | | | | 180,00 | 35,00 | 30,00 | 0,90 | 22,37 | 3,81 | 1,331 | 17,150 | 0,99 | 0,300 | 82,65 | 52,65 | 1,5090 | ZE | | | |
| Z-057E-10X | | | | 270,00 | 35,00 | 30,00 | 0,90 | 22,52 | 3,73 | 1,331 | 17,150 | 0,99 | 0,298 | 83,03 | 53,03 | 1,5190 | ZE | | | |
| Z-057E-11I | | | | 180,00 | 42,00 | 40,00 | 0,90 | 31,81 | 4,09 | 1,331 | 17,150 | 0,96 | 0,209 | 115,54 | 75,54 | 2,1290 | ZE | | | |
| Z-057E-11X | | | | 270,00 | 42,00 | 40,00 | 0,90 | 31,97 | 4,01 | 1,331 | 17,150 | 0,96 | 0,208 | 115,92 | 75,92 | 2,1390 | ZE | | | |
| Z-057E-12I | | | | 180,00 | 48,00 | 50,00 | 1,30 | 41,90 | 4,05 | 1,331 | 17,150 | 0,93 | 0,158 | 149,96 | 99,96 | 2,7910 | ZE | | | |
| Z-057E-12X | | | | 270,00 | 48,00 | 50,00 | 1,30 | 42,05 | 3,97 | 1,331 | 17,150 | 0,93 | 0,158 | 150,34 | 100,34 | 2,8010 | ZE | | | |
| Z-057E-13I | | | | 180,00 | 54,00 | 60,00 | 1,30 | 51,98 | 4,01 | 1,331 | 17,150 | 0,92 | 0,127 | 184,37 | 124,37 | 3,4520 | ZF | | | |
| Z-057E-13X | | | | 270,00 | 54,00 | 60,00 | 1,30 | 52,13 | 3,93 | 1,331 | 17,150 | 0,92 | 0,127 | 184,75 | 124,75 | 3,4630 | ZF | | | |
| Z-058I | | | | 5,60 | 0,20 | 6,80 | 180,00 | 20,00 | 15,10 | 0,50 | 7,88 | 3,61 | 1,371 | 18,300 | 1,43 | 1,137 | 29,99 | 14,89 | 0,5166 | ZD |
| Z-058X | | | | | | | 270,00 | 20,00 | 15,10 | 0,50 | 8,03 | 3,53 | 1,371 | 18,300 | 1,42 | 1,113 | 30,32 | 15,22 | 0,5264 | ZD |
| Z-059I | 180,00 | 28,00 | 23,30 | | | | 0,60 | 16,07 | 3,61 | 1,371 | 18,300 | 1,18 | 0,534 | 55,03 | 31,73 | 1,0140 | ZD | | | |
| Z-059X | 270,00 | 29,00 | 23,30 | | | | 0,60 | 16,22 | 3,53 | 1,371 | 18,300 | 1,18 | 0,528 | 55,35 | 32,05 | 1,0230 | ZD | | | |
| Z-060I | 180,00 | 36,00 | 32,80 | | | | 0,80 | 25,52 | 3,64 | 1,371 | 18,300 | 1,09 | 0,331 | 83,96 | 51,16 | 1,5880 | ZE | | | |
| Z-060X | 270,00 | 36,00 | 32,80 | | | | 0,80 | 25,67 | 3,56 | 1,371 | 18,300 | 1,09 | 0,329 | 84,28 | 51,48 | 1,5980 | ZE | | | |
| Z-060AI | 180,00 | 39,00 | 37,20 | | | | 0,80 | 29,93 | 3,63 | 1,371 | 18,300 | 1,06 | 0,281 | 97,42 | 60,22 | 1,8560 | ZE | | | |
| Z-060AX | 270,00 | 39,00 | 37,20 | | | | 0,80 | 30,08 | 3,55 | 1,371 | 18,300 | 1,06 | 0,280 | 97,75 | 60,55 | 1,8660 | ZE | | | |
| Z-060BI | 180,00 | 42,00 | 41,60 | | | | 1,10 | 34,34 | 3,63 | 1,371 | 18,300 | 1,04 | 0,244 | 110,89 | 69,29 | 2,1240 | ZE | | | |
| Z-060BX | 270,00 | 42,00 | 41,60 | | | | 1,10 | 34,49 | 3,55 | 1,371 | 18,300 | 1,04 | 0,243 | 111,21 | 69,61 | 2,1340 | ZE | | | |
| Z-060CI | 180,00 | 45,00 | 46,70 | | | | 1,10 | 39,38 | 3,66 | 1,371 | 18,300 | 1,03 | 0,213 | 126,35 | 79,65 | 2,4300 | ZE | | | |
| Z-060CX | 270,00 | 45,00 | 46,70 | | | | 1,10 | 39,53 | 3,58 | 1,371 | 18,300 | 1,03 | 0,212 | 126,67 | 79,97 | 2,4400 | ZE | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-060DI | 0,63 | 5,60 | 0,20 | 6,80 | 180,00 | 49,00 | 53,70 | 1,10 | 46,31 | 3,69 | 1,371 | 18,300 | 1,02 | 0,180 | 147,60 | 93,90 | 2,8520 | ZE | | |
| Z-060DX | | | | | 270,00 | 49,00 | 53,70 | 1,10 | 46,46 | 3,61 | 1,371 | 18,300 | 1,02 | 0,180 | 147,92 | 94,22 | 2,8610 | ZE | | |
| Z-060EI | | | | | 180,00 | 52,00 | 58,80 | 1,10 | 51,35 | 3,72 | 1,371 | 18,300 | 1,01 | 0,162 | 163,06 | 104,26 | 3,1580 | ZE | | |
| Z-060EX | | | | | 270,00 | 52,00 | 58,80 | 1,10 | 51,50 | 3,64 | 1,371 | 18,300 | 1,01 | 0,162 | 163,38 | 104,58 | 3,1670 | ZE | | |
| Z-060EAI | 5,00 | 0,20 | 6,20 | 180,00 | 20,00 | 16,20 | 0,60 | 9,77 | 3,22 | 1,571 | 20,350 | 1,38 | 1,326 | 30,36 | 14,16 | 0,5500 | ZD | | | |
| Z-060EAX | | | | 270,00 | 20,00 | 16,20 | 0,60 | 9,92 | 3,14 | 1,571 | 20,350 | 1,38 | 1,304 | 30,60 | 14,40 | 0,5580 | ZD | | | |
| Z-060E-011 | | | | 180,00 | 25,00 | 20,00 | 0,60 | 13,55 | 3,22 | 1,571 | 20,350 | 1,35 | 0,938 | 40,02 | 20,02 | 0,7576 | ZD | | | |
| Z-060E-01X | | | | 270,00 | 26,00 | 20,00 | 0,60 | 13,70 | 3,14 | 1,571 | 20,350 | 1,35 | 0,927 | 40,26 | 20,26 | 0,7662 | ZD | | | |
| Z-060E-021 | | | | 180,00 | 30,00 | 25,00 | 0,60 | 18,58 | 3,20 | 1,571 | 20,350 | 1,32 | 0,675 | 52,83 | 27,83 | 1,0270 | ZD | | | |
| Z-060E-02X | | | | 270,00 | 30,00 | 25,00 | 0,60 | 18,74 | 3,12 | 1,571 | 20,350 | 1,32 | 0,669 | 53,07 | 28,07 | 1,0350 | ZD | | | |
| Z-060E-031 | | | | 180,00 | 34,00 | 30,00 | 0,80 | 23,63 | 3,18 | 1,571 | 20,350 | 1,30 | 0,527 | 65,64 | 35,64 | 1,2960 | ZE | | | |
| Z-060E-03X | | | | 270,00 | 34,00 | 30,00 | 0,80 | 23,78 | 3,10 | 1,571 | 20,350 | 1,30 | 0,523 | 65,89 | 35,89 | 1,3050 | ZE | | | |
| Z-060E-041 | | | | 180,00 | 41,00 | 40,00 | 0,80 | 33,71 | 3,14 | 1,571 | 20,350 | 1,25 | 0,366 | 91,27 | 51,27 | 1,8350 | ZE | | | |
| Z-060E-04X | | | | 270,00 | 41,00 | 40,00 | 0,80 | 33,86 | 3,06 | 1,571 | 20,350 | 1,25 | 0,365 | 91,51 | 51,51 | 1,8430 | ZE | | | |
| Z-060E-051 | | | | 180,00 | 46,00 | 50,00 | 1,10 | 43,79 | 3,10 | 1,571 | 20,350 | 1,23 | 0,281 | 116,89 | 66,89 | 2,3740 | ZE | | | |
| Z-060E-05X | | | | 270,00 | 47,00 | 50,00 | 1,10 | 43,94 | 3,02 | 1,571 | 20,350 | 1,23 | 0,280 | 117,13 | 67,13 | 2,3820 | ZE | | | |
| Z-0611 | | | | 4,60 | 0,15 | 5,70 | 180,00 | 19,00 | 13,50 | 0,50 | 7,88 | 2,81 | 1,771 | 21,980 | 2,02 | 2,230 | 22,56 | 9,06 | 0,4131 | ZD |
| Z-061X | | | | | | | 270,00 | 19,00 | 13,50 | 0,50 | 8,03 | 2,73 | 1,771 | 21,980 | 2,01 | 2,183 | 22,75 | 9,25 | 0,4209 | ZD |
| Z-0621 | | | | | | | 180,00 | 27,00 | 21,70 | 0,60 | 16,07 | 2,81 | 1,771 | 21,980 | 1,67 | 1,047 | 41,00 | 19,30 | 0,8112 | ZD |
| Z-062X | | | | | | | 270,00 | 27,00 | 21,70 | 0,60 | 16,22 | 2,73 | 1,771 | 21,980 | 1,66 | 1,036 | 41,20 | 19,50 | 0,8188 | ZD |
| Z-0631 | 180,00 | 35,00 | 31,20 | | | | 0,80 | 25,52 | 2,84 | 1,771 | 21,980 | 1,53 | 0,649 | 62,32 | 31,12 | 1,2700 | ZE | | | |
| Z-063X | 270,00 | 35,00 | 31,20 | | | | 0,80 | 25,67 | 2,76 | 1,771 | 21,980 | 1,53 | 0,645 | 62,52 | 31,32 | 1,2780 | ZE | | | |
| Z-063AI | 180,00 | 38,00 | 35,60 | | | | 0,80 | 29,93 | 2,83 | 1,771 | 21,980 | 1,49 | 0,552 | 72,24 | 36,64 | 1,4840 | ZE | | | |
| Z-063AX | 270,00 | 38,00 | 35,60 | | | | 0,80 | 30,08 | 2,75 | 1,771 | 21,980 | 1,49 | 0,549 | 72,43 | 36,83 | 1,4920 | ZE | | | |
| Z-063BI | 180,00 | 40,00 | 40,00 | | | | 0,80 | 34,34 | 2,83 | 1,771 | 21,980 | 1,46 | 0,479 | 82,15 | 42,15 | 1,6990 | ZE | | | |
| Z-063BX | 270,00 | 41,00 | 40,00 | | | | 0,80 | 34,49 | 2,75 | 1,771 | 21,980 | 1,46 | 0,477 | 82,35 | 42,35 | 1,7060 | ZE | | | |
| Z-063CI | 180,00 | 43,00 | 45,10 | | | | 1,10 | 39,38 | 2,86 | 1,771 | 21,980 | 1,44 | 0,417 | 93,55 | 48,45 | 1,9430 | ZE | | | |
| Z-063CX | 270,00 | 43,00 | 45,10 | | | | 1,10 | 39,53 | 2,78 | 1,771 | 21,980 | 1,44 | 0,415 | 93,75 | 48,65 | 1,9510 | ZE | | | |
| Z-063DI | 180,00 | 46,00 | 50,10 | | | | 1,10 | 44,42 | 2,84 | 1,771 | 21,980 | 1,43 | 0,369 | 104,86 | 54,76 | 2,1880 | ZE | | | |
| Z-063DX | 270,00 | 46,00 | 50,10 | | | | 1,10 | 44,57 | 2,76 | 1,771 | 21,980 | 1,43 | 0,368 | 105,06 | 54,96 | 2,1960 | ZE | | | |
| Z-063EI | 180,00 | 49,00 | 55,20 | | | | 1,10 | 49,46 | 2,87 | 1,771 | 21,980 | 1,42 | 0,331 | 116,26 | 61,06 | 2,4330 | ZE | | | |
| Z-063EX | 270,00 | 49,00 | 55,20 | | | | 1,10 | 49,61 | 2,79 | 1,771 | 21,980 | 1,42 | 0,330 | 116,46 | 61,26 | 2,4410 | ZE | | | |
| Z-0641 | 3,80 | 0,15 | 4,90 | | | | 180,00 | 18,00 | 12,30 | 0,50 | 7,88 | 2,21 | 1,991 | 26,090 | 3,09 | 4,381 | 17,81 | 5,51 | 0,3304 | ZD |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| RZ-060DI | 0,63 | 5,60 | 0,20 | 6,80 | 180,00 | 49,00 | 53,70 | 1,10 | 46,31 | 3,69 | 1,111 | 14,870 | 0,97 | 0,155 | 142,54 | 88,84 | 2,8578 | ZH | | |
| RZ-060DX | | | | | 270,00 | 49,00 | 53,70 | 1,10 | 46,46 | 3,61 | 1,111 | 14,870 | 0,97 | 0,154 | 142,85 | 89,15 | 2,8670 | ZH | | |
| RZ-060EI | | | | | 180,00 | 52,00 | 58,80 | 1,10 | 51,35 | 3,72 | 1,111 | 14,870 | 0,96 | 0,139 | 157,45 | 98,65 | 3,1657 | ZH | | |
| RZ-060EX | | | | | 270,00 | 52,00 | 58,80 | 1,10 | 51,50 | 3,64 | 1,111 | 14,870 | 0,96 | 0,139 | 157,75 | 98,95 | 3,1749 | ZH | | |
| RZ-060EAI | 5,00 | 0,20 | 6,20 | 180,00 | 20,00 | 16,20 | 0,60 | 9,77 | 3,22 | 1,251 | 16,530 | 1,52 | 1,138 | 29,60 | 13,40 | 0,5502 | ZG | | | |
| RZ-060EAX | | | | 270,00 | 20,00 | 16,20 | 0,60 | 9,92 | 3,14 | 1,251 | 16,530 | 1,52 | 1,120 | 29,80 | 13,60 | 0,5582 | ZG | | | |
| RZ-060E-01I | | | | 180,00 | 25,00 | 20,00 | 0,60 | 13,55 | 3,22 | 1,251 | 16,530 | 1,42 | 0,805 | 38,97 | 18,97 | 0,7532 | ZG | | | |
| RZ-060E-01X | | | | 270,00 | 26,00 | 20,00 | 0,60 | 13,70 | 3,14 | 1,251 | 16,530 | 1,42 | 0,796 | 39,20 | 19,20 | 0,7612 | ZG | | | |
| RZ-060E-02I | | | | 180,00 | 30,00 | 25,00 | 0,60 | 18,58 | 3,20 | 1,251 | 16,530 | 1,32 | 0,580 | 51,37 | 26,37 | 1,0234 | ZG | | | |
| RZ-060E-02X | | | | 270,00 | 30,00 | 25,00 | 0,60 | 18,74 | 3,12 | 1,251 | 16,530 | 1,32 | 0,575 | 51,60 | 26,60 | 1,0320 | ZG | | | |
| RZ-060E-03I | | | | 180,00 | 34,00 | 30,00 | 0,80 | 23,63 | 3,18 | 1,251 | 16,530 | 1,27 | 0,452 | 63,77 | 33,77 | 1,2946 | ZH | | | |
| RZ-060E-03X | | | | 270,00 | 34,00 | 30,00 | 0,80 | 23,78 | 3,10 | 1,251 | 16,530 | 1,27 | 0,449 | 64,00 | 34,00 | 1,3027 | ZH | | | |
| RZ-060E-04I | | | | 180,00 | 41,00 | 40,00 | 0,80 | 33,71 | 3,14 | 1,251 | 16,530 | 1,20 | 0,315 | 88,58 | 48,58 | 1,8360 | ZH | | | |
| RZ-060E-04X | | | | 270,00 | 41,00 | 40,00 | 0,80 | 33,86 | 3,06 | 1,251 | 16,530 | 1,20 | 0,313 | 88,81 | 48,81 | 1,8441 | ZH | | | |
| RZ-060E-05I | | | | 180,00 | 46,00 | 50,00 | 1,10 | 43,79 | 3,10 | 1,251 | 16,530 | 1,17 | 0,241 | 113,38 | 63,38 | 2,3775 | ZH | | | |
| RZ-060E-05X | | | | 270,00 | 47,00 | 50,00 | 1,10 | 43,94 | 3,02 | 1,251 | 16,530 | 1,17 | 0,240 | 113,61 | 63,61 | 2,3855 | ZH | | | |
| RZ-061I | | | | 4,60 | 0,15 | 5,70 | 180,00 | 19,00 | 13,50 | 0,50 | 7,88 | 2,81 | 1,411 | 17,860 | 1,96 | 1,914 | 22,09 | 8,59 | 0,4076 | ZG |
| RZ-061X | | | | | | | 270,00 | 19,00 | 13,50 | 0,50 | 8,03 | 2,73 | 1,411 | 17,860 | 1,94 | 1,875 | 22,27 | 8,77 | 0,4149 | ZG |
| RZ-062I | | | | | | | 180,00 | 27,00 | 21,70 | 0,60 | 16,07 | 2,81 | 1,411 | 17,860 | 1,61 | 0,899 | 39,99 | 18,29 | 0,8072 | ZG |
| RZ-062X | | | | | | | 270,00 | 27,00 | 21,70 | 0,60 | 16,22 | 2,73 | 1,411 | 17,860 | 1,60 | 0,890 | 40,18 | 18,48 | 0,8145 | ZG |
| RZ-063I | 180,00 | 35,00 | 31,20 | | | | 0,80 | 25,52 | 2,84 | 1,411 | 17,860 | 1,47 | 0,558 | 60,68 | 29,48 | 1,2683 | ZH | | | |
| RZ-063X | 270,00 | 35,00 | 31,20 | | | | 0,80 | 25,67 | 2,76 | 1,411 | 17,860 | 1,47 | 0,554 | 60,88 | 29,68 | 1,2757 | ZH | | | |
| RZ-063AI | 180,00 | 38,00 | 35,60 | | | | 0,80 | 29,93 | 2,83 | 1,411 | 17,860 | 1,43 | 0,474 | 70,32 | 34,72 | 1,4835 | ZH | | | |
| RZ-063AX | 270,00 | 38,00 | 35,60 | | | | 0,80 | 30,08 | 2,75 | 1,411 | 17,860 | 1,42 | 0,471 | 70,50 | 34,90 | 1,4909 | ZH | | | |
| RZ-063BI | 180,00 | 40,00 | 40,00 | | | | 0,80 | 34,34 | 2,83 | 1,411 | 17,860 | 1,40 | 0,412 | 79,94 | 39,94 | 1,6987 | ZH | | | |
| RZ-063BX | 270,00 | 41,00 | 40,00 | | | | 0,80 | 34,49 | 2,75 | 1,411 | 17,860 | 1,40 | 0,410 | 80,13 | 40,13 | 1,7061 | ZH | | | |
| RZ-063CI | 180,00 | 43,00 | 45,10 | | | | 1,10 | 39,38 | 2,86 | 1,411 | 17,860 | 1,38 | 0,358 | 91,01 | 45,91 | 1,9447 | ZH | | | |
| RZ-063CX | 270,00 | 43,00 | 45,10 | | | | 1,10 | 39,53 | 2,78 | 1,411 | 17,860 | 1,38 | 0,357 | 91,20 | 46,10 | 1,9520 | ZH | | | |
| RZ-063DI | 180,00 | 46,00 | 50,10 | | | | 1,10 | 44,42 | 2,84 | 1,411 | 17,860 | 1,37 | 0,317 | 101,99 | 51,89 | 2,1906 | ZH | | | |
| RZ-063DX | 270,00 | 46,00 | 50,10 | | | | 1,10 | 44,57 | 2,76 | 1,411 | 17,860 | 1,37 | 0,316 | 102,17 | 52,07 | 2,1979 | ZH | | | |
| RZ-063EI | 180,00 | 49,00 | 55,20 | | | | 1,10 | 49,46 | 2,87 | 1,411 | 17,860 | 1,35 | 0,284 | 113,06 | 57,86 | 2,4365 | ZH | | | |
| RZ-063EX | 270,00 | 49,00 | 55,20 | | | | 1,10 | 49,61 | 2,79 | 1,411 | 17,860 | 1,35 | 0,283 | 113,25 | 58,05 | 2,4439 | ZH | | | |
| RZ-064I | 3,80 | 0,15 | 4,90 | | | | 180,00 | 18,00 | 12,30 | 0,50 | 7,88 | 2,21 | 1,611 | 21,210 | 3,01 | 3,760 | 17,51 | 5,21 | 0,3254 | ZG |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| RZ-064X | 0,63 | 3,80 | 0,15 | 4,90 | 270,00 | 18,00 | 12,30 | 0,50 | 8,03 | 2,13 | 1,611 | 21,210 | 2,99 | 3,684 | 17,62 | 5,32 | 0,3313 | ZG | | | |
| RZ-065I | | | | | 180,00 | 26,00 | 20,40 | 0,60 | 16,07 | 2,16 | 1,611 | 21,210 | 2,45 | 1,766 | 31,50 | 11,10 | 0,6446 | ZG | | | |
| RZ-065X | | | | | 270,00 | 27,00 | 20,40 | 0,60 | 16,22 | 2,08 | 1,611 | 21,210 | 2,44 | 1,749 | 31,61 | 11,21 | 0,6504 | ZG | | | |
| RZ-066I | | | | | 180,00 | 34,00 | 29,90 | 0,80 | 25,52 | 2,19 | 1,611 | 21,210 | 2,23 | 1,095 | 47,79 | 17,89 | 1,0128 | ZG | | | |
| RZ-066X | | | | | 270,00 | 34,00 | 29,90 | 0,80 | 25,67 | 2,11 | 1,611 | 21,210 | 2,22 | 1,089 | 47,91 | 18,01 | 1,0186 | ZG | | | |
| RZ-066AI | | | | | 180,00 | 36,00 | 34,30 | 0,80 | 29,93 | 2,18 | 1,611 | 21,210 | 2,16 | 0,930 | 55,37 | 21,07 | 1,1846 | ZG | | | |
| RZ-066AX | | | | | 270,00 | 37,00 | 34,30 | 0,80 | 30,08 | 2,10 | 1,611 | 21,210 | 2,16 | 0,926 | 55,48 | 21,18 | 1,1904 | ZG | | | |
| RZ-066BI | | | | | 180,00 | 39,00 | 38,70 | 0,80 | 34,34 | 2,18 | 1,611 | 21,210 | 2,12 | 0,809 | 62,94 | 24,24 | 1,3564 | ZG | | | |
| RZ-066BX | | | | | 270,00 | 39,00 | 38,70 | 0,80 | 34,49 | 2,10 | 1,611 | 21,210 | 2,12 | 0,805 | 63,05 | 24,35 | 1,3623 | ZG | | | |
| RZ-066CI | | | | | 180,00 | 42,00 | 43,80 | 1,10 | 39,38 | 2,21 | 1,611 | 21,210 | 2,09 | 0,703 | 71,66 | 27,86 | 1,5528 | ZG | | | |
| RZ-066CX | | | | | 270,00 | 42,00 | 43,80 | 1,10 | 39,53 | 2,13 | 1,611 | 21,210 | 2,09 | 0,701 | 71,77 | 27,97 | 1,5586 | ZG | | | |
| RZ-066DI | | | | | 180,00 | 45,00 | 48,80 | 1,10 | 44,42 | 2,19 | 1,611 | 21,210 | 2,07 | 0,623 | 80,28 | 31,48 | 1,7492 | ZG | | | |
| RZ-066DX | | | | | 270,00 | 45,00 | 48,80 | 1,10 | 44,57 | 2,11 | 1,611 | 21,210 | 2,07 | 0,620 | 80,40 | 31,60 | 1,7550 | ZG | | | |
| RZ-066EI | | | | | 180,00 | 47,00 | 53,90 | 1,10 | 49,46 | 2,22 | 1,611 | 21,210 | 2,05 | 0,558 | 89,01 | 35,11 | 1,9455 | ZH | | | |
| RZ-066EX | | | | | 270,00 | 47,00 | 53,90 | 1,10 | 49,61 | 2,14 | 1,611 | 21,210 | 2,05 | 0,557 | 89,12 | 35,22 | 1,9514 | ZH | | | |
| RZ-066E-01I | 3,00 | 0,15 | 4,10 | 180,00 | 17,00 | 9,00 | 0,50 | 5,99 | 1,50 | 2,511 | 25,900 | 3,08 | 12,170 | 10,92 | 1,92 | 0,1883 | ZG | | | | |
| RZ-066E-01X | | | | 270,00 | 17,00 | 9,00 | 0,50 | 6,14 | 1,42 | 2,511 | 25,900 | 3,08 | 11,839 | 10,98 | 1,98 | 0,1926 | ZG | | | | |
| RZ-066E-02I | | | | 180,00 | 21,00 | 12,80 | 0,50 | 9,76 | 1,51 | 2,511 | 25,900 | 3,04 | 7,145 | 16,08 | 3,28 | 0,2981 | ZG | | | | |
| RZ-066E-02X | | | | 270,00 | 21,00 | 12,80 | 0,50 | 9,92 | 1,43 | 2,511 | 25,900 | 3,04 | 7,022 | 16,14 | 3,34 | 0,3027 | ZG | | | | |
| RZ-066E-03I | | | | 180,00 | 26,00 | 17,80 | 0,60 | 14,81 | 1,49 | 2,511 | 25,900 | 2,78 | 4,600 | 22,89 | 5,09 | 0,4452 | ZG | | | | |
| RZ-066E-03X | | | | 270,00 | 26,00 | 17,80 | 0,60 | 14,96 | 1,42 | 2,511 | 25,900 | 2,78 | 4,552 | 22,94 | 5,14 | 0,4496 | ZG | | | | |
| RZ-066E-04I | | | | 180,00 | 27,00 | 23,50 | 0,60 | 20,48 | 1,51 | 2,511 | 25,900 | 2,60 | 3,286 | 30,60 | 7,10 | 0,6104 | ZG | | | | |
| RZ-066E-04X | | | | 270,00 | 27,00 | 23,50 | 0,60 | 20,63 | 1,44 | 2,511 | 25,900 | 2,60 | 3,262 | 30,65 | 7,15 | 0,6147 | ZG | | | | |
| RZ-063E-10I | | | | 0,70 | 10,00 | 0,30 | 11,40 | 180,00 | 28,00 | 23,60 | 0,70 | 9,45 | 7,07 | 0,661 | 11,530 | 1,07 | 0,209 | 75,60 | 52,00 | 1,2669 | ZH |
| RZ-063E-10X | | | | | | | | 270,00 | 28,00 | 23,60 | 0,70 | 9,63 | 6,98 | 0,661 | 11,530 | 1,06 | 0,205 | 76,64 | 53,04 | 1,2898 | ZH |
| RZ-063E-20I | 180,00 | 35,00 | 31,40 | | | | | 0,90 | 17,15 | 7,13 | 0,661 | 11,530 | 0,88 | 0,111 | 129,20 | 97,80 | 2,2449 | ZH | | | |
| RZ-063E-20X | 270,00 | 35,00 | 31,40 | | | | | 0,90 | 17,33 | 7,04 | 0,661 | 11,530 | 0,88 | 0,110 | 130,30 | 98,90 | 2,2678 | ZH | | | |
| RZ-063E-11I | 180,00 | 47,00 | 40,40 | | | | | 1,30 | 26,25 | 7,07 | 0,661 | 11,530 | 0,84 | 0,072 | 192,24 | 151,84 | 3,4007 | ZJ | | | |
| RZ-063E-11X | 270,00 | 47,00 | 40,40 | | | | | 1,30 | 26,43 | 6,98 | 0,661 | 11,530 | 0,84 | 0,071 | 193,28 | 152,88 | 3,4236 | ZJ | | | |
| RZ-063E-22I | 180,00 | 53,00 | 49,10 | | | | | 1,30 | 34,65 | 7,23 | 0,661 | 11,530 | 0,82 | 0,054 | 250,90 | 201,80 | 4,4676 | ZJ | | | |
| RZ-063E-22X | 270,00 | 53,00 | 49,10 | | | | | 1,30 | 34,83 | 7,14 | 0,661 | 11,530 | 0,82 | 0,054 | 252,00 | 202,90 | 4,4905 | ZJ | | | |
| RZ-063E-12I | 180,00 | 66,00 | 64,40 | | | | | 1,80 | 50,05 | 7,17 | 0,661 | 11,530 | 0,77 | 0,037 | 357,68 | 293,28 | 6,4236 | ZJ | | | |
| RZ-063E-12X | 270,00 | 66,00 | 64,40 | | | | | 1,80 | 50,23 | 7,08 | 0,661 | 11,530 | 0,77 | 0,037 | 358,72 | 294,32 | 6,4464 | ZJ | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|--------|----|
| Z-064X | 0,63 | 3,80 | 0,15 | 4,90 | 270,00 | 18,00 | 12,30 | 0,50 | 8,03 | 2,13 | 1,991 | 26,090 | 3,06 | 4,288 | 17,92 | 5,62 | 0,3365 | ZD | | | |
| Z-065I | | | | | 180,00 | 26,00 | 20,40 | 0,60 | 16,07 | 2,16 | 1,991 | 26,090 | 2,52 | 2,056 | 32,13 | 11,73 | 0,6487 | ZD | | | |
| Z-065X | | | | | 270,00 | 27,00 | 20,40 | 0,60 | 16,22 | 2,08 | 1,991 | 26,090 | 2,51 | 2,036 | 32,25 | 11,85 | 0,6548 | ZD | | | |
| Z-066I | | | | | 180,00 | 34,00 | 29,90 | 0,80 | 25,52 | 2,19 | 1,991 | 26,090 | 2,30 | 1,275 | 48,81 | 18,91 | 1,0160 | ZD | | | |
| Z-066X | | | | | 270,00 | 34,00 | 29,90 | 0,80 | 25,67 | 2,11 | 1,991 | 26,090 | 2,30 | 1,267 | 48,93 | 19,03 | 1,0220 | ZD | | | |
| Z-066AI | | | | | 180,00 | 36,00 | 34,30 | 0,80 | 29,93 | 2,18 | 1,991 | 26,090 | 2,23 | 1,083 | 56,56 | 22,26 | 1,1870 | ZD | | | |
| Z-066AX | | | | | 270,00 | 37,00 | 34,30 | 0,80 | 30,08 | 2,10 | 1,991 | 26,090 | 2,23 | 1,078 | 56,68 | 22,38 | 1,1930 | ZD | | | |
| Z-066BI | | | | | 180,00 | 39,00 | 38,70 | 0,80 | 34,34 | 2,18 | 1,991 | 26,090 | 2,19 | 0,942 | 64,31 | 25,61 | 1,3580 | ZD | | | |
| Z-066BX | | | | | 270,00 | 39,00 | 38,70 | 0,80 | 34,49 | 2,10 | 1,991 | 26,090 | 2,19 | 0,937 | 64,43 | 25,73 | 1,3650 | ZD | | | |
| Z-066CI | | | | | 180,00 | 42,00 | 43,80 | 1,10 | 39,38 | 2,21 | 1,991 | 26,090 | 2,17 | 0,819 | 73,24 | 29,44 | 1,5540 | ZD | | | |
| Z-066CX | | | | | 270,00 | 42,00 | 43,80 | 1,10 | 39,53 | 2,13 | 1,991 | 26,090 | 2,17 | 0,816 | 73,36 | 29,56 | 1,5610 | ZD | | | |
| Z-066DI | | | | | 180,00 | 45,00 | 48,80 | 1,10 | 44,42 | 2,19 | 1,991 | 26,090 | 2,14 | 0,725 | 82,07 | 33,27 | 1,7500 | ZD | | | |
| Z-066DX | | | | | 270,00 | 45,00 | 48,80 | 1,10 | 44,57 | 2,11 | 1,991 | 26,090 | 2,14 | 0,722 | 82,19 | 33,39 | 1,7570 | ZD | | | |
| Z-066EI | | | | | 180,00 | 47,00 | 53,90 | 1,10 | 49,46 | 2,22 | 1,991 | 26,090 | 2,12 | 0,650 | 91,00 | 37,10 | 1,9460 | ZE | | | |
| Z-066EX | | | | | 270,00 | 47,00 | 53,90 | 1,10 | 49,61 | 2,14 | 1,991 | 26,090 | 2,12 | 0,648 | 91,12 | 37,22 | 1,9520 | ZE | | | |
| Z-066E-01I | | | | | 3,00 | 0,15 | 4,10 | 180,00 | 17,00 | 9,00 | 0,50 | 5,99 | 1,50 | 3,111 | 31,880 | 3,15 | 14,183 | 11,03 | 2,03 | 0,1926 | ZD |
| Z-066E-01X | 270,00 | 17,00 | 9,00 | 0,50 | | | | 6,14 | 1,42 | 3,111 | 31,880 | 3,15 | 13,778 | 11,09 | 2,09 | 0,1972 | ZD | | | | |
| Z-066E-02I | 180,00 | 21,00 | 12,80 | 0,50 | | | | 9,76 | 1,51 | 3,111 | 31,880 | 3,11 | 8,314 | 16,26 | 3,46 | 0,3029 | ZD | | | | |
| Z-066E-02X | 270,00 | 21,00 | 12,80 | 0,50 | | | | 9,92 | 1,43 | 3,111 | 31,880 | 3,11 | 8,173 | 16,32 | 3,52 | 0,3076 | ZD | | | | |
| Z-066E-03I | 180,00 | 26,00 | 17,80 | 0,60 | | | | 14,81 | 1,49 | 3,111 | 31,880 | 4,16 | 5,358 | 23,17 | 5,37 | 0,4500 | ZD | | | | |
| Z-066E-03X | 270,00 | 26,00 | 17,80 | 0,60 | | | | 14,96 | 1,42 | 3,111 | 31,880 | 4,16 | 5,299 | 23,23 | 5,43 | 0,4547 | ZD | | | | |
| Z-066E-04I | 180,00 | 27,00 | 23,50 | 0,60 | | | | 20,48 | 1,51 | 3,111 | 31,880 | 1,20 | 3,827 | 31,02 | 7,52 | 0,6100 | ZD | | | | |
| Z-066E-04X | 270,00 | 27,00 | 23,50 | 0,60 | | | | 20,63 | 1,44 | 3,111 | 31,880 | 4,20 | 3,797 | 31,08 | 7,58 | 0,6150 | ZD | | | | |
| Z-063E-10I | 0,70 | 10,00 | 0,30 | 11,40 | | | | 180,00 | 28,00 | 23,60 | 0,70 | 9,45 | 7,07 | 0,831 | 14,130 | 1,13 | 0,243 | 78,29 | 54,69 | 1,2800 | ZE |
| Z-063E-10X | | | | | | | | 270,00 | 28,00 | 23,60 | 0,70 | 9,63 | 6,98 | 0,831 | 14,130 | 1,10 | 0,239 | 79,38 | 55,78 | 1,3020 | ZE |
| Z-063E-20I | | | | | | | | 180,00 | 35,00 | 31,40 | 0,90 | 17,15 | 7,13 | 0,831 | 14,130 | 0,88 | 0,129 | 134,15 | 102,75 | 2,2440 | ZE |
| Z-063E-20X | | | | | | | | 270,00 | 35,00 | 31,40 | 0,90 | 17,33 | 7,04 | 0,831 | 14,130 | 0,88 | 0,128 | 135,25 | 103,85 | 2,2680 | ZE |
| Z-063E-11I | | | | | 180,00 | 47,00 | 40,40 | 1,30 | 26,25 | 7,07 | 0,831 | 14,130 | 0,88 | 0,083 | 200,08 | 159,68 | 3,4000 | ZF | | | |
| Z-063E-11X | | | | | 270,00 | 47,00 | 40,40 | 1,30 | 26,43 | 6,98 | 0,831 | 14,130 | 0,88 | 0,083 | 201,18 | 160,78 | 3,4220 | ZF | | | |
| Z-063E-22I | | | | | 180,00 | 53,00 | 49,10 | 1,30 | 34,65 | 7,23 | 0,831 | 14,130 | 0,85 | 0,063 | 261,20 | 212,10 | 4,4680 | ZF | | | |
| Z-063E-22X | | | | | 270,00 | 53,00 | 49,10 | 1,30 | 34,83 | 7,14 | 0,831 | 14,130 | 0,85 | 0,062 | 262,30 | 213,20 | 4,4910 | ZF | | | |
| Z-063E-12I | | | | | 180,00 | 66,00 | 64,40 | 1,80 | 50,05 | 7,17 | 0,831 | 14,130 | 0,81 | 0,043 | 372,70 | 308,30 | 6,4030 | ZF | | | |
| Z-063E-12X | | | | | 270,00 | 66,00 | 64,40 | 1,80 | 50,23 | 7,08 | 0,831 | 14,130 | 0,81 | 0,043 | 373,92 | 309,52 | 6,4250 | ZF | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-063E-13I | 0,70 | 10,00 | 0,30 | 11,40 | 180,00 | 72,00 | 74,00 | 1,80 | 59,85 | 7,07 | 0,831 | 14,130 | 0,80 | 0,036 | 443,50 | 369,50 | 7,6400 | ZF | | |
| Z-063E-13X | | | | | 270,00 | 72,00 | 74,00 | 1,80 | 60,03 | 6,98 | 0,831 | 14,130 | 0,80 | 0,036 | 444,77 | 370,77 | 7,6620 | ZF | | |
| Z-063E-14I | | | | | 180,00 | 82,00 | 90,80 | 1,80 | 76,65 | 7,07 | 0,831 | 14,130 | 0,79 | 0,028 | 565,47 | 474,67 | 9,7600 | ZG | | |
| Z-063E-14X | | | | | 270,00 | 82,00 | 90,80 | 1,80 | 76,83 | 6,98 | 0,831 | 14,130 | 0,79 | 0,028 | 566,57 | 475,77 | 9,7820 | ZG | | |
| Z-066FI | 8,00 | 0,30 | 9,40 | 180,00 | 20,00 | 18,30 | 0,70 | 7,35 | 5,47 | 1,181 | 17,540 | 1,37 | 0,662 | 43,02 | 24,72 | 0,7976 | ZD | | | |
| Z-066FX | | | | 270,00 | 21,00 | 18,30 | 0,70 | 7,52 | 5,38 | 1,181 | 17,540 | 1,36 | 0,645 | 43,67 | 25,37 | 0,8148 | ZD | | | |
| Z-066GI | | | | 180,00 | 26,00 | 22,50 | 0,70 | 11,55 | 5,47 | 1,181 | 17,540 | 1,18 | 0,406 | 62,83 | 40,33 | 1,2130 | ZE | | | |
| Z-066GX | | | | 270,00 | 26,00 | 22,50 | 0,70 | 11,73 | 5,38 | 1,181 | 17,540 | 1,18 | 0,399 | 63,48 | 40,98 | 1,2310 | ZE | | | |
| Z-066HI | | | | 180,00 | 33,00 | 28,80 | 0,90 | 17,85 | 5,47 | 1,181 | 17,540 | 1,07 | 0,257 | 92,54 | 63,74 | 1,8380 | ZE | | | |
| Z-066HX | | | | 270,00 | 33,00 | 28,80 | 0,90 | 18,03 | 5,38 | 1,181 | 17,540 | 1,07 | 0,254 | 93,19 | 64,39 | 1,8550 | ZE | | | |
| Z-066JI | | | | 180,00 | 42,00 | 39,30 | 0,90 | 28,35 | 5,47 | 1,181 | 17,540 | 0,99 | 0,159 | 142,07 | 102,77 | 2,8780 | ZF | | | |
| Z-066JX | | | | 270,00 | 42,00 | 39,30 | 0,90 | 28,53 | 5,38 | 1,181 | 17,540 | 0,99 | 0,158 | 142,72 | 103,42 | 2,8950 | ZF | | | |
| Z-066KI | | | | 180,00 | 51,00 | 53,30 | 1,30 | 42,35 | 5,47 | 1,181 | 17,540 | 0,94 | 0,106 | 208,10 | 154,80 | 4,2650 | ZF | | | |
| Z-066KX | | | | 270,00 | 51,00 | 53,30 | 1,30 | 42,53 | 5,38 | 1,181 | 17,540 | 0,94 | 0,105 | 208,75 | 155,45 | 4,2820 | ZF | | | |
| Z-066LI | | | | 7,50 | 0,30 | 8,90 | 180,00 | 20,00 | 17,50 | 0,70 | 7,35 | 5,07 | 1,441 | 18,660 | 1,45 | 0,819 | 38,53 | 21,03 | 0,7429 | ZD |
| Z-066LX | | | | | | | 270,00 | 20,00 | 17,50 | 0,70 | 7,52 | 4,98 | 1,441 | 18,660 | 1,44 | 0,798 | 39,08 | 21,58 | 0,7592 | ZD |
| Z-066MI | 180,00 | 25,00 | 21,70 | | | | 0,70 | 11,55 | 5,07 | 1,441 | 18,660 | 1,25 | 0,502 | 56,01 | 34,31 | 1,1300 | ZD | | | |
| Z-066MX | 270,00 | 25,00 | 21,70 | | | | 0,70 | 11,73 | 4,98 | 1,441 | 18,660 | 1,24 | 0,494 | 56,56 | 34,86 | 1,1460 | ZD | | | |
| Z-066NI | 180,00 | 32,00 | 28,00 | | | | 0,90 | 17,85 | 5,07 | 1,441 | 18,660 | 1,13 | 0,318 | 82,23 | 54,23 | 1,7120 | ZE | | | |
| Z-066NX | 270,00 | 32,00 | 28,00 | | | | 0,90 | 18,03 | 4,98 | 1,441 | 18,660 | 1,13 | 0,314 | 82,78 | 54,78 | 1,7280 | ZE | | | |
| Z-066OI | 180,00 | 40,00 | 38,50 | | | | 0,90 | 28,35 | 5,07 | 1,441 | 18,660 | 1,04 | 0,197 | 125,94 | 87,44 | 2,6810 | ZE | | | |
| Z-066OX | 270,00 | 40,00 | 38,50 | | | | 0,90 | 28,53 | 4,98 | 1,441 | 18,660 | 1,04 | 0,196 | 126,48 | 87,98 | 2,6970 | ZE | | | |
| Z-066PI | 180,00 | 49,00 | 52,50 | | | | 1,30 | 42,35 | 5,07 | 1,441 | 18,660 | 0,99 | 0,131 | 184,20 | 131,70 | 3,9740 | ZF | | | |
| Z-066PX | 270,00 | 49,00 | 52,50 | | | | 1,30 | 42,53 | 4,98 | 1,441 | 18,660 | 0,99 | 0,130 | 184,75 | 132,25 | 3,9910 | ZF | | | |
| Z-066QI | 5,00 | 0,20 | 6,30 | | | | 180,00 | 17,00 | 13,50 | 0,50 | 7,35 | 3,07 | 2,771 | 27,300 | 2,72 | 3,238 | 21,08 | 7,58 | 0,4707 | ZD |
| Z-066QX | | | | | | | 270,00 | 17,00 | 13,50 | 0,50 | 7,52 | 2,98 | 2,771 | 27,300 | 2,69 | 3,155 | 21,28 | 7,78 | 0,4809 | ZD |
| Z-066RI | | | | 180,00 | 22,00 | 17,70 | 0,60 | 11,55 | 3,07 | 2,771 | 27,300 | 2,32 | 1,985 | 30,06 | 12,36 | 0,7163 | ZD | | | |
| Z-066RX | | | | 270,00 | 22,00 | 17,70 | 0,60 | 11,73 | 2,98 | 2,771 | 27,300 | 2,31 | 1,953 | 30,26 | 12,56 | 0,7266 | ZD | | | |
| Z-066SI | | | | 180,00 | 27,00 | 24,00 | 0,60 | 17,85 | 3,07 | 2,771 | 27,300 | 2,09 | 1,256 | 43,54 | 19,54 | 1,0840 | ZE | | | |
| Z-066SX | | | | 270,00 | 27,00 | 24,00 | 0,60 | 18,03 | 2,98 | 2,771 | 27,300 | 2,09 | 1,243 | 43,74 | 19,74 | 1,0950 | ZE | | | |
| Z-066TI | | | | 180,00 | 35,00 | 34,50 | 0,80 | 28,35 | 3,07 | 2,771 | 27,300 | 1,92 | 0,779 | 66,00 | 31,50 | 1,6990 | ZE | | | |
| Z-066TX | | | | 270,00 | 35,00 | 34,50 | 0,80 | 28,53 | 2,98 | 2,771 | 27,300 | 1,92 | 0,774 | 66,20 | 31,70 | 1,7090 | ZE | | | |
| Z-066UI | 180,00 | 42,00 | 48,50 | 1,10 | 42,35 | 3,07 | 2,771 | 27,300 | 1,82 | 0,517 | 95,95 | 47,45 | 2,5180 | ZF | | | | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| RZ-063E-13I | 0,70 | 10,00 | 0,30 | 11,40 | 180,00 | 72,00 | 74,00 | 1,80 | 59,85 | 7,07 | 0,661 | 11,530 | 0,76 | 0,031 | 425,52 | 351,52 | 7,6683 | ZJ | | |
| RZ-063E-13X | | | | | 270,00 | 72,00 | 74,00 | 1,80 | 60,03 | 6,98 | 0,661 | 11,530 | 0,76 | 0,031 | 426,56 | 352,56 | 7,6911 | ZJ | | |
| RZ-063E-14I | | | | | 180,00 | 82,00 | 90,80 | 1,80 | 76,65 | 7,07 | 0,661 | 11,530 | 0,75 | 0,024 | 542,16 | 451,36 | 9,8020 | ZK | | |
| RZ-063E-14X | | | | | 270,00 | 82,00 | 90,80 | 1,80 | 76,83 | 6,98 | 0,661 | 11,530 | 0,75 | 0,024 | 543,20 | 452,40 | 9,8249 | ZK | | |
| RZ-066FI | 8,00 | 0,30 | 9,40 | 180,00 | 20,00 | 18,30 | 0,70 | 7,35 | 5,47 | 0,951 | 14,300 | 1,32 | 0,568 | 41,79 | 23,49 | 0,7851 | ZG | | | |
| RZ-066FX | | | | 270,00 | 21,00 | 18,30 | 0,70 | 7,52 | 5,38 | 0,951 | 14,300 | 1,31 | 0,554 | 42,41 | 24,11 | 0,8021 | ZG | | | |
| RZ-066GI | | | | 180,00 | 26,00 | 22,50 | 0,70 | 11,55 | 5,47 | 0,951 | 14,300 | 1,13 | 0,348 | 60,82 | 38,32 | 1,2038 | ZH | | | |
| RZ-066GX | | | | 270,00 | 26,00 | 22,50 | 0,70 | 11,73 | 5,38 | 0,951 | 14,300 | 1,13 | 0,343 | 61,44 | 38,94 | 1,2218 | ZH | | | |
| RZ-066HI | | | | 180,00 | 33,00 | 28,80 | 0,90 | 17,85 | 5,47 | 0,951 | 14,300 | 1,02 | 0,220 | 89,37 | 60,57 | 1,8319 | ZH | | | |
| RZ-066HX | | | | 270,00 | 33,00 | 28,80 | 0,90 | 18,03 | 5,38 | 0,951 | 14,300 | 1,02 | 0,218 | 89,99 | 61,19 | 1,8499 | ZH | | | |
| RZ-066JI | | | | 180,00 | 42,00 | 39,30 | 0,90 | 28,35 | 5,47 | 0,951 | 14,300 | 0,94 | 0,137 | 136,96 | 97,66 | 2,8787 | ZJ | | | |
| RZ-066JX | | | | 270,00 | 42,00 | 39,30 | 0,90 | 28,53 | 5,38 | 0,951 | 14,300 | 0,94 | 0,136 | 137,58 | 98,28 | 2,8967 | ZJ | | | |
| RZ-066KI | | | | 180,00 | 51,00 | 53,30 | 1,30 | 42,35 | 5,47 | 0,951 | 14,300 | 0,89 | 0,091 | 200,41 | 147,11 | 4,2745 | ZJ | | | |
| RZ-066KX | | | | 270,00 | 51,00 | 53,30 | 1,30 | 42,53 | 5,38 | 0,951 | 14,300 | 0,89 | 0,090 | 201,02 | 147,72 | 4,2924 | ZJ | | | |
| RZ-066LI | | | | 7,50 | 0,30 | 8,90 | 180,00 | 20,00 | 17,50 | 0,70 | 7,35 | 5,07 | 1,151 | 15,220 | 1,40 | 0,703 | 37,50 | 20,00 | 0,7313 | ZG |
| RZ-066LX | | | | | | | 270,00 | 20,00 | 17,50 | 0,70 | 7,52 | 4,98 | 1,151 | 15,220 | 1,38 | 0,686 | 38,03 | 20,53 | 0,7471 | ZG |
| RZ-066MI | | | | | | | 180,00 | 25,00 | 21,70 | 0,70 | 11,55 | 5,07 | 1,151 | 15,220 | 1,20 | 0,431 | 54,33 | 32,63 | 1,1214 | ZG |
| RZ-066MX | | | | | | | 270,00 | 25,00 | 21,70 | 0,70 | 11,73 | 4,98 | 1,151 | 15,220 | 1,19 | 0,424 | 54,86 | 33,16 | 1,1381 | ZG |
| RZ-066NI | 180,00 | 32,00 | 28,00 | | | | 0,90 | 17,85 | 5,07 | 1,151 | 15,220 | 1,08 | 0,273 | 79,58 | 51,58 | 1,7064 | ZH | | | |
| RZ-066NX | 270,00 | 32,00 | 28,00 | | | | 0,90 | 18,03 | 4,98 | 1,151 | 15,220 | 1,08 | 0,270 | 80,10 | 52,10 | 1,7232 | ZH | | | |
| RZ-066OI | 180,00 | 40,00 | 38,50 | | | | 0,90 | 28,35 | 5,07 | 1,151 | 15,220 | 0,99 | 0,169 | 121,65 | 83,15 | 2,6816 | ZH | | | |
| RZ-066OX | 270,00 | 40,00 | 38,50 | | | | 0,90 | 28,53 | 4,98 | 1,151 | 15,220 | 0,99 | 0,168 | 122,18 | 83,68 | 2,6983 | ZH | | | |
| RZ-066PI | 180,00 | 49,00 | 52,50 | | | | 1,30 | 42,35 | 5,07 | 1,151 | 15,220 | 0,94 | 0,112 | 177,76 | 125,26 | 3,9817 | ZJ | | | |
| RZ-066PX | 270,00 | 49,00 | 52,50 | | | | 1,30 | 42,53 | 4,98 | 1,151 | 15,220 | 0,94 | 0,112 | 178,28 | 125,78 | 3,9984 | ZJ | | | |
| RZ-066QI | 5,00 | 0,20 | 6,30 | | | | 180,00 | 17,00 | 13,50 | 0,50 | 7,35 | 3,07 | 2,221 | 22,260 | 2,64 | 2,781 | 20,71 | 7,21 | 0,4625 | ZG |
| RZ-066QX | | | | | | | 270,00 | 17,00 | 13,50 | 0,50 | 7,52 | 2,98 | 2,221 | 22,260 | 2,61 | 2,712 | 20,90 | 7,40 | 0,4724 | ZG |
| RZ-066RI | | | | | | | 180,00 | 22,00 | 17,70 | 0,60 | 11,55 | 3,07 | 2,221 | 22,260 | 2,24 | 1,705 | 29,46 | 11,76 | 0,7091 | ZG |
| RZ-066RX | | | | | | | 270,00 | 22,00 | 17,70 | 0,60 | 11,73 | 2,98 | 2,221 | 22,260 | 2,23 | 1,677 | 29,65 | 11,95 | 0,7197 | ZG |
| RZ-066SI | | | | 180,00 | 27,00 | 24,00 | 0,60 | 17,85 | 3,07 | 2,221 | 22,260 | 2,02 | 1,079 | 42,59 | 18,59 | 1,0791 | ZH | | | |
| RZ-066SX | | | | 270,00 | 27,00 | 24,00 | 0,60 | 18,03 | 2,98 | 2,221 | 22,260 | 2,01 | 1,067 | 42,78 | 18,78 | 1,0896 | ZH | | | |
| RZ-066TI | | | | 180,00 | 35,00 | 34,50 | 0,80 | 28,35 | 3,07 | 2,221 | 22,260 | 1,84 | 0,669 | 64,46 | 29,96 | 1,6957 | ZH | | | |
| RZ-066TX | | | | 270,00 | 35,00 | 34,50 | 0,80 | 28,53 | 2,98 | 2,221 | 22,260 | 1,84 | 0,665 | 64,65 | 30,15 | 1,7063 | ZH | | | |
| RZ-066UI | | | | 180,00 | 42,00 | 48,50 | 1,10 | 42,35 | 3,07 | 2,221 | 22,260 | 1,74 | 0,444 | 93,64 | 45,14 | 2,5178 | ZJ | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|----|
| RZ-066UX | 0,70 | 5,00 | 0,20 | 6,30 | 270,00 | 43,00 | 48,50 | 1,10 | 42,53 | 2,98 | 2,221 | 22,260 | 1,74 | 0,442 | 93,83 | 45,33 | 2,5284 | ZJ | | | |
| RZ-066VI | | 3,50 | 0,25 | 4,80 | 180,00 | 16,00 | 11,10 | 0,50 | 7,35 | 1,87 | 2,751 | 30,410 | 6,21 | 10,074 | 13,85 | 2,75 | 0,3011 | ZG | | | |
| RZ-066VX | | | | | 270,00 | 16,00 | 11,10 | 0,50 | 7,52 | 1,78 | 2,751 | 30,410 | 6,13 | 9,823 | 13,92 | 2,82 | 0,3076 | ZG | | | |
| RZ-066WI | | | | | 180,00 | 20,00 | 15,30 | 0,50 | 11,55 | 1,87 | 2,751 | 30,410 | 5,21 | 6,174 | 19,78 | 4,48 | 0,4617 | ZG | | | |
| RZ-066WX | | | | | 270,00 | 21,00 | 15,30 | 0,50 | 11,73 | 1,78 | 2,751 | 30,410 | 5,19 | 6,074 | 19,86 | 4,56 | 0,4686 | ZG | | | |
| RZ-066XI | | | | | 180,00 | 26,00 | 21,60 | 0,60 | 17,85 | 1,87 | 2,751 | 30,410 | 4,65 | 3,906 | 28,69 | 7,09 | 0,7027 | ZG | | | |
| RZ-066XX | | | | | 270,00 | 26,00 | 21,60 | 0,60 | 18,03 | 1,78 | 2,751 | 30,410 | 4,64 | 3,866 | 28,76 | 7,16 | 0,7095 | ZG | | | |
| RZ-066YI | | | | | 180,00 | 33,00 | 32,10 | 0,80 | 28,35 | 1,87 | 2,751 | 30,410 | 4,21 | 2,423 | 43,53 | 11,43 | 1,1042 | ZH | | | |
| RZ-066YX | | | | | 270,00 | 33,00 | 32,10 | 0,80 | 28,53 | 1,78 | 2,751 | 30,410 | 4,21 | 2,407 | 43,60 | 11,50 | 1,1111 | ZH | | | |
| RZ-066ZI | | | | | 180,00 | 40,00 | 46,10 | 1,10 | 42,35 | 1,87 | 2,751 | 30,410 | 3,96 | 1,608 | 63,31 | 17,21 | 1,6395 | ZH | | | |
| RZ-066ZX | | | | | 270,00 | 40,00 | 46,10 | 1,10 | 42,53 | 1,78 | 2,751 | 30,410 | 3,96 | 1,602 | 63,39 | 17,29 | 1,6464 | ZH | | | |
| RZ-067I | 0,80 | 10,80 | 0,30 | 12,30 | 180,00 | 25,00 | 25,10 | 0,90 | 10,00 | 7,55 | 0,971 | 15,670 | 1,41 | 0,312 | 72,26 | 47,16 | 1,6545 | ZG | | | |
| RZ-067X | | | | | 270,00 | 26,00 | 25,10 | 0,90 | 10,20 | 7,45 | 0,971 | 15,670 | 1,40 | 0,305 | 73,29 | 48,19 | 1,6857 | ZG | | | |
| RZ-068I | | | | | 180,00 | 37,00 | 35,50 | 0,90 | 20,40 | 7,55 | 0,971 | 15,670 | 1,17 | 0,146 | 135,97 | 100,47 | 3,2777 | ZH | | | |
| RZ-068X | | | | | 270,00 | 37,00 | 35,50 | 0,90 | 20,60 | 7,45 | 0,971 | 15,670 | 1,16 | 0,145 | 137,00 | 101,50 | 3,3089 | ZH | | | |
| RZ-069I | | | | | 180,00 | 47,00 | 47,50 | 1,30 | 32,40 | 7,55 | 0,971 | 15,670 | 1,07 | 0,091 | 209,49 | 161,99 | 5,1507 | ZJ | | | |
| RZ-069X | | | | | 270,00 | 47,00 | 47,50 | 1,30 | 32,60 | 7,45 | 0,971 | 15,670 | 1,07 | 0,090 | 210,51 | 163,01 | 5,1819 | ZJ | | | |
| RZ-069AI | | | | | 180,00 | 55,00 | 58,70 | 1,30 | 43,60 | 7,55 | 0,971 | 15,670 | 1,02 | 0,067 | 278,10 | 219,40 | 6,8988 | ZJ | | | |
| RZ-069AX | | | | | 270,00 | 55,00 | 58,70 | 1,30 | 43,80 | 7,45 | 0,971 | 15,670 | 1,02 | 0,067 | 279,13 | 220,43 | 6,9300 | ZJ | | | |
| RZ-069CI | | | | | 8,80 | 0,30 | 10,30 | 180,00 | 16,00 | 18,00 | 0,70 | 6,00 | 6,00 | 1,211 | 19,090 | 1,75 | 1,077 | 34,60 | 16,60 | 0,8241 | ZG |
| RZ-069CX | | | | | | | | 270,00 | 16,00 | 18,00 | 0,70 | 6,20 | 5,90 | 1,211 | 19,090 | 1,75 | 1,037 | 35,25 | 17,25 | 0,8491 | ZG |
| RZ-070I | | 180,00 | 22,00 | 21,90 | | | | 0,70 | 10,00 | 5,95 | 1,211 | 19,090 | 1,61 | 0,609 | 51,28 | 29,38 | 1,3236 | ZG | | | |
| RZ-070X | | 270,00 | 22,00 | 21,90 | | | | 0,70 | 10,20 | 5,85 | 1,211 | 19,090 | 1,60 | 0,596 | 51,91 | 30,01 | 1,3485 | ZG | | | |
| RZ-071I | | 180,00 | 32,00 | 32,30 | | | | 0,90 | 20,40 | 5,95 | 1,211 | 19,090 | 1,33 | 0,286 | 94,88 | 62,58 | 2,6222 | ZH | | | |
| RZ-071X | | 270,00 | 32,00 | 32,30 | | | | 0,90 | 20,60 | 5,85 | 1,211 | 19,090 | 1,33 | 0,283 | 95,52 | 63,22 | 2,6471 | ZH | | | |
| RZ-072I | | 180,00 | 41,00 | 44,30 | | | | 1,30 | 32,40 | 5,95 | 1,211 | 19,090 | 1,22 | 0,177 | 145,20 | 100,90 | 4,1205 | ZJ | | | |
| RZ-072X | | 270,00 | 41,00 | 44,30 | | | | 1,30 | 32,60 | 5,85 | 1,211 | 19,090 | 1,22 | 0,176 | 145,84 | 101,54 | 4,1455 | ZJ | | | |
| RZ-072AI | | 180,00 | 44,00 | 49,90 | | | | 1,30 | 38,00 | 5,95 | 1,211 | 19,090 | 1,19 | 0,151 | 168,68 | 118,78 | 4,8198 | ZJ | | | |
| RZ-072AX | | 270,00 | 44,00 | 49,90 | | | | 1,30 | 38,20 | 5,85 | 1,211 | 19,090 | 1,19 | 0,150 | 169,32 | 119,42 | 4,8447 | ZJ | | | |
| RZ-072BI | | 180,00 | 47,00 | 55,50 | | | | 1,30 | 43,60 | 5,95 | 1,211 | 19,090 | 1,17 | 0,131 | 192,16 | 136,66 | 5,5190 | ZJ | | | |
| RZ-072BX | | 270,00 | 47,00 | 55,50 | 1,30 | 43,80 | 5,85 | 1,211 | 19,090 | 1,17 | 0,130 | 192,80 | 137,30 | 5,5440 | ZJ | | | | | | |
| RZ-072CI | | 180,00 | 51,00 | 61,90 | 1,30 | 50,00 | 5,95 | 1,211 | 19,090 | 1,16 | 0,114 | 219,00 | 157,10 | 6,3181 | ZJ | | | | | | |
| RZ-072CX | 270,00 | 51,00 | 61,90 | 1,30 | 50,20 | 5,85 | 1,211 | 19,090 | 1,16 | 0,113 | 219,23 | 157,33 | 6,3431 | ZJ | | | | | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|--------|
| Z-066UX | 0,70 | 5,00 | 0,20 | 6,30 | 270,00 | 43,00 | 48,50 | 1,10 | 42,53 | 2,98 | 2,771 | 27,300 | 1,82 | 0,515 | 96,15 | 47,65 | 2,5280 | ZF | | | |
| Z-066VI | | | | | 180,00 | 16,00 | 11,10 | 0,50 | 7,35 | 1,87 | 3,441 | 37,330 | 6,31 | 11,729 | 13,99 | 2,89 | 0,3075 | ZD | | | |
| Z-066VX | | | | | 270,00 | 16,00 | 11,10 | 0,50 | 7,52 | 1,78 | 3,441 | 37,330 | 6,24 | 11,428 | 14,07 | 2,97 | 0,3142 | ZD | | | |
| Z-066WI | | | | | 180,00 | 20,00 | 15,30 | 0,50 | 11,55 | 1,87 | 3,441 | 37,330 | 5,32 | 7,189 | 20,01 | 4,71 | 0,4683 | ZD | | | |
| Z-066WX | | | | | 270,00 | 21,00 | 15,30 | 0,50 | 11,73 | 1,78 | 3,441 | 37,330 | 5,30 | 7,075 | 20,09 | 4,79 | 0,4749 | ZD | | | |
| Z-066XI | | | | | 180,00 | 26,00 | 21,60 | 0,60 | 17,85 | 1,87 | 3,441 | 37,330 | 4,75 | 4,548 | 29,05 | 7,45 | 0,7093 | ZD | | | |
| Z-066XX | | | | | 270,00 | 26,00 | 21,60 | 0,60 | 18,03 | 1,78 | 3,441 | 37,330 | 4,74 | 4,502 | 29,13 | 7,53 | 0,7160 | ZD | | | |
| Z-066YI | | | | | 180,00 | 33,00 | 32,10 | 0,80 | 28,35 | 1,87 | 3,441 | 37,330 | 4,32 | 2,821 | 44,11 | 12,01 | 1,1110 | ZE | | | |
| Z-066YX | | | | | 270,00 | 33,00 | 32,10 | 0,80 | 28,53 | 1,78 | 3,441 | 37,330 | 4,31 | 2,803 | 44,19 | 12,09 | 1,1170 | ZE | | | |
| Z-066ZI | | | | | 180,00 | 40,00 | 46,10 | 1,10 | 42,35 | 1,87 | 3,441 | 37,330 | 4,07 | 1,873 | 64,20 | 18,10 | 1,6460 | ZE | | | |
| Z-066ZX | | | | | 270,00 | 40,00 | 46,10 | 1,10 | 42,53 | 1,78 | 3,441 | 37,330 | 4,06 | 1,865 | 64,27 | 18,17 | 1,6530 | ZE | | | |
| Z-067I | | | | | 0,80 | 10,80 | 0,30 | 12,30 | 180,00 | 25,00 | 25,10 | 0,90 | 10,00 | 7,55 | 1,221 | 19,100 | 1,47 | 0,363 | 74,39 | 49,29 | 1,6740 |
| Z-067X | 270,00 | 26,00 | 25,10 | 0,90 | | | | | 10,20 | 7,45 | 1,221 | 19,100 | 1,46 | 0,355 | 75,46 | 50,36 | 1,7050 | ZD | | | |
| Z-068I | 180,00 | 37,00 | 35,50 | 0,90 | | | | | 20,40 | 7,55 | 1,221 | 19,100 | 1,22 | 0,170 | 140,50 | 105,00 | 3,2870 | ZE | | | |
| Z-068X | 270,00 | 37,00 | 35,50 | 0,90 | | | | | 20,60 | 7,45 | 1,221 | 19,100 | 1,22 | 0,169 | 141,57 | 106,07 | 3,3180 | ZE | | | |
| Z-069I | 180,00 | 47,00 | 47,50 | 1,30 | | | | | 32,40 | 7,55 | 1,221 | 19,100 | 1,12 | 0,106 | 216,79 | 169,29 | 5,1480 | ZF | | | |
| Z-069X | 270,00 | 47,00 | 47,50 | 1,30 | | | | | 32,60 | 7,45 | 1,221 | 19,100 | 1,12 | 0,105 | 217,86 | 170,36 | 5,1790 | ZF | | | |
| Z-069AI | 180,00 | 55,00 | 58,70 | 1,30 | | | | | 43,60 | 7,55 | 1,221 | 19,100 | 1,07 | 0,078 | 287,99 | 229,29 | 6,8850 | ZF | | | |
| Z-069AX | 270,00 | 55,00 | 58,70 | 1,30 | | | | | 43,80 | 7,45 | 1,221 | 19,100 | 1,07 | 0,078 | 289,06 | 230,36 | 6,9160 | ZF | | | |
| Z-069CI | 8,80 | 0,30 | 10,30 | 180,00 | | | | | 16,00 | 18,00 | 0,70 | 6,00 | 6,00 | 1,551 | 23,280 | 1,50 | 1,254 | 35,33 | 17,33 | 0,8240 | ZD |
| Z-069CX | | | | 270,00 | | | | | 16,00 | 18,00 | 0,70 | 6,20 | 5,90 | 1,551 | 23,280 | 1,50 | 1,207 | 36,00 | 18,00 | 0,8490 | ZD |
| Z-070I | | | | 180,00 | | | | | 22,00 | 21,90 | 0,70 | 10,00 | 5,95 | 1,551 | 23,280 | 1,67 | 0,709 | 52,56 | 30,66 | 1,3400 | ZD |
| Z-070X | | | | 270,00 | | | | | 22,00 | 21,90 | 0,70 | 10,20 | 5,85 | 1,551 | 23,280 | 1,66 | 0,694 | 53,22 | 31,32 | 1,3640 | ZD |
| Z-071I | | | | 180,00 | | 32,00 | 32,30 | 0,90 | 20,40 | 5,95 | 1,551 | 23,280 | 1,39 | 0,333 | 97,61 | 65,31 | 2,6310 | ZE | | | |
| Z-071X | | | | 270,00 | | 32,00 | 32,30 | 0,90 | 20,60 | 5,85 | 1,551 | 23,280 | 1,39 | 0,329 | 98,28 | 65,98 | 2,6560 | ZE | | | |
| Z-072I | | | | 180,00 | | 41,00 | 44,30 | 1,30 | 32,40 | 5,95 | 1,551 | 23,280 | 1,29 | 0,206 | 149,60 | 105,30 | 4,1200 | ZF | | | |
| Z-072X | | | | 270,00 | | 41,00 | 44,30 | 1,30 | 32,60 | 5,85 | 1,551 | 23,280 | 1,28 | 0,205 | 150,27 | 105,97 | 4,1450 | ZF | | | |
| Z-072AI | | | | 180,00 | | 44,00 | 49,90 | 1,30 | 38,00 | 5,95 | 1,551 | 23,280 | 1,25 | 0,175 | 173,86 | 123,96 | 4,8150 | ZF | | | |
| Z-072AX | | | | 270,00 | | 44,00 | 49,90 | 1,30 | 38,20 | 5,85 | 1,551 | 23,280 | 1,25 | 0,174 | 174,53 | 124,63 | 4,8400 | ZF | | | |
| Z-072BI | | | | 180,00 | | 47,00 | 55,50 | 1,30 | 43,60 | 5,95 | 1,551 | 23,280 | 1,23 | 0,152 | 198,12 | 142,62 | 5,5100 | ZF | | | |
| Z-072BX | | | | 270,00 | | 47,00 | 55,50 | 1,30 | 43,80 | 5,85 | 1,551 | 23,280 | 1,23 | 0,152 | 198,80 | 143,30 | 5,5350 | ZF | | | |
| Z-072CI | 180,00 | 51,00 | 61,90 | 1,30 | | 50,00 | 5,95 | 1,551 | 23,280 | 1,22 | 0,133 | 225,85 | 163,95 | 6,3050 | ZF | | | | | | |
| Z-072CX | 270,00 | 51,00 | 61,90 | 1,30 | | 50,20 | 5,85 | 1,551 | 23,280 | 1,22 | 0,132 | 226,52 | 164,62 | 6,3290 | ZF | | | | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-072DI | 0,80 | 8,80 | 0,30 | 10,30 | 180,00 | 54,00 | 68,30 | 1,80 | 56,40 | 5,95 | 1,551 | 23,280 | 1,21 | 0,117 | 253,59 | 185,29 | 7,0990 | ZF | | |
| Z-072DX | | | | | 270,00 | 54,00 | 68,30 | 1,80 | 56,60 | 5,85 | 1,551 | 23,280 | 1,21 | 0,117 | 254,24 | 185,94 | 7,1240 | ZF | | |
| Z-072EI | | | | | 180,00 | 57,00 | 74,70 | 1,80 | 62,80 | 5,95 | 1,551 | 23,280 | 1,20 | 0,105 | 281,31 | 206,61 | 7,8930 | ZG | | |
| Z-072EX | | | | | 270,00 | 57,00 | 74,70 | 1,80 | 63,00 | 5,85 | 1,551 | 23,280 | 1,20 | 0,105 | 281,97 | 207,27 | 7,9180 | ZG | | |
| Z-072EAI | 8,00 | 0,30 | 9,50 | 180,00 | 21,00 | 20,00 | 0,70 | 9,20 | 5,40 | 1,771 | 25,500 | 1,54 | 1,065 | 42,29 | 22,29 | 1,1010 | ZG | | | |
| Z-072EAX | | | | 270,00 | 21,00 | 20,00 | 0,70 | 9,40 | 5,30 | 1,771 | 25,500 | 1,54 | 1,040 | 42,82 | 22,82 | 1,1240 | ZG | | | |
| Z-072FI | | | | 180,00 | 26,00 | 26,50 | 0,90 | 15,60 | 5,45 | 1,771 | 25,500 | 1,62 | 0,604 | 65,76 | 39,26 | 1,8320 | ZG | | | |
| Z-072FX | | | | 270,00 | 26,00 | 26,50 | 0,90 | 15,80 | 5,35 | 1,771 | 25,500 | 1,62 | 0,596 | 66,29 | 39,79 | 1,8540 | ZG | | | |
| Z-072F-01I | | | | 180,00 | 36,00 | 40,00 | 0,90 | 29,20 | 5,40 | 1,771 | 25,500 | 1,44 | 0,315 | 115,34 | 75,34 | 3,3520 | ZD | | | |
| Z-072F-01X | | | | 270,00 | 37,00 | 40,00 | 0,90 | 29,40 | 5,30 | 1,771 | 25,500 | 1,44 | 0,313 | 115,87 | 75,87 | 3,3740 | ZD | | | |
| Z-072F-02I | | | | 180,00 | 43,00 | 50,00 | 1,30 | 39,60 | 5,20 | 1,771 | 25,500 | 1,37 | 0,231 | 152,93 | 102,93 | 4,5140 | ZE | | | |
| Z-072F-02X | | | | 270,00 | 43,00 | 50,00 | 1,30 | 39,80 | 5,10 | 1,771 | 25,500 | 1,37 | 0,229 | 153,46 | 103,46 | 4,5360 | ZE | | | |
| Z-072F-03I | | | | 180,00 | 48,00 | 60,00 | 1,30 | 49,20 | 5,40 | 1,771 | 25,500 | 1,35 | 0,185 | 188,40 | 128,40 | 5,5860 | ZF | | | |
| Z-072F-03X | | | | 270,00 | 48,00 | 60,00 | 1,30 | 49,40 | 5,30 | 1,771 | 25,500 | 1,34 | 0,184 | 188,93 | 128,93 | 5,6090 | ZF | | | |
| Z-072F-04I | | | | 180,00 | 52,00 | 70,00 | 1,80 | 59,60 | 5,20 | 1,771 | 25,500 | 1,32 | 0,152 | 225,99 | 155,99 | 6,7480 | ZF | | | |
| Z-072F-04X | | | | 270,00 | 53,00 | 70,00 | 1,80 | 59,80 | 5,10 | 1,771 | 25,500 | 1,32 | 0,152 | 226,52 | 156,52 | 6,7710 | ZF | | | |
| Z-072F-05I | | | | 180,00 | 57,00 | 80,00 | 1,80 | 69,20 | 5,40 | 1,771 | 25,500 | 1,31 | 0,131 | 261,46 | 181,46 | 7,8210 | ZF | | | |
| Z-072F-05X | | | | 270,00 | 57,00 | 80,00 | 1,80 | 69,40 | 5,30 | 1,771 | 25,500 | 1,31 | 0,130 | 261,99 | 181,99 | 7,8440 | ZF | | | |
| Z-072F-10I | | | | 7,80 | 0,30 | 9,30 | 180,00 | 18,00 | 18,00 | 0,70 | 7,60 | 5,20 | 1,881 | 26,120 | 1,63 | 1,431 | 34,94 | 16,94 | 0,8960 | ZG |
| Z-072F-10X | | | | | | | 270,00 | 18,00 | 18,00 | 0,70 | 7,80 | 5,10 | 1,881 | 26,120 | 1,63 | 1,390 | 35,43 | 17,43 | 0,9180 | ZG |
| Z-072GI | 180,00 | 23,00 | 22,50 | | | | 0,70 | 12,40 | 5,05 | 1,881 | 26,120 | 1,77 | 0,839 | 51,39 | 28,89 | 1,4330 | ZG | | | |
| Z-072GX | 270,00 | 23,00 | 22,50 | | | | 0,70 | 12,60 | 4,95 | 1,881 | 26,120 | 1,76 | 0,825 | 51,89 | 29,39 | 1,4550 | ZG | | | |
| Z-073I | 7,10 | 0,20 | 8,50 | 180,00 | 20,00 | 19,20 | 0,60 | 10,00 | 4,60 | 2,331 | 28,550 | 2,16 | 1,451 | 37,27 | 18,07 | 1,0560 | ZD | | | |
| Z-073X | | | | 270,00 | 20,00 | 19,20 | 0,60 | 10,20 | 4,50 | 2,331 | 28,550 | 2,15 | 1,420 | 37,66 | 18,46 | 1,0750 | ZD | | | |
| Z-074I | | | | 180,00 | 28,00 | 29,60 | 0,80 | 20,40 | 4,60 | 2,331 | 28,550 | 1,80 | 0,681 | 68,09 | 38,49 | 2,0730 | ZD | | | |
| Z-074X | | | | 270,00 | 29,00 | 29,60 | 0,80 | 20,60 | 4,50 | 2,331 | 28,550 | 1,79 | 0,674 | 68,48 | 38,88 | 2,0920 | ZD | | | |
| Z-075I | | | | 180,00 | 36,00 | 41,60 | 1,10 | 32,40 | 4,60 | 2,331 | 28,550 | 1,65 | 0,422 | 103,66 | 62,06 | 3,2470 | ZD | | | |
| Z-075X | | | | 270,00 | 36,00 | 41,60 | 1,10 | 32,60 | 4,50 | 2,331 | 28,550 | 1,65 | 0,420 | 104,05 | 62,45 | 3,2660 | ZD | | | |
| Z-075AI | | | | 180,00 | 39,00 | 47,20 | 1,10 | 38,00 | 4,60 | 2,331 | 28,550 | 1,61 | 0,359 | 120,26 | 73,06 | 3,7950 | ZE | | | |
| Z-075AX | | | | 270,00 | 39,00 | 47,20 | 1,10 | 38,20 | 4,50 | 2,331 | 28,550 | 1,61 | 0,357 | 120,65 | 73,45 | 3,8140 | ZE | | | |
| Z-075BI | | | | 180,00 | 42,00 | 52,80 | 1,10 | 43,60 | 4,60 | 2,331 | 28,550 | 1,59 | 0,312 | 136,85 | 84,05 | 4,3420 | ZF | | | |
| Z-075BX | | | | 270,00 | 42,00 | 52,80 | 1,10 | 43,80 | 4,50 | 2,331 | 28,550 | 1,58 | 0,310 | 137,25 | 84,45 | 4,3620 | ZF | | | |
| Z-075CI | | | | 180,00 | 45,00 | 59,20 | 1,10 | 50,00 | 4,60 | 2,331 | 28,550 | 1,57 | 0,271 | 155,82 | 96,62 | 4,9680 | ZF | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| RZ-072DI | 0,80 | 8,80 | 0,30 | 10,30 | 180,00 | 54,00 | 68,30 | 1,80 | 56,40 | 5,95 | 1,211 | 19,090 | 1,15 | 0,101 | 245,83 | 177,53 | 7,1173 | ZJ | | |
| RZ-072DX | | | | | 270,00 | 54,00 | 68,30 | 1,80 | 56,60 | 5,85 | 1,211 | 19,090 | 1,15 | 0,100 | 246,47 | 178,17 | 7,1422 | ZJ | | |
| RZ-072EI | | | | | 180,00 | 57,00 | 74,70 | 1,80 | 62,80 | 5,95 | 1,211 | 19,090 | 1,14 | 0,090 | 272,67 | 197,97 | 7,9164 | ZK | | |
| RZ-072EX | | | | | 270,00 | 57,00 | 74,70 | 1,80 | 63,00 | 5,85 | 1,211 | 19,090 | 1,14 | 0,090 | 273,31 | 198,61 | 7,9414 | ZK | | |
| RZ-072EAI | 8,00 | 0,30 | 9,50 | 180,00 | 21,00 | 20,00 | 0,70 | 9,20 | 5,40 | 1,411 | 20,910 | 1,63 | 0,914 | 41,30 | 21,30 | 1,1013 | ZK | | | |
| RZ-072EAX | | | | 270,00 | 21,00 | 20,00 | 0,70 | 9,40 | 5,30 | 1,411 | 20,910 | 1,63 | 0,893 | 41,80 | 21,80 | 1,1238 | ZK | | | |
| RZ-072FI | | | | 180,00 | 26,00 | 26,50 | 0,90 | 15,60 | 5,45 | 1,411 | 20,910 | 1,56 | 0,519 | 64,07 | 37,57 | 1,8205 | ZK | | | |
| RZ-072FX | | | | 270,00 | 26,00 | 26,50 | 0,90 | 15,80 | 5,35 | 1,411 | 20,910 | 1,55 | 0,512 | 64,58 | 38,08 | 1,8430 | ZK | | | |
| RZ-072F-01I | | | | 180,00 | 36,00 | 40,00 | 0,90 | 29,20 | 5,40 | 1,411 | 20,910 | 1,37 | 0,270 | 112,10 | 72,10 | 3,3489 | ZG | | | |
| RZ-072F-01X | | | | 270,00 | 37,00 | 40,00 | 0,90 | 29,40 | 5,30 | 1,411 | 20,910 | 1,37 | 0,269 | 112,61 | 72,61 | 3,3713 | ZG | | | |
| RZ-072F-02I | | | | 180,00 | 43,00 | 50,00 | 1,30 | 39,60 | 5,20 | 1,411 | 20,910 | 1,30 | 0,198 | 148,50 | 98,50 | 4,5176 | ZH | | | |
| RZ-072F-02X | | | | 270,00 | 43,00 | 50,00 | 1,30 | 39,80 | 5,10 | 1,411 | 20,910 | 1,30 | 0,197 | 149,01 | 99,01 | 4,5401 | ZH | | | |
| RZ-072F-03I | | | | 180,00 | 48,00 | 60,00 | 1,30 | 49,20 | 5,40 | 1,411 | 20,910 | 1,28 | 0,159 | 182,87 | 122,87 | 5,5964 | ZJ | | | |
| RZ-072F-03X | | | | 270,00 | 48,00 | 60,00 | 1,30 | 49,40 | 5,30 | 1,411 | 20,910 | 1,28 | 0,158 | 183,38 | 123,38 | 5,6189 | ZJ | | | |
| RZ-072F-04I | | | | 180,00 | 52,00 | 70,00 | 1,80 | 59,60 | 5,20 | 1,411 | 20,910 | 1,26 | 0,131 | 219,27 | 149,27 | 6,7651 | ZJ | | | |
| RZ-072F-04X | | | | 270,00 | 53,00 | 70,00 | 1,80 | 59,80 | 5,10 | 1,411 | 20,910 | 1,26 | 0,130 | 219,78 | 149,78 | 6,7876 | ZJ | | | |
| RZ-072F-05I | | | | 180,00 | 57,00 | 80,00 | 1,80 | 69,20 | 5,40 | 1,411 | 20,910 | 1,24 | 0,112 | 253,65 | 173,65 | 7,8440 | ZJ | | | |
| RZ-072F-05X | | | | 270,00 | 57,00 | 80,00 | 1,80 | 69,40 | 5,30 | 1,411 | 20,910 | 1,24 | 0,112 | 254,15 | 174,15 | 7,8665 | ZJ | | | |
| RZ-072F-10I | | | | 7,80 | 0,30 | 9,30 | 180,00 | 18,00 | 18,00 | 0,70 | 7,60 | 5,20 | 1,511 | 21,420 | 1,82 | 1,229 | 34,20 | 16,20 | 0,8959 | ZK |
| RZ-072F-10X | | | | | | | 270,00 | 18,00 | 18,00 | 0,70 | 7,80 | 5,10 | 1,511 | 21,420 | 1,82 | 1,194 | 34,67 | 16,67 | 0,9178 | ZK |
| RZ-072GI | 180,00 | 23,00 | 22,50 | | | | 0,70 | 12,40 | 5,05 | 1,511 | 21,420 | 1,70 | 0,721 | 50,13 | 27,63 | 1,4203 | ZK | | | |
| RZ-072GX | 270,00 | 23,00 | 22,50 | | | | 0,70 | 12,60 | 4,95 | 1,511 | 21,420 | 1,69 | 0,708 | 50,61 | 28,11 | 1,4422 | ZK | | | |
| RZ-073I | 7,10 | 0,20 | 8,50 | 180,00 | 20,00 | 19,20 | 0,60 | 10,00 | 4,60 | 1,851 | 23,410 | 2,08 | 1,246 | 36,50 | 17,30 | 1,0423 | ZG | | | |
| RZ-073X | | | | 270,00 | 20,00 | 19,20 | 0,60 | 10,20 | 4,50 | 1,851 | 23,410 | 2,07 | 1,220 | 36,88 | 17,68 | 1,0620 | ZG | | | |
| RZ-074I | | | | 180,00 | 28,00 | 29,60 | 0,80 | 20,40 | 4,60 | 1,851 | 23,410 | 1,72 | 0,585 | 66,46 | 36,86 | 2,0649 | ZG | | | |
| RZ-074X | | | | 270,00 | 29,00 | 29,60 | 0,80 | 20,60 | 4,50 | 1,851 | 23,410 | 1,71 | 0,579 | 66,84 | 37,24 | 2,0846 | ZG | | | |
| RZ-075I | | | | 180,00 | 36,00 | 41,60 | 1,10 | 32,40 | 4,60 | 1,851 | 23,410 | 1,58 | 0,363 | 101,03 | 59,43 | 3,2449 | ZG | | | |
| RZ-075X | | | | 270,00 | 36,00 | 41,60 | 1,10 | 32,60 | 4,50 | 1,851 | 23,410 | 1,57 | 0,361 | 101,40 | 59,80 | 3,2646 | ZG | | | |
| RZ-075AI | | | | 180,00 | 39,00 | 47,20 | 1,10 | 38,00 | 4,60 | 1,851 | 23,410 | 1,54 | 0,308 | 117,16 | 69,96 | 3,7956 | ZH | | | |
| RZ-075AX | | | | 270,00 | 39,00 | 47,20 | 1,10 | 38,20 | 4,50 | 1,851 | 23,410 | 1,53 | 0,307 | 117,54 | 70,34 | 3,8152 | ZH | | | |
| RZ-075BI | | | | 180,00 | 42,00 | 52,80 | 1,10 | 43,60 | 4,60 | 1,851 | 23,410 | 1,51 | 0,268 | 133,29 | 80,49 | 4,3462 | ZJ | | | |
| RZ-075BX | | | | 270,00 | 42,00 | 52,80 | 1,10 | 43,80 | 4,50 | 1,851 | 23,410 | 1,51 | 0,267 | 133,67 | 80,87 | 4,3659 | ZJ | | | |
| RZ-075CI | | | | 180,00 | 45,00 | 59,20 | 1,10 | 50,00 | 4,60 | 1,851 | 23,410 | 1,49 | 0,233 | 151,73 | 92,53 | 4,9755 | ZJ | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| RZ-075CX | 0,80 | 7,10 | 0,20 | 8,50 | 270,00 | 45,00 | 59,20 | 1,10 | 50,20 | 4,50 | 1,851 | 23,410 | 1,49 | 0,232 | 152,10 | 92,90 | 4,9952 | ZJ | | |
| RZ-075DI | | | | | 180,00 | 48,00 | 65,60 | 1,50 | 56,40 | 4,60 | 1,851 | 23,410 | 1,48 | 0,206 | 170,16 | 104,56 | 5,6048 | ZJ | | |
| RZ-075DX | | | | | 270,00 | 48,00 | 65,60 | 1,50 | 56,60 | 4,50 | 1,851 | 23,410 | 1,48 | 0,205 | 170,54 | 104,94 | 5,6245 | ZJ | | |
| RZ-075EI | | | | | 180,00 | 51,00 | 72,00 | 1,50 | 62,80 | 4,60 | 1,851 | 23,410 | 1,46 | 0,185 | 188,60 | 116,60 | 6,2342 | ZJ | | |
| RZ-075EX | | | | | 270,00 | 51,00 | 72,00 | 1,50 | 63,00 | 4,50 | 1,851 | 23,410 | 1,46 | 0,184 | 188,97 | 116,97 | 6,2538 | ZJ | | |
| RZ-075E-011 | 6,40 | 0,20 | 7,80 | 180,00 | 18,00 | 18,70 | 0,60 | 10,80 | 3,95 | 2,331 | 25,800 | 2,08 | 1,633 | 33,07 | 14,37 | 0,9964 | ZG | | | |
| RZ-075E-01X | | | | 270,00 | 18,00 | 18,70 | 0,60 | 11,00 | 3,85 | 2,331 | 25,800 | 2,08 | 1,601 | 33,36 | 14,66 | 1,0139 | ZG | | | |
| RZ-075E-03I | | | | 180,00 | 26,00 | 27,50 | 0,80 | 19,60 | 3,95 | 2,331 | 25,800 | 1,99 | 0,868 | 54,50 | 27,00 | 1,7656 | ZG | | | |
| RZ-075E-03X | | | | 270,00 | 26,00 | 27,50 | 0,80 | 19,80 | 3,85 | 2,331 | 25,800 | 1,99 | 0,859 | 54,80 | 27,30 | 1,7831 | ZG | | | |
| RZ-075FI | | | | 180,00 | 33,00 | 36,40 | 0,80 | 28,40 | 4,00 | 2,331 | 25,800 | 1,91 | 0,592 | 76,08 | 39,68 | 2,5347 | ZG | | | |
| RZ-075FX | | | | 270,00 | 33,00 | 36,40 | 0,80 | 28,60 | 3,90 | 2,331 | 25,800 | 1,91 | 0,587 | 76,37 | 39,97 | 2,5522 | ZG | | | |
| RZ-075GI | | | | 180,00 | 40,00 | 49,20 | 1,10 | 41,20 | 4,00 | 2,331 | 25,800 | 1,79 | 0,404 | 107,29 | 58,09 | 3,6535 | ZJ | | | |
| RZ-075GX | | | | 270,00 | 40,00 | 49,20 | 1,10 | 41,40 | 3,90 | 2,331 | 25,800 | 1,79 | 0,402 | 107,57 | 58,37 | 3,6710 | ZJ | | | |
| RZ-075HI | | | | 180,00 | 46,00 | 62,00 | 1,10 | 54,00 | 4,00 | 2,331 | 25,800 | 1,75 | 0,307 | 138,49 | 76,49 | 4,7723 | ZJ | | | |
| RZ-075HX | | | | 270,00 | 46,00 | 62,00 | 1,10 | 54,20 | 3,91 | 2,331 | 25,800 | 1,75 | 0,306 | 138,78 | 76,78 | 4,7898 | ZJ | | | |
| RZ-075JI | | | | 180,00 | 51,00 | 74,80 | 1,50 | 66,80 | 4,00 | 2,331 | 25,800 | 1,72 | 0,247 | 169,67 | 94,87 | 5,8911 | ZJ | | | |
| RZ-075JX | | | | 270,00 | 51,00 | 74,80 | 1,50 | 67,00 | 3,90 | 2,331 | 25,800 | 1,72 | 0,247 | 169,98 | 95,18 | 5,9086 | ZJ | | | |
| RZ-075K-011 | | | | 6,00 | 0,20 | 7,40 | 180,00 | 18,00 | 18,80 | 0,60 | 11,60 | 3,60 | 2,511 | 27,390 | 2,42 | 1,888 | 32,00 | 13,20 | 0,9902 | ZG |
| RZ-075K-01X | | | | | | | 270,00 | 18,00 | 18,80 | 0,60 | 11,80 | 3,50 | 2,511 | 27,390 | 2,42 | 1,854 | 32,20 | 13,40 | 1,0064 | ZG |
| RZ-075KI | | | | | | | 180,00 | 26,00 | 25,00 | 0,60 | 18,00 | 3,50 | 2,511 | 27,390 | 2,37 | 1,186 | 45,99 | 20,99 | 1,5096 | ZG |
| RZ-075KX | 270,00 | 26,00 | 25,00 | | | | 0,60 | 18,20 | 3,40 | 2,511 | 27,390 | 2,36 | 1,172 | 46,23 | 21,23 | 1,5258 | ZG | | | |
| RZ-075LI | 180,00 | 29,00 | 30,00 | | | | 0,80 | 22,80 | 3,60 | 2,511 | 27,390 | 2,25 | 0,927 | 56,85 | 26,85 | 1,8992 | ZH | | | |
| RZ-075LX | 270,00 | 29,00 | 30,00 | | | | 0,80 | 23,00 | 3,50 | 2,511 | 27,390 | 2,24 | 0,919 | 57,09 | 27,09 | 1,9154 | ZH | | | |
| RZ-075MI | 180,00 | 35,00 | 40,00 | | | | 0,80 | 32,40 | 3,80 | 2,511 | 27,390 | 2,11 | 0,645 | 78,56 | 38,56 | 2,6783 | ZJ | | | |
| RZ-075MX | 270,00 | 35,00 | 40,00 | | | | 0,80 | 32,60 | 3,70 | 2,511 | 27,390 | 2,10 | 0,641 | 78,81 | 38,81 | 2,6946 | ZJ | | | |
| RZ-075NI | 180,00 | 40,00 | 50,00 | | | | 1,10 | 42,80 | 3,60 | 2,511 | 27,390 | 2,02 | 0,486 | 101,25 | 51,25 | 3,5224 | ZJ | | | |
| RZ-075NX | 270,00 | 40,00 | 50,00 | | | | 1,10 | 43,00 | 3,50 | 2,511 | 27,390 | 2,01 | 0,483 | 101,50 | 51,50 | 3,5387 | ZJ | | | |
| RZ-075OI | 180,00 | 45,00 | 60,00 | | | | 1,10 | 52,40 | 3,80 | 2,511 | 27,390 | 1,98 | 0,395 | 122,97 | 62,97 | 4,3016 | ZJ | | | |
| RZ-075OX | 270,00 | 45,00 | 60,00 | | | | 1,10 | 52,60 | 3,70 | 2,511 | 27,390 | 1,98 | 0,394 | 123,21 | 63,21 | 4,3178 | ZJ | | | |
| RZ-076I | 5,80 | 0,20 | 7,20 | | | | 180,00 | 20,00 | 17,90 | 0,60 | 10,80 | 3,55 | 2,551 | 28,250 | 2,92 | 2,294 | 28,67 | 10,77 | 0,8897 | ZG |
| RZ-076X | | | | | | | 270,00 | 20,00 | 17,90 | 0,60 | 11,00 | 3,45 | 2,551 | 28,250 | 2,90 | 2,249 | 29,33 | 11,43 | 0,9053 | ZG |
| RZ-077I | | | | | | | 180,00 | 28,00 | 28,30 | 0,80 | 21,20 | 3,55 | 2,551 | 28,250 | 2,44 | 1,124 | 51,17 | 22,87 | 1,7013 | ZG |
| RZ-077X | | | | 270,00 | 28,00 | 28,30 | 0,80 | 21,40 | 3,45 | 2,551 | 28,250 | 2,44 | 1,113 | 51,39 | 23,09 | 1,7169 | ZG | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-075CX | 0,80 | 7,10 | 0,20 | 8,50 | 270,00 | 45,00 | 59,20 | 1,10 | 50,20 | 4,50 | 2,331 | 28,550 | 1,57 | 0,270 | 156,21 | 97,01 | 4,9880 | ZF | | |
| Z-075DI | | | | | 180,00 | 48,00 | 65,60 | 1,50 | 56,40 | 4,60 | 2,331 | 28,550 | 1,55 | 0,240 | 174,79 | 109,19 | 5,5940 | ZF | | |
| Z-075DX | | | | | 270,00 | 48,00 | 65,60 | 1,50 | 56,60 | 4,50 | 2,331 | 28,550 | 1,55 | 0,239 | 175,18 | 109,58 | 5,6140 | ZF | | |
| Z-075EI | | | | | 180,00 | 51,00 | 72,00 | 1,50 | 62,80 | 4,60 | 2,331 | 28,550 | 1,54 | 0,215 | 193,76 | 121,76 | 6,2210 | ZF | | |
| Z-075EX | | | | | 270,00 | 51,00 | 72,00 | 1,50 | 63,00 | 4,50 | 2,331 | 28,550 | 1,54 | 0,215 | 194,15 | 122,15 | 6,2400 | ZF | | |
| Z-075E-01I | 6,40 | 0,20 | 7,80 | 180,00 | 18,00 | 18,70 | 0,60 | 10,80 | 3,95 | 2,881 | 31,460 | 2,10 | 1,901 | 33,73 | 15,03 | 0,9960 | ZD | | | |
| Z-075E-01X | | | | 270,00 | 18,00 | 18,70 | 0,60 | 11,00 | 3,85 | 2,881 | 31,460 | 2,10 | 1,864 | 33,94 | 15,24 | 1,0140 | ZD | | | |
| Z-075E-03I | | | | 180,00 | 26,00 | 27,50 | 0,80 | 19,60 | 3,95 | 2,881 | 31,460 | 1,99 | 1,011 | 55,77 | 28,27 | 1,7550 | ZD | | | |
| Z-075E-03X | | | | 270,00 | 26,00 | 27,50 | 0,80 | 19,80 | 3,85 | 2,881 | 31,460 | 1,99 | 1,000 | 56,07 | 28,57 | 1,7830 | ZD | | | |
| Z-075FI | | | | 180,00 | 33,00 | 36,40 | 0,80 | 28,40 | 4,00 | 2,881 | 31,460 | 1,99 | 0,689 | 77,90 | 41,50 | 2,5390 | ZD | | | |
| Z-075FX | | | | 270,00 | 33,00 | 36,40 | 0,80 | 28,60 | 3,90 | 2,881 | 31,460 | 1,99 | 0,684 | 78,20 | 41,80 | 2,5570 | ZD | | | |
| Z-075GI | | | | 180,00 | 40,00 | 49,20 | 1,10 | 41,20 | 4,00 | 2,881 | 31,460 | 1,88 | 0,471 | 109,95 | 60,75 | 3,6530 | ZF | | | |
| Z-075GX | | | | 270,00 | 40,00 | 49,20 | 1,10 | 41,40 | 3,90 | 2,881 | 31,460 | 1,88 | 0,468 | 110,25 | 61,05 | 3,6700 | ZF | | | |
| Z-075HI | | | | 180,00 | 46,00 | 62,00 | 1,10 | 54,00 | 4,00 | 2,881 | 31,460 | 1,84 | 0,357 | 141,99 | 79,99 | 4,7670 | ZF | | | |
| Z-075HX | | | | 270,00 | 46,00 | 62,00 | 1,10 | 54,20 | 3,91 | 2,881 | 31,460 | 1,84 | 0,356 | 142,29 | 80,29 | 4,7840 | ZF | | | |
| Z-075JI | | | | 180,00 | 51,00 | 74,80 | 1,50 | 66,80 | 4,00 | 2,881 | 31,460 | 1,81 | 0,288 | 174,04 | 99,24 | 5,8800 | ZF | | | |
| Z-075JX | | | | 270,00 | 51,00 | 74,80 | 1,50 | 67,00 | 3,90 | 2,881 | 31,460 | 1,81 | 0,287 | 174,34 | 99,54 | 5,8970 | ZF | | | |
| Z-075K-01I | | | | 6,00 | 0,20 | 7,40 | 180,00 | 18,00 | 18,80 | 0,60 | 11,60 | 3,60 | 3,111 | 33,400 | 2,33 | 2,198 | 32,58 | 13,78 | 0,9900 | ZD |
| Z-075K-01X | | | | | | | 270,00 | 18,00 | 18,80 | 0,60 | 11,80 | 3,50 | 3,111 | 33,400 | 2,33 | 2,158 | 32,83 | 14,03 | 1,0060 | ZD |
| Z-075KI | | | | | | | 180,00 | 26,00 | 25,00 | 0,60 | 18,00 | 3,50 | 3,111 | 33,400 | 2,46 | 1,380 | 46,94 | 21,94 | 1,5180 | ZD |
| Z-075KX | 270,00 | 26,00 | 25,00 | | | | 0,60 | 18,20 | 3,40 | 3,111 | 33,400 | 2,45 | 1,364 | 47,20 | 22,20 | 1,5340 | ZD | | | |
| Z-075LI | 180,00 | 29,00 | 30,00 | | | | 0,80 | 22,80 | 3,60 | 3,111 | 33,400 | 2,34 | 1,079 | 58,07 | 28,07 | 1,9060 | ZE | | | |
| Z-075LX | 270,00 | 29,00 | 30,00 | | | | 0,80 | 23,00 | 3,50 | 3,111 | 33,400 | 2,33 | 1,069 | 58,32 | 28,32 | 1,9220 | ZE | | | |
| Z-075MI | 180,00 | 35,00 | 40,00 | | | | 0,80 | 32,40 | 3,80 | 3,111 | 33,400 | 2,20 | 0,751 | 80,32 | 40,32 | 2,6820 | ZF | | | |
| Z-075MX | 270,00 | 35,00 | 40,00 | | | | 0,80 | 32,60 | 3,70 | 3,111 | 33,400 | 2,19 | 0,747 | 80,57 | 40,57 | 2,6990 | ZF | | | |
| Z-075NI | 180,00 | 40,00 | 50,00 | | | | 1,10 | 42,80 | 3,60 | 3,111 | 33,400 | 2,11 | 0,565 | 103,58 | 53,58 | 3,5230 | ZF | | | |
| Z-075NX | 270,00 | 40,00 | 50,00 | | | | 1,10 | 43,00 | 3,50 | 3,111 | 33,400 | 2,10 | 0,563 | 103,84 | 53,84 | 3,5390 | ZF | | | |
| Z-075OI | 180,00 | 45,00 | 60,00 | | | | 1,10 | 52,40 | 3,80 | 3,111 | 33,400 | 2,07 | 0,460 | 125,83 | 65,83 | 4,2990 | ZF | | | |
| Z-075OX | 270,00 | 45,00 | 60,00 | | | | 1,10 | 52,60 | 3,70 | 3,111 | 33,400 | 2,07 | 0,458 | 126,09 | 66,09 | 4,3150 | ZF | | | |
| Z-076I | 5,80 | 0,20 | 7,20 | | | | 180,00 | 20,00 | 17,90 | 0,60 | 10,80 | 3,55 | 3,221 | 34,460 | 3,02 | 2,671 | 29,60 | 11,70 | 0,9012 | ZD |
| Z-076X | | | | | | | 270,00 | 20,00 | 17,90 | 0,60 | 11,00 | 3,45 | 3,221 | 34,460 | 3,00 | 2,618 | 29,83 | 11,93 | 0,9166 | ZD |
| Z-077I | | | | | | | 180,00 | 28,00 | 28,30 | 0,80 | 21,20 | 3,55 | 3,221 | 34,460 | 2,54 | 1,309 | 52,16 | 23,86 | 1,7090 | ZD |
| Z-077X | | | | 270,00 | 28,00 | 28,30 | 0,80 | 21,40 | 3,45 | 3,221 | 34,460 | 2,53 | 1,296 | 52,40 | 24,10 | 1,7250 | ZD | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|--------|----|
| Z-077AI | 0,80 | 5,80 | 0,20 | 7,20 | 180,00 | 31,00 | 34,00 | 0,80 | 26,80 | 3,60 | 3,221 | 34,460 | 2,35 | 1,027 | 64,41 | 30,41 | 2,1380 | ZD | | | |
| Z-077AX | | | | | 270,00 | 31,00 | 34,00 | 0,80 | 27,00 | 3,50 | 3,221 | 34,460 | 2,35 | 1,019 | 34,460 | 2,35 | 1,019 | 64,65 | 30,65 | 2,1540 | ZD |
| Z-078I | | | | | 180,00 | 35,00 | 40,30 | 1,10 | 33,20 | 3,55 | 3,221 | 34,460 | 2,34 | 0,824 | 34,460 | 2,34 | 0,824 | 78,20 | 37,90 | 2,6420 | ZD |
| Z-078X | | | | | 270,00 | 35,00 | 40,30 | 1,10 | 33,40 | 3,45 | 3,221 | 34,460 | 2,33 | 0,819 | 34,460 | 2,33 | 0,819 | 78,43 | 38,13 | 2,6570 | ZD |
| Z-078AI | | | | | 180,00 | 38,00 | 45,10 | 1,10 | 38,00 | 3,55 | 3,221 | 34,460 | 2,28 | 0,718 | 34,460 | 2,28 | 0,718 | 88,61 | 43,51 | 3,0150 | ZE |
| Z-078AX | | | | | 270,00 | 38,00 | 45,10 | 1,10 | 38,20 | 3,45 | 3,221 | 34,460 | 2,28 | 0,714 | 34,460 | 2,28 | 0,714 | 88,85 | 43,75 | 3,0300 | ZE |
| Z-078BI | | | | | 180,00 | 40,00 | 50,70 | 1,10 | 43,60 | 3,55 | 3,221 | 34,460 | 2,24 | 0,624 | 34,460 | 2,24 | 0,624 | 100,76 | 50,06 | 3,4500 | ZE |
| Z-078BX | | | | | 270,00 | 40,00 | 50,70 | 1,10 | 43,80 | 3,45 | 3,221 | 34,460 | 2,24 | 0,621 | 34,460 | 2,24 | 0,621 | 101,00 | 50,30 | 3,4660 | ZE |
| Z-078CI | | | | | 180,00 | 43,00 | 57,10 | 1,10 | 50,00 | 3,55 | 3,221 | 34,460 | 2,22 | 0,543 | 34,460 | 2,22 | 0,543 | 114,65 | 57,55 | 3,9470 | ZF |
| Z-078CX | | | | | 270,00 | 43,00 | 57,10 | 1,10 | 50,20 | 3,45 | 3,221 | 34,460 | 2,22 | 0,541 | 34,460 | 2,22 | 0,541 | 114,88 | 57,78 | 3,9630 | ZF |
| Z-078DI | | | | | 180,00 | 46,00 | 63,50 | 1,50 | 56,40 | 3,55 | 3,221 | 34,460 | 2,19 | 0,480 | 34,460 | 2,19 | 0,480 | 128,53 | 65,03 | 4,4450 | ZF |
| Z-078DX | | | | | 270,00 | 46,00 | 63,50 | 1,50 | 56,60 | 3,45 | 3,221 | 34,460 | 2,19 | 0,479 | 34,460 | 2,19 | 0,479 | 128,77 | 65,27 | 4,4600 | ZF |
| Z-078EI | | | | | 180,00 | 49,00 | 69,90 | 1,50 | 62,80 | 3,55 | 3,221 | 34,460 | 2,17 | 0,431 | 34,460 | 2,17 | 0,431 | 142,42 | 72,52 | 4,9430 | ZF |
| Z-078EX | | | | | 270,00 | 49,00 | 69,90 | 1,50 | 63,00 | 3,45 | 3,221 | 34,460 | 2,17 | 0,429 | 34,460 | 2,17 | 0,429 | 142,65 | 72,75 | 4,9580 | ZF |
| Z-079I | 4,80 | 0,15 | 6,20 | 180,00 | 18,00 | 15,50 | 0,50 | 10,00 | 2,75 | 3,661 | 40,840 | 4,71 | 5,670 | 22,06 | 6,56 | 0,6724 | ZD | | | | |
| Z-079X | | | | 270,00 | 18,00 | 15,50 | 0,50 | 10,20 | 2,65 | 3,661 | 40,840 | 4,68 | 5,549 | 40,840 | 4,68 | 5,549 | 22,20 | 6,70 | 0,6846 | ZD | |
| Z-079AI | | | | 180,00 | 20,00 | 17,90 | 0,60 | 12,40 | 2,75 | 3,661 | 40,840 | 4,36 | 4,497 | 40,840 | 4,36 | 4,497 | 26,17 | 8,27 | 0,8219 | ZD | |
| Z-079AX | | | | 270,00 | 21,00 | 17,90 | 0,60 | 12,60 | 2,65 | 3,661 | 40,840 | 4,34 | 4,420 | 40,840 | 4,34 | 4,420 | 26,31 | 8,41 | 0,8342 | ZD | |
| Z-080I | | | | 180,00 | 26,00 | 25,90 | 0,80 | 20,40 | 2,75 | 3,661 | 40,840 | 3,85 | 2,661 | 40,840 | 3,85 | 2,661 | 39,88 | 13,98 | 1,3190 | ZD | |
| Z-080X | | | | 270,00 | 27,00 | 25,90 | 0,80 | 20,60 | 2,65 | 3,661 | 40,840 | 3,84 | 2,634 | 40,840 | 3,84 | 2,634 | 40,02 | 14,12 | 1,3320 | ZD | |
| Z-081I | | | | 180,00 | 34,00 | 37,90 | 0,80 | 32,40 | 2,75 | 3,661 | 40,840 | 3,52 | 1,651 | 40,840 | 3,52 | 1,651 | 60,43 | 22,53 | 2,0670 | ZD | |
| Z-081X | | | | 270,00 | 34,00 | 37,90 | 0,80 | 32,60 | 2,65 | 3,661 | 40,840 | 3,51 | 1,640 | 40,840 | 3,51 | 1,640 | 60,58 | 22,68 | 2,0790 | ZD | |
| Z-081AI | | | | 180,00 | 36,00 | 43,50 | 1,10 | 38,00 | 2,75 | 3,661 | 40,840 | 3,42 | 1,402 | 40,840 | 3,42 | 1,402 | 70,03 | 26,53 | 2,4160 | ZE | |
| Z-081AX | | | | 270,00 | 37,00 | 43,50 | 1,10 | 38,20 | 2,65 | 3,661 | 40,840 | 3,41 | 1,395 | 40,840 | 3,41 | 1,395 | 70,17 | 26,67 | 2,4280 | ZE | |
| Z-081BI | | | | 180,00 | 39,00 | 49,10 | 1,10 | 43,60 | 2,75 | 3,661 | 40,840 | 3,35 | 1,219 | 40,840 | 3,35 | 1,219 | 79,62 | 30,52 | 2,7650 | ZE | |
| Z-081BX | | | | 270,00 | 39,00 | 49,10 | 1,10 | 43,80 | 2,65 | 3,661 | 40,840 | 3,35 | 1,213 | 40,840 | 3,35 | 1,213 | 79,76 | 30,66 | 2,7770 | ZE | |
| Z-081CI | | | | 180,00 | 42,00 | 55,50 | 1,10 | 50,00 | 2,75 | 3,661 | 40,840 | 3,31 | 1,060 | 40,840 | 3,31 | 1,060 | 90,59 | 35,09 | 3,1630 | ZF | |
| Z-081CX | | | | 270,00 | 42,00 | 55,50 | 1,10 | 50,20 | 2,65 | 3,661 | 40,840 | 3,31 | 1,056 | 40,840 | 3,31 | 1,056 | 90,73 | 35,23 | 3,1760 | ZF | |
| Z-081DI | 180,00 | 45,00 | 61,90 | 1,10 | 56,40 | 2,75 | 3,661 | 40,840 | 3,28 | 0,938 | 40,840 | 3,28 | 0,938 | 101,55 | 39,65 | 3,5620 | ZF | | | | |
| Z-081DX | 270,00 | 45,00 | 61,90 | 1,10 | 56,60 | 2,65 | 3,661 | 40,840 | 3,28 | 0,935 | 40,840 | 3,28 | 0,935 | 101,69 | 39,79 | 3,5740 | ZF | | | | |
| Z-081EI | 180,00 | 47,00 | 68,30 | 1,50 | 62,80 | 2,75 | 3,661 | 40,840 | 3,24 | 0,841 | 40,840 | 3,24 | 0,841 | 112,51 | 44,21 | 3,9610 | ZF | | | | |
| Z-081EX | 270,00 | 47,00 | 68,30 | 1,50 | 63,00 | 2,65 | 3,661 | 40,840 | 3,24 | 0,839 | 40,840 | 3,24 | 0,839 | 112,66 | 44,36 | 3,9730 | ZF | | | | |
| Z-081E-011 | 0,90 | 12,50 | 0,35 | 14,30 | 180,00 | 22,00 | 28,00 | 0,90 | 9,45 | 9,28 | 1,000 | 22,450 | 1,48 | 0,451 | 75,59 | 47,59 | 2,0620 | ZD | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-077AI | 0,80 | 5,80 | 0,20 | 7,20 | 180,00 | 31,00 | 34,00 | 0,80 | 26,80 | 3,60 | 2,551 | 28,250 | 2,35 | 0,882 | 63,10 | 29,10 | 2,1383 | ZG |
| RZ-077AX | | | | | 270,00 | 31,00 | 34,00 | 0,80 | 27,00 | 3,50 | 2,551 | 28,250 | 2,35 | 0,875 | 63,35 | 29,35 | 2,1539 | ZG |
| RZ-078I | | | | | 180,00 | 35,00 | 40,30 | 1,10 | 33,20 | 3,55 | 2,551 | 28,250 | 2,24 | 0,708 | 76,62 | 36,32 | 2,6378 | ZG |
| RZ-078X | | | | | 270,00 | 35,00 | 40,30 | 1,10 | 33,40 | 3,45 | 2,551 | 28,250 | 2,24 | 0,704 | 76,84 | 36,54 | 2,6534 | ZG |
| RZ-078AI | | | | | 180,00 | 38,00 | 45,10 | 1,10 | 38,00 | 3,55 | 2,551 | 28,250 | 2,19 | 0,617 | 86,80 | 41,70 | 3,0124 | ZH |
| RZ-078AX | | | | | 270,00 | 38,00 | 45,10 | 1,10 | 38,20 | 3,45 | 2,551 | 28,250 | 2,19 | 0,613 | 87,02 | 41,92 | 3,0280 | ZH |
| RZ-078BI | | | | | 180,00 | 40,00 | 50,70 | 1,10 | 43,60 | 3,55 | 2,551 | 28,250 | 2,15 | 0,536 | 98,67 | 47,97 | 3,4494 | ZH |
| RZ-078BX | | | | | 270,00 | 40,00 | 50,70 | 1,10 | 43,80 | 3,45 | 2,551 | 28,250 | 2,15 | 0,533 | 98,90 | 48,20 | 3,4650 | ZH |
| RZ-078CI | | | | | 180,00 | 43,00 | 57,10 | 1,10 | 50,00 | 3,55 | 2,551 | 28,250 | 2,12 | 0,466 | 112,25 | 55,15 | 3,9488 | ZJ |
| RZ-078CX | | | | | 270,00 | 43,00 | 57,10 | 1,10 | 50,20 | 3,45 | 2,551 | 28,250 | 2,12 | 0,464 | 112,47 | 55,37 | 3,9644 | ZJ |
| RZ-078DI | | | | | 180,00 | 46,00 | 63,50 | 1,50 | 56,40 | 3,55 | 2,551 | 28,250 | 2,10 | 0,413 | 125,80 | 62,30 | 4,4483 | ZJ |
| RZ-078DX | | | | | 270,00 | 46,00 | 63,50 | 1,50 | 56,60 | 3,45 | 2,551 | 28,250 | 2,10 | 0,411 | 126,05 | 62,55 | 4,4639 | ZJ |
| RZ-078EI | | | | | 180,00 | 49,00 | 69,90 | 1,50 | 62,80 | 3,55 | 2,551 | 28,250 | 2,08 | 0,370 | 139,40 | 69,50 | 4,9477 | ZJ |
| RZ-078EX | | | | | 270,00 | 49,00 | 69,90 | 1,50 | 63,00 | 3,45 | 2,551 | 28,250 | 2,08 | 0,369 | 139,62 | 69,72 | 4,9634 | ZJ |
| RZ-079I | 4,80 | 0,15 | 6,20 | 180,00 | 18,00 | 15,50 | 0,50 | 10,00 | 2,75 | 2,911 | 33,490 | 4,60 | 4,870 | 21,78 | 6,28 | 0,6618 | ZG | |
| RZ-079X | | | | 270,00 | 18,00 | 15,50 | 0,50 | 10,20 | 2,65 | 2,911 | 33,490 | 4,57 | 4,766 | 21,92 | 6,42 | 0,6743 | ZG | |
| RZ-079AI | | | | 180,00 | 20,00 | 17,90 | 0,60 | 12,40 | 2,75 | 2,911 | 33,490 | 4,25 | 3,862 | 25,82 | 7,92 | 0,8116 | ZG | |
| RZ-079AX | | | | 270,00 | 21,00 | 17,90 | 0,60 | 12,60 | 2,65 | 2,911 | 33,490 | 4,23 | 3,797 | 25,95 | 8,05 | 0,8241 | ZG | |
| RZ-080I | | | | 180,00 | 26,00 | 25,90 | 0,80 | 20,40 | 2,75 | 2,911 | 33,490 | 3,74 | 2,286 | 39,29 | 13,39 | 1,3111 | ZG | |
| RZ-080X | | | | 270,00 | 27,00 | 25,90 | 0,80 | 20,60 | 2,65 | 2,911 | 33,490 | 3,73 | 2,263 | 39,42 | 13,52 | 1,3236 | ZG | |
| RZ-081I | | | | 180,00 | 34,00 | 37,90 | 0,80 | 32,40 | 2,75 | 2,911 | 33,490 | 3,40 | 1,418 | 59,48 | 21,58 | 2,0603 | ZG | |
| RZ-081X | | | | 270,00 | 34,00 | 37,90 | 0,80 | 32,60 | 2,65 | 2,911 | 33,490 | 3,40 | 1,409 | 59,62 | 21,72 | 2,0727 | ZG | |
| RZ-081AI | | | | 180,00 | 36,00 | 43,50 | 1,10 | 38,00 | 2,75 | 2,911 | 33,490 | 3,31 | 1,204 | 68,91 | 25,41 | 2,4099 | ZH | |
| RZ-081AX | | | | 270,00 | 37,00 | 43,50 | 1,10 | 38,20 | 2,65 | 2,911 | 33,490 | 3,30 | 1,198 | 69,05 | 25,55 | 2,4224 | ZH | |
| RZ-081BI | | | | 180,00 | 39,00 | 49,10 | 1,10 | 43,60 | 2,75 | 2,911 | 33,490 | 3,24 | 1,047 | 78,33 | 29,23 | 2,7595 | ZH | |
| RZ-081BX | | | | 270,00 | 39,00 | 49,10 | 1,10 | 43,80 | 2,65 | 2,911 | 33,490 | 3,24 | 1,042 | 78,47 | 29,37 | 2,7720 | ZH | |
| RZ-081CI | | | | 180,00 | 42,00 | 55,50 | 1,10 | 50,00 | 2,75 | 2,911 | 33,490 | 3,20 | 0,911 | 89,10 | 33,60 | 3,1591 | ZJ | |
| RZ-081CX | | | | 270,00 | 42,00 | 55,50 | 1,10 | 50,20 | 2,65 | 2,911 | 33,490 | 3,20 | 0,907 | 89,24 | 33,74 | 3,1716 | ZJ | |
| RZ-081DI | 180,00 | 45,00 | 61,90 | 1,10 | 56,40 | 2,75 | 2,911 | 33,490 | 3,17 | 0,806 | 99,88 | 37,98 | 3,5586 | ZJ | | | | |
| RZ-081DX | 270,00 | 45,00 | 61,90 | 1,10 | 56,60 | 2,65 | 2,911 | 33,490 | 3,17 | 0,803 | 100,01 | 38,11 | 3,5711 | ZJ | | | | |
| RZ-081EI | 180,00 | 47,00 | 68,30 | 1,50 | 62,80 | 2,75 | 2,911 | 33,490 | 3,13 | 0,723 | 110,65 | 42,35 | 3,9582 | ZJ | | | | |
| RZ-081EX | 270,00 | 47,00 | 68,30 | 1,50 | 63,00 | 2,65 | 2,911 | 33,490 | 3,13 | 0,720 | 110,78 | 42,48 | 3,9707 | ZJ | | | | |
| RZ-081E-011 | 0,90 | 12,50 | 0,35 | 14,30 | 180,00 | 22,00 | 28,00 | 0,90 | 9,45 | 9,28 | 0,900 | 19,800 | 1,48 | 0,387 | 76,80 | 48,80 | 2,0623 | ZG |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-081E-01X | 0,90 | 12,50 | 0,35 | 14,30 | 270,00 | 22,00 | 28,00 | 0,90 | 9,67 | 9,17 | 0,900 | 19,800 | 1,48 | 0,377 | 78,10 | 50,10 | 2,1071 | ZG |
| RZ-081E-02I | | | | | 180,00 | 30,00 | 33,50 | 0,90 | 14,85 | 9,33 | 0,900 | 19,800 | 1,41 | 0,237 | 113,20 | 79,70 | 3,1622 | ZG |
| RZ-081E-02X | | | | | 270,00 | 30,00 | 33,50 | 0,90 | 15,08 | 9,21 | 0,900 | 19,800 | 1,41 | 0,233 | 114,45 | 80,95 | 3,2091 | ZG |
| RZ-081E-03I | | | | | 180,00 | 37,00 | 41,50 | 1,30 | 22,95 | 9,28 | 0,900 | 19,800 | 1,36 | 0,150 | 167,40 | 125,90 | 4,8121 | ZH |
| RZ-081E-03X | | | | | 270,00 | 37,00 | 41,50 | 1,30 | 23,18 | 9,16 | 0,900 | 19,800 | 1,36 | 0,149 | 168,70 | 127,20 | 4,8589 | ZH |
| RZ-081E-04I | | | | | 180,00 | 40,00 | 47,50 | 1,30 | 29,25 | 9,13 | 0,900 | 19,800 | 1,35 | 0,117 | 209,40 | 161,90 | 6,0953 | ZH |
| RZ-081E-04X | | | | | 270,00 | 40,00 | 47,50 | 1,30 | 29,48 | 9,01 | 0,900 | 19,800 | 1,35 | 0,116 | 210,70 | 163,20 | 6,1421 | ZH |
| RZ-081E-05I | | | | | 180,00 | 47,00 | 54,70 | 1,30 | 36,45 | 9,13 | 0,900 | 19,800 | 1,33 | 0,093 | 257,70 | 203,00 | 7,5618 | ZJ |
| RZ-081E-05X | | | | | 270,00 | 47,00 | 54,70 | 1,30 | 36,68 | 9,01 | 0,900 | 19,800 | 1,33 | 0,093 | 259,00 | 204,30 | 7,6086 | ZJ |
| RZ-081E-06I | | | | | 180,00 | 58,00 | 72,80 | 1,80 | 54,45 | 9,18 | 0,900 | 19,800 | 1,32 | 0,062 | 378,60 | 305,80 | 11,2281 | ZJ |
| RZ-081E-06X | | | | | 270,00 | 58,00 | 72,80 | 1,80 | 54,68 | 9,06 | 0,900 | 19,800 | 1,32 | 0,062 | 379,90 | 307,10 | 11,2750 | ZJ |
| RZ-081FI | 10,00 | 0,30 | 11,70 | 180,00 | 20,00 | 23,00 | 0,70 | 9,45 | 6,77 | 1,611 | 23,600 | 2,09 | 0,802 | 50,42 | 27,42 | 1,6178 | ZG | |
| RZ-081FX | | | | 270,00 | 20,00 | 23,00 | 0,70 | 9,67 | 6,66 | 1,611 | 23,600 | 2,07 | 0,782 | 51,14 | 28,14 | 1,6530 | ZG | |
| RZ-081GI | | | | 180,00 | 26,00 | 28,40 | 0,90 | 14,85 | 6,77 | 1,611 | 23,600 | 1,90 | 0,491 | 73,13 | 44,73 | 2,4807 | ZG | |
| RZ-081GX | | | | 270,00 | 26,00 | 28,40 | 0,90 | 15,08 | 6,66 | 1,611 | 23,600 | 1,79 | 0,484 | 73,86 | 45,46 | 2,5174 | ZG | |
| RZ-081HI | | | | 180,00 | 32,00 | 36,50 | 0,90 | 22,95 | 6,77 | 1,611 | 23,600 | 1,62 | 0,311 | 107,21 | 70,71 | 3,7750 | ZH | |
| RZ-081HX | | | | 270,00 | 32,00 | 36,50 | 0,90 | 23,18 | 6,66 | 1,611 | 23,600 | 1,62 | 0,308 | 107,93 | 71,43 | 3,8117 | ZH | |
| RZ-081H-01I | | | | 180,00 | 35,00 | 43,00 | 1,30 | 29,25 | 6,88 | 1,611 | 23,600 | 1,57 | 0,242 | 133,90 | 90,90 | 4,7816 | ZH | |
| RZ-081H-01X | | | | 270,00 | 35,00 | 43,00 | 1,30 | 29,48 | 6,76 | 1,611 | 23,600 | 1,57 | 0,240 | 134,70 | 91,70 | 4,8184 | ZH | |
| RZ-081JI | | | | 180,00 | 41,00 | 50,00 | 1,30 | 36,45 | 6,77 | 1,611 | 23,600 | 1,49 | 0,193 | 164,00 | 114,00 | 5,9321 | ZJ | |
| RZ-081JX | | | | 270,00 | 41,00 | 50,00 | 1,30 | 36,68 | 6,66 | 1,611 | 23,600 | 1,49 | 0,192 | 164,72 | 114,72 | 5,9689 | ZJ | |
| RZ-081KI | | | | 180,00 | 50,00 | 68,00 | 1,80 | 54,45 | 6,77 | 1,611 | 23,600 | 1,41 | 0,128 | 239,72 | 171,72 | 8,8083 | ZK | |
| RZ-081KX | 270,00 | 50,00 | 68,00 | 1,80 | 54,68 | 6,66 | 1,611 | 23,600 | 1,41 | 0,127 | 240,45 | 172,45 | 8,8450 | ZK | | | | |
| RZ-081K-10I | 8,50 | 0,30 | 10,20 | 180,00 | 20,00 | 23,50 | 0,70 | 12,15 | 5,68 | 2,221 | 27,550 | 1,98 | 1,046 | 47,70 | 24,20 | 1,7115 | ZG | |
| RZ-081K-10X | | | | 270,00 | 20,00 | 23,50 | 0,70 | 12,38 | 5,56 | 2,221 | 27,550 | 1,98 | 1,025 | 48,20 | 24,70 | 1,7422 | ZG | |
| RZ-081KBI | | | | 180,00 | 25,00 | 31,60 | 0,90 | 20,25 | 5,68 | 2,221 | 27,550 | 1,90 | 0,608 | 73,20 | 41,60 | 2,7924 | ZG | |
| RZ-081KBX | | | | 270,00 | 25,00 | 31,60 | 0,90 | 20,48 | 5,56 | 2,221 | 27,550 | 1,90 | 0,601 | 73,70 | 42,10 | 2,8231 | ZG | |
| RZ-081K-12I | | | | 180,00 | 32,00 | 41,50 | 1,30 | 30,15 | 5,68 | 2,221 | 27,550 | 1,86 | 0,402 | 104,45 | 62,95 | 4,1136 | ZH | |
| RZ-081K-12X | | | | 270,00 | 32,00 | 41,50 | 1,30 | 30,38 | 5,56 | 2,221 | 27,550 | 1,86 | 0,399 | 104,90 | 63,40 | 4,1443 | ZH | |
| RZ-081K-01I | | | | 180,00 | 38,00 | 48,50 | 1,30 | 37,35 | 5,57 | 2,221 | 27,550 | 1,70 | 0,323 | 126,94 | 78,44 | 5,0744 | ZJ | |
| RZ-081K-01X | | | | 270,00 | 38,00 | 48,50 | 1,30 | 37,57 | 5,46 | 2,221 | 27,550 | 1,69 | 0,321 | 127,44 | 78,94 | 5,1037 | ZJ | |
| RZ-081K-02I | | | | 180,00 | 44,00 | 61,10 | 1,30 | 49,95 | 5,57 | 2,221 | 27,550 | 1,70 | 0,240 | 166,68 | 105,58 | 6,7558 | ZJ | |
| RZ-081K-02X | | | | 270,00 | 44,00 | 61,10 | 1,30 | 50,18 | 5,46 | 2,221 | 27,550 | 1,69 | 0,239 | 167,16 | 106,06 | 6,7865 | ZJ | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-081E-01X | 0,90 | 12,50 | 0,35 | 14,30 | 270,00 | 22,00 | 28,00 | 0,90 | 9,67 | 9,17 | 1,000 | 22,450 | 1,48 | 0,439 | 76,81 | 48,81 | 2,1070 | ZD |
| Z-081E-02I | | | | | 180,00 | 30,00 | 33,50 | 0,90 | 14,85 | 9,33 | 1,000 | 22,450 | 1,41 | 0,276 | 111,14 | 77,64 | 3,1620 | ZD |
| Z-081E-02X | | | | | 270,00 | 30,00 | 33,50 | 0,90 | 15,08 | 9,21 | 1,000 | 22,450 | 1,41 | 0,272 | 112,42 | 78,92 | 3,2090 | ZD |
| Z-081E-03I | | | | | 180,00 | 37,00 | 41,50 | 1,30 | 22,95 | 9,28 | 1,000 | 22,450 | 1,36 | 0,175 | 164,22 | 122,72 | 4,8120 | ZE |
| Z-081E-03X | | | | | 270,00 | 37,00 | 41,50 | 1,30 | 23,18 | 9,16 | 1,000 | 22,450 | 1,36 | 0,176 | 165,50 | 124,00 | 4,8580 | ZE |
| Z-081E-04I | | | | | 180,00 | 40,00 | 47,50 | 1,30 | 29,25 | 9,13 | 1,000 | 22,450 | 1,35 | 0,136 | 205,29 | 157,79 | 6,0950 | ZF |
| Z-081E-04X | | | | | 270,00 | 40,00 | 47,50 | 1,30 | 29,48 | 9,01 | 1,000 | 22,450 | 1,35 | 0,137 | 206,54 | 159,04 | 6,1420 | ZF |
| Z-081E-05I | | | | | 180,00 | 47,00 | 54,70 | 1,30 | 36,45 | 9,13 | 1,000 | 22,450 | 1,33 | 0,108 | 252,56 | 197,86 | 7,5620 | ZG |
| Z-081E-05X | | | | | 270,00 | 47,00 | 54,70 | 1,30 | 36,68 | 9,01 | 1,000 | 22,450 | 1,33 | 0,108 | 253,84 | 199,14 | 7,6090 | ZG |
| Z-081E-06I | | | | | 180,00 | 58,00 | 72,80 | 1,80 | 54,45 | 9,18 | 1,000 | 22,450 | 1,32 | 0,072 | 370,84 | 298,04 | 11,2280 | ZG |
| Z-081E-06X | | | | | 270,00 | 58,00 | 72,80 | 1,80 | 54,68 | 9,06 | 1,000 | 22,450 | 1,32 | 0,072 | 372,12 | 299,32 | 11,2750 | ZG |
| Z-081FI | 10,00 | 0,30 | 11,70 | 180,00 | 20,00 | 23,00 | 0,70 | 9,45 | 6,77 | 1,991 | 28,590 | 2,17 | 0,934 | 51,49 | 28,49 | 1,6430 | ZD | |
| Z-081FX | | | | 270,00 | 20,00 | 23,00 | 0,70 | 9,67 | 6,66 | 1,991 | 28,590 | 2,14 | 0,910 | 52,24 | 29,24 | 1,6790 | ZD | |
| Z-081GI | | | | 180,00 | 26,00 | 28,40 | 0,90 | 14,85 | 6,77 | 1,991 | 28,590 | 1,87 | 0,572 | 74,89 | 46,49 | 2,5010 | ZD | |
| Z-081GX | | | | 270,00 | 26,00 | 28,40 | 0,90 | 15,08 | 6,66 | 1,991 | 28,590 | 1,86 | 0,563 | 75,64 | 47,24 | 2,5360 | ZD | |
| Z-081HI | | | | 180,00 | 32,00 | 36,50 | 0,90 | 22,95 | 6,77 | 1,991 | 28,590 | 1,70 | 0,362 | 109,99 | 73,49 | 3,7870 | ZE | |
| Z-081HX | | | | 270,00 | 32,00 | 36,50 | 0,90 | 23,18 | 6,66 | 1,991 | 28,590 | 1,69 | 0,358 | 110,74 | 74,24 | 3,8230 | ZE | |
| Z-081H-01I | | | | 180,00 | 35,00 | 43,00 | 1,30 | 29,25 | 6,88 | 1,991 | 28,590 | 1,57 | 0,282 | 137,45 | 94,45 | 4,7820 | ZF | |
| Z-081H-01X | | | | 270,00 | 35,00 | 43,00 | 1,30 | 29,48 | 6,76 | 1,991 | 28,590 | 1,57 | 0,279 | 138,20 | 95,20 | 4,8180 | ZF | |
| Z-081JI | | | | 180,00 | 41,00 | 50,00 | 1,30 | 36,45 | 6,77 | 1,991 | 28,590 | 1,56 | 0,225 | 168,48 | 118,48 | 5,9310 | ZF | |
| Z-081JX | | | | 270,00 | 41,00 | 50,00 | 1,30 | 36,68 | 6,66 | 1,991 | 28,590 | 1,56 | 0,223 | 169,23 | 119,23 | 5,9670 | ZF | |
| Z-081KI | | | | 180,00 | 50,00 | 68,00 | 1,80 | 54,45 | 6,77 | 1,991 | 28,590 | 1,49 | 0,149 | 246,47 | 178,47 | 8,7900 | ZG | |
| Z-081KX | 270,00 | 50,00 | 68,00 | 1,80 | 54,68 | 6,66 | 1,991 | 28,590 | 1,49 | 0,148 | 247,22 | 179,22 | 8,8260 | ZG | | | | |
| Z-081KAI | 8,50 | 0,30 | 10,20 | 180,00 | 20,00 | 23,50 | 0,70 | 12,15 | 5,68 | 2,771 | 33,390 | 1,98 | 1,218 | 48,64 | 25,14 | 1,7110 | ZD | |
| Z-081KAX | | | | 270,00 | 20,00 | 23,50 | 0,70 | 12,38 | 5,56 | 2,771 | 33,390 | 1,98 | 1,194 | 49,14 | 25,64 | 1,7420 | ZD | |
| Z-081KBI | | | | 180,00 | 25,00 | 31,60 | 0,90 | 20,25 | 5,68 | 2,771 | 33,390 | 1,90 | 0,708 | 74,83 | 43,23 | 2,7920 | ZE | |
| Z-081KBX | | | | 270,00 | 25,00 | 31,60 | 0,90 | 20,48 | 5,56 | 2,771 | 33,390 | 1,90 | 0,700 | 75,34 | 43,74 | 2,8230 | ZE | |
| Z-081K-12I | | | | 180,00 | 32,00 | 41,50 | 1,30 | 30,15 | 5,68 | 2,771 | 33,390 | 1,86 | 0,469 | 106,84 | 65,34 | 4,1130 | ZE | |
| Z-081K-12X | | | | 270,00 | 32,00 | 41,50 | 1,30 | 30,38 | 5,56 | 2,771 | 33,390 | 1,86 | 0,465 | 107,36 | 65,86 | 4,1440 | ZE | |
| Z-081K-01I | | | | 180,00 | 38,00 | 48,50 | 1,30 | 37,35 | 5,57 | 2,771 | 33,390 | 1,85 | 0,376 | 129,94 | 81,44 | 5,0750 | ZF | |
| Z-081K-01X | | | | 270,00 | 38,00 | 48,50 | 1,30 | 37,57 | 5,46 | 2,771 | 33,390 | 1,85 | 0,374 | 130,45 | 81,95 | 5,1050 | ZF | |
| Z-081K-02I | | | | 180,00 | 44,00 | 61,10 | 1,30 | 49,95 | 5,57 | 2,771 | 33,390 | 1,78 | 0,279 | 170,70 | 109,60 | 6,7480 | ZF | |
| Z-081K-02X | | | | 270,00 | 44,00 | 61,10 | 1,30 | 50,18 | 5,46 | 2,771 | 33,390 | 1,78 | 0,278 | 171,20 | 110,10 | 6,7780 | ZF | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|--------|----|
| Z-081K-03I | 0,90 | 8,50 | 0,30 | 10,20 | 180,00 | 49,00 | 73,70 | 1,80 | 62,55 | 5,57 | 2,771 | 33,390 | 1,75 | 0,222 | 211,45 | 137,75 | 8,4200 | ZG | | | |
| Z-081K-03X | | | | | 270,00 | 49,00 | 73,70 | 1,80 | 62,78 | 5,46 | 2,771 | 33,390 | 1,75 | 0,221 | 211,95 | 138,25 | 8,4500 | ZG | | | |
| Z-081K-04I | | | | | 180,00 | 58,00 | 98,90 | 1,80 | 87,75 | 5,57 | 2,771 | 33,390 | 1,70 | 0,158 | 292,96 | 194,06 | 11,7600 | ZG | | | |
| Z-081K-04X | | | | | 270,00 | 58,00 | 98,90 | 1,80 | 87,98 | 5,46 | 2,771 | 33,390 | 1,70 | 0,157 | 293,46 | 194,56 | 11,7900 | ZG | | | |
| Z-081LI | 6,30 | 0,20 | 7,90 | 180,00 | 17,00 | 17,10 | 0,60 | 9,45 | 3,82 | 4,221 | 44,120 | 4,37 | 4,468 | 26,03 | 8,93 | 0,9773 | ZH | | | | |
| Z-081LX | | | | 270,00 | 17,00 | 17,10 | 0,60 | 9,67 | 3,71 | 4,221 | 44,120 | 4,32 | 4,354 | 25,27 | 8,17 | 0,9983 | ZH | | | | |
| Z-081MI | | | | 180,00 | 22,00 | 22,50 | 0,60 | 14,85 | 3,85 | 4,221 | 44,120 | 3,73 | 2,739 | 37,07 | 14,57 | 1,4870 | ZD | | | | |
| Z-081MX | | | | 270,00 | 22,00 | 22,50 | 0,60 | 15,08 | 3,71 | 4,221 | 44,120 | 3,72 | 2,695 | 37,31 | 14,81 | 1,5080 | ZD | | | | |
| Z-081NI | | | | 180,00 | 27,00 | 30,60 | 0,80 | 22,95 | 3,82 | 4,221 | 44,120 | 3,36 | 1,733 | 53,64 | 23,04 | 2,2520 | ZD | | | | |
| Z-081NX | | | | 270,00 | 27,00 | 30,60 | 0,80 | 23,18 | 3,71 | 4,221 | 44,120 | 3,36 | 1,715 | 53,87 | 23,27 | 2,2730 | ZD | | | | |
| Z-081OI | | | | 180,00 | 34,00 | 44,10 | 1,10 | 36,45 | 3,82 | 4,221 | 44,120 | 3,08 | 1,075 | 81,24 | 37,14 | 3,5270 | ZD | | | | |
| Z-081OX | | | | 270,00 | 35,00 | 44,10 | 1,10 | 36,68 | 3,71 | 4,221 | 44,120 | 3,08 | 1,068 | 81,48 | 37,38 | 3,5480 | ZD | | | | |
| Z-0810-01I | | | | 180,00 | 37,00 | 53,10 | 1,10 | 45,45 | 3,83 | 4,221 | 44,120 | 3,03 | 0,858 | 99,63 | 46,53 | 4,3730 | ZD | | | | |
| Z-0810-01X | | | | 270,00 | 37,00 | 53,10 | 1,10 | 45,68 | 3,71 | 4,221 | 44,120 | 3,03 | 0,853 | 99,86 | 46,76 | 4,3900 | ZD | | | | |
| Z-081PI | | | | 180,00 | 42,00 | 62,10 | 1,10 | 54,45 | 3,82 | 4,221 | 44,120 | 2,92 | 0,713 | 118,05 | 55,95 | 5,2270 | ZE | | | | |
| Z-081PX | | | | 270,00 | 42,00 | 62,10 | 1,10 | 54,68 | 3,71 | 4,221 | 44,120 | 2,92 | 0,710 | 118,28 | 56,18 | 5,2490 | ZE | | | | |
| Z-081QI | | | | 4,50 | 0,25 | 6,10 | 180,00 | 16,00 | 14,20 | 0,50 | 9,45 | 2,37 | 5,881 | 59,210 | 9,71 | 15,080 | 17,74 | 3,54 | 0,6537 | ZF | |
| Z-081QX | | | | | | | 270,00 | 16,00 | 14,20 | 0,50 | 9,67 | 2,26 | 5,881 | 59,210 | 9,59 | 14,694 | 17,83 | 3,63 | 0,6677 | ZF | |
| Z-081RI | | | | | | | 180,00 | 20,00 | 19,60 | 0,60 | 14,85 | 2,37 | 5,881 | 59,210 | 8,18 | 9,243 | 25,37 | 5,77 | 0,9953 | ZD | |
| Z-081RX | | | | | | | 270,00 | 21,00 | 19,60 | 0,60 | 15,08 | 2,26 | 5,881 | 59,210 | 8,15 | 9,096 | 25,47 | 5,87 | 1,0090 | ZD | |
| Z-081SI | 180,00 | 26,00 | 27,70 | | | | 0,80 | 22,95 | 2,37 | 5,881 | 59,210 | 7,31 | 5,847 | 36,82 | 9,12 | 1,5070 | ZD | | | | |
| Z-081SX | 270,00 | 26,00 | 27,70 | | | | 0,80 | 23,18 | 2,26 | 5,881 | 59,210 | 7,30 | 5,788 | 36,92 | 9,22 | 1,5210 | ZD | | | | |
| Z-081TI | 180,00 | 33,00 | 41,20 | | | | 1,10 | 36,45 | 2,37 | 5,881 | 59,210 | 6,65 | 3,627 | 55,91 | 14,71 | 2,3610 | ZD | | | | |
| Z-081TX | 270,00 | 33,00 | 41,20 | | | | 1,10 | 36,68 | 2,26 | 5,881 | 59,210 | 6,64 | 3,604 | 56,00 | 14,80 | 2,3750 | ZD | | | | |
| Z-081UI | 180,00 | 40,00 | 59,20 | | | | 1,10 | 54,45 | 2,37 | 5,881 | 59,210 | 6,26 | 2,408 | 81,36 | 22,16 | 3,4990 | ZE | | | | |
| Z-081UX | 270,00 | 40,00 | 59,20 | | | | 1,10 | 54,68 | 2,26 | 5,881 | 59,210 | 6,26 | 2,398 | 81,45 | 22,25 | 3,5130 | ZE | | | | |
| Z-082I | 1,00 | 13,50 | 0,35 | | | | 15,40 | 180,00 | 25,00 | 31,40 | 0,90 | 12,50 | 9,45 | 1,771 | 28,630 | 2,15 | 0,454 | 90,62 | 59,22 | 3,2700 | ZF |
| Z-082X | | | | | | | | 270,00 | 26,00 | 31,40 | 0,90 | 12,75 | 9,32 | 1,771 | 28,630 | 2,14 | 0,444 | 91,90 | 60,50 | 3,3310 | ZF |
| Z-083I | | | | 180,00 | 37,00 | 44,40 | | 1,30 | 25,50 | 9,45 | 1,771 | 28,630 | 1,79 | 0,213 | 170,56 | 126,16 | 6,4200 | ZF | | | |
| Z-083X | | | | 270,00 | 37,00 | 44,40 | | 1,30 | 25,75 | 9,32 | 1,771 | 28,630 | 1,79 | 0,211 | 171,84 | 127,44 | 6,4810 | ZF | | | |
| Z-084I | | | | 180,00 | 47,00 | 59,40 | | 1,30 | 40,50 | 9,45 | 1,771 | 28,630 | 1,65 | 0,132 | 262,79 | 203,39 | 10,0500 | ZF | | | |
| Z-084X | | | | 270,00 | 47,00 | 59,40 | | 1,30 | 40,75 | 9,32 | 1,771 | 28,630 | 1,65 | 0,131 | 264,08 | 204,68 | 10,1100 | ZF | | | |
| Z-084AI | | | | 180,00 | 55,00 | 73,40 | | 1,80 | 54,50 | 9,45 | 1,771 | 28,630 | 1,58 | 0,097 | 348,88 | 275,48 | 13,4400 | ZG | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-081K-03I | 0,90 | 8,50 | 0,30 | 10,20 | 180,00 | 49,00 | 73,70 | 1,80 | 62,55 | 5,57 | 2,221 | 27,550 | 1,66 | 0,191 | 206,40 | 132,70 | 8,4373 | ZK | | |
| RZ-081K-03X | | | | | 270,00 | 49,00 | 73,70 | 1,80 | 62,78 | 5,46 | 2,221 | 27,550 | 1,66 | 0,190 | 206,88 | 133,18 | 8,4680 | ZK | | |
| RZ-081K-04I | | | | | 180,00 | 58,00 | 98,90 | 1,80 | 87,75 | 5,57 | 2,221 | 27,550 | 1,62 | 0,136 | 285,84 | 186,94 | 11,8002 | ZK | | |
| RZ-081K-04X | | | | | 270,00 | 58,00 | 98,90 | 1,80 | 87,98 | 5,46 | 2,221 | 27,550 | 1,62 | 0,135 | 286,32 | 187,42 | 11,8309 | ZK | | |
| RZ-081LI | 6,30 | 0,20 | 7,90 | 180,00 | 17,00 | 17,10 | 0,60 | 9,45 | 3,82 | 3,331 | 36,420 | 4,26 | 3,838 | 25,72 | 8,62 | 0,9600 | ZL | | | |
| RZ-081LX | | | | 270,00 | 17,00 | 17,10 | 0,60 | 9,67 | 3,71 | 3,331 | 36,420 | 4,21 | 3,741 | 25,95 | 8,85 | 0,9809 | ZL | | | |
| RZ-081MI | | | | 180,00 | 22,00 | 22,50 | 0,60 | 14,85 | 3,85 | 3,331 | 36,420 | 3,61 | 2,352 | 36,57 | 14,07 | 1,4721 | ZG | | | |
| RZ-081MX | | | | 270,00 | 22,00 | 22,50 | 0,60 | 15,08 | 3,71 | 3,331 | 36,420 | 3,60 | 2,314 | 36,79 | 14,29 | 1,4939 | ZG | | | |
| RZ-081NI | | | | 180,00 | 27,00 | 30,60 | 0,80 | 22,95 | 3,82 | 3,331 | 36,420 | 3,25 | 1,488 | 52,84 | 22,24 | 2,2401 | ZG | | | |
| RZ-081NX | | | | 270,00 | 27,00 | 30,60 | 0,80 | 23,18 | 3,71 | 3,331 | 36,420 | 3,24 | 1,473 | 53,06 | 22,46 | 2,2619 | ZG | | | |
| RZ-081OI | | | | 180,00 | 34,00 | 44,10 | 1,10 | 36,45 | 3,82 | 3,331 | 36,420 | 2,97 | 0,923 | 79,95 | 35,85 | 3,5201 | ZG | | | |
| RZ-081OX | | | | 270,00 | 35,00 | 44,10 | 1,10 | 36,68 | 3,71 | 3,331 | 36,420 | 2,97 | 0,917 | 80,18 | 36,08 | 3,5420 | ZG | | | |
| RZ-0810-01I | | | | 180,00 | 37,00 | 53,10 | 1,10 | 45,45 | 3,83 | 3,331 | 36,420 | 3,03 | 0,737 | 98,00 | 44,90 | 4,3735 | ZH | | | |
| RZ-0810-01X | | | | 270,00 | 37,00 | 53,10 | 1,10 | 45,68 | 3,71 | 3,331 | 36,420 | 3,03 | 0,733 | 98,30 | 45,20 | 4,3953 | ZH | | | |
| RZ-081PI | | | | 180,00 | 42,00 | 62,10 | 1,10 | 54,45 | 3,82 | 3,331 | 36,420 | 2,81 | 0,613 | 116,10 | 54,00 | 5,2269 | ZH | | | |
| RZ-081PX | | | | 270,00 | 42,00 | 62,10 | 1,10 | 54,68 | 3,71 | 3,331 | 36,420 | 2,81 | 0,610 | 116,33 | 54,23 | 5,2487 | ZH | | | |
| RZ-081QI | | | | 4,50 | 0,25 | 6,10 | 180,00 | 16,00 | 14,20 | 0,50 | 9,45 | 2,37 | 4,711 | 48,850 | 9,55 | 12,952 | 17,61 | 3,41 | 0,6400 | ZJ |
| RZ-081QX | | | | | | | 270,00 | 16,00 | 14,20 | 0,50 | 9,67 | 2,26 | 4,711 | 48,850 | 9,44 | 12,627 | 17,70 | 3,50 | 0,6539 | ZJ |
| RZ-081RI | 180,00 | 20,00 | 19,60 | | | | 0,60 | 14,85 | 2,37 | 4,711 | 48,850 | 8,03 | 7,939 | 25,16 | 5,56 | 0,9814 | ZG | | | |
| RZ-081RX | 270,00 | 21,00 | 19,60 | | | | 0,60 | 15,08 | 2,26 | 4,711 | 48,850 | 7,99 | 7,810 | 25,25 | 5,65 | 0,9959 | ZG | | | |
| RZ-081SI | 180,00 | 26,00 | 27,70 | | | | 0,80 | 22,95 | 2,37 | 4,711 | 48,850 | 7,16 | 5,022 | 36,49 | 8,79 | 1,4934 | ZG | | | |
| RZ-081SX | 270,00 | 26,00 | 27,70 | | | | 0,80 | 23,18 | 2,26 | 4,711 | 48,850 | 7,14 | 4,970 | 36,58 | 8,88 | 1,5079 | ZG | | | |
| RZ-081TI | 180,00 | 33,00 | 41,20 | | | | 1,10 | 36,45 | 2,37 | 4,711 | 48,850 | 6,49 | 3,115 | 55,38 | 14,18 | 2,3468 | ZG | | | |
| RZ-081TX | 270,00 | 33,00 | 41,20 | | | | 1,10 | 36,68 | 2,26 | 4,711 | 48,850 | 6,48 | 3,095 | 55,47 | 14,27 | 2,3613 | ZG | | | |
| RZ-081UI | 180,00 | 40,00 | 59,20 | | | | 1,10 | 54,45 | 2,37 | 4,711 | 48,850 | 6,11 | 2,068 | 80,56 | 21,36 | 3,4846 | ZH | | | |
| RZ-081UX | 270,00 | 40,00 | 59,20 | | | | 1,10 | 54,68 | 2,26 | 4,711 | 48,850 | 6,11 | 2,059 | 80,65 | 21,45 | 3,4991 | ZH | | | |
| RZ-082I | 1,00 | 13,50 | 0,35 | 15,40 | 180,00 | 25,00 | 31,40 | 0,90 | 12,50 | 9,45 | 1,411 | 23,770 | 2,08 | 0,390 | 88,80 | 57,40 | 3,2314 | ZJ | | |
| RZ-082X | | | | | 270,00 | 26,00 | 31,40 | 0,90 | 12,75 | 9,32 | 1,411 | 23,770 | 2,07 | 0,381 | 90,05 | 58,65 | 3,2923 | ZJ | | |
| RZ-083I | | | | | 180,00 | 37,00 | 44,40 | 1,30 | 25,50 | 9,45 | 1,411 | 23,770 | 1,72 | 0,183 | 166,69 | 122,29 | 6,4017 | ZJ | | |
| RZ-083X | | | | | 270,00 | 37,00 | 44,40 | 1,30 | 25,75 | 9,32 | 1,411 | 23,770 | 1,71 | 0,181 | 167,94 | 123,54 | 6,4627 | ZJ | | |
| RZ-084I | | | | | 180,00 | 47,00 | 59,40 | 1,30 | 40,50 | 9,45 | 1,411 | 23,770 | 1,58 | 0,113 | 256,56 | 197,16 | 10,0599 | ZJ | | |
| RZ-084X | | | | | 270,00 | 47,00 | 59,40 | 1,30 | 40,75 | 9,32 | 1,411 | 23,770 | 1,57 | 0,113 | 257,81 | 198,41 | 10,1208 | ZJ | | |
| RZ-084AI | | | | | 180,00 | 55,00 | 73,40 | 1,80 | 54,50 | 9,45 | 1,411 | 23,770 | 1,51 | 0,084 | 340,44 | 267,04 | 13,4741 | ZK | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|-------|
| RZ-084AX | 1,00 | 13,50 | 0,35 | 15,40 | 270,00 | 55,00 | 73,40 | 1,80 | 54,75 | 9,32 | 1,411 | 23,770 | 1,51 | 0,083 | 341,69 | 268,29 | 13,5351 | ZK | | |
| RZ-085I | | 11,00 | 0,30 | 12,80 | 180,00 | 22,00 | 27,40 | 0,90 | 12,50 | 7,45 | 2,411 | 28,970 | 2,37 | 0,761 | 62,30 | 34,90 | 2,5851 | ZG | | |
| RZ-085X | | | | | 270,00 | 22,00 | 27,40 | 0,90 | 12,75 | 7,32 | 2,411 | 28,970 | 2,35 | 0,745 | 63,06 | 35,66 | 2,6339 | ZZ | | |
| RZ-086I | | | | | 180,00 | 32,00 | 40,40 | 1,30 | 25,50 | 7,45 | 2,411 | 28,970 | 1,96 | 0,357 | 114,75 | 74,35 | 5,1214 | ZH | | |
| RZ-086X | | | | | 270,00 | 32,00 | 40,40 | 1,30 | 25,75 | 7,32 | 2,411 | 28,970 | 1,96 | 0,354 | 115,51 | 75,11 | 5,1702 | ZH | | |
| RZ-087I | | | | | 180,00 | 41,00 | 55,40 | 1,30 | 40,50 | 7,45 | 2,411 | 28,970 | 1,80 | 0,222 | 175,28 | 119,88 | 8,0479 | ZJ | | |
| RZ-087X | | | | | 270,00 | 41,00 | 55,40 | 1,30 | 40,75 | 7,32 | 2,411 | 28,970 | 1,80 | 0,220 | 176,03 | 120,63 | 8,0967 | ZJ | | |
| RZ-087AI | | | | | 180,00 | 44,00 | 62,40 | 1,30 | 47,50 | 7,45 | 2,411 | 28,970 | 1,76 | 0,188 | 203,52 | 141,12 | 9,4136 | ZK | | |
| RZ-087AX | | | | | 270,00 | 44,00 | 62,40 | 1,30 | 47,75 | 7,32 | 2,411 | 28,970 | 1,76 | 0,187 | 204,28 | 141,88 | 9,4624 | ZK | | |
| RZ-087BI | | | | | 180,00 | 47,00 | 69,40 | 1,80 | 54,50 | 7,45 | 2,411 | 28,970 | 1,73 | 0,164 | 231,76 | 162,36 | 10,7793 | ZK | | |
| RZ-087BX | | | | | 270,00 | 47,00 | 69,40 | 1,80 | 54,75 | 7,32 | 2,411 | 28,970 | 1,73 | 0,163 | 232,52 | 163,12 | 10,8281 | ZK | | |
| RZ-087CI | | | | | 180,00 | 51,00 | 77,40 | 1,80 | 62,50 | 7,45 | 2,411 | 28,970 | 1,71 | 0,142 | 264,04 | 186,64 | 12,3401 | ZL | | |
| RZ-087CX | | | | | 270,00 | 51,00 | 77,40 | 1,80 | 62,75 | 7,32 | 2,411 | 28,970 | 1,71 | 0,142 | 264,80 | 187,40 | 12,3889 | ZL | | |
| RZ-087DI | | | | | 180,00 | 54,00 | 85,40 | 1,80 | 70,50 | 7,45 | 2,411 | 28,970 | 1,69 | 0,126 | 296,32 | 210,92 | 13,9009 | ZL | | |
| RZ-087DX | | | | | 270,00 | 54,00 | 85,40 | 1,80 | 70,75 | 7,32 | 2,411 | 28,970 | 1,69 | 0,125 | 297,08 | 211,68 | 13,9497 | ZL | | |
| RZ-087EI | | | | | 180,00 | 57,00 | 93,40 | 1,80 | 78,50 | 7,45 | 2,411 | 28,970 | 1,68 | 0,113 | 328,60 | 235,20 | 15,4617 | ZL | | |
| RZ-087EX | | | | | 270,00 | 57,00 | 93,40 | 1,80 | 78,75 | 7,32 | 2,411 | 28,970 | 1,68 | 0,113 | 329,36 | 235,96 | 15,5105 | ZL | | |
| RZ-087FI | | 10,00 | 0,30 | 11,80 | 180,00 | 36,00 | 50,00 | 1,30 | 36,50 | 6,75 | 2,551 | 31,730 | 2,02 | 0,338 | 136,30 | 86,30 | 6,5407 | ZH | | |
| RZ-087FX | | | | | 270,00 | 37,00 | 50,00 | 1,30 | 36,75 | 6,62 | 2,551 | 6,62 | 2,551 | 31,730 | 2,02 | 0,336 | 136,90 | 86,90 | 6,5846 | ZH |
| RZ-087GI | | | | | 180,00 | 41,00 | 60,00 | 1,30 | 46,50 | 6,75 | 2,551 | 6,75 | 2,551 | 31,730 | 1,94 | 0,264 | 170,60 | 110,60 | 8,2966 | ZJ |
| RZ-087GX | 270,00 | | | | 41,00 | 60,00 | 1,30 | 46,75 | 6,62 | 2,551 | 6,62 | 2,551 | 31,730 | 1,94 | 0,262 | 171,21 | 111,21 | 8,3405 | ZJ | |
| RZ-087HI | 180,00 | | | | 49,00 | 80,00 | 1,80 | 66,50 | 6,75 | 2,551 | 6,75 | 2,551 | 31,730 | 1,87 | 0,183 | 239,22 | 159,22 | 11,8085 | ZL | |
| RZ-087HX | 270,00 | | | | 50,00 | 80,00 | 1,80 | 66,75 | 6,62 | 2,551 | 6,62 | 2,551 | 31,730 | 1,87 | 0,183 | 239,83 | 159,83 | 11,8524 | ZL | |
| RZ-087JI | 180,00 | | | | 57,00 | 100,00 | 1,80 | 86,50 | 6,75 | 2,551 | 6,75 | 2,551 | 31,730 | 1,83 | 0,140 | 307,84 | 207,84 | 15,3203 | ZM | |
| RZ-087JX | 270,00 | | | | 57,00 | 100,00 | 1,80 | 86,75 | 6,62 | 2,551 | 6,62 | 2,551 | 31,730 | 1,83 | 0,140 | 308,45 | 208,45 | 15,3642 | ZM | |
| RZ-087KI | 9,40 | | | | 0,30 | 11,20 | 180,00 | 20,00 | 26,00 | 0,90 | 13,50 | 6,25 | 2,751 | 33,650 | 2,39 | 1,181 | 52,20 | 26,20 | 2,3354 | ZG |
| RZ-087KX | | | | | | | 270,00 | 20,00 | 26,00 | 0,90 | 13,75 | 6,13 | 2,751 | 6,13 | 2,751 | 33,650 | 2,39 | 1,158 | 52,70 | 26,70 |
| RZ-088I | | 180,00 | 29,00 | 38,00 | | | 0,90 | 25,50 | 6,25 | 2,751 | 6,25 | 2,751 | 33,650 | 2,33 | 0,603 | 89,28 | 51,28 | 4,3020 | ZH | |
| RZ-088X | | 270,00 | 29,00 | 38,00 | | | 0,90 | 25,75 | 6,12 | 2,751 | 6,12 | 2,751 | 33,650 | 2,33 | 0,596 | 89,80 | 51,80 | 4,3429 | ZH | |
| RZ-089I | | 180,00 | 37,00 | 53,00 | | | 1,30 | 40,50 | 6,25 | 2,751 | 6,25 | 2,751 | 33,650 | 2,14 | 0,374 | 135,67 | 82,67 | 6,7602 | ZH | |
| RZ-089X | | 270,00 | 37,00 | 53,00 | | | 1,30 | 40,75 | 6,12 | 2,751 | 6,12 | 2,751 | 33,650 | 2,14 | 0,371 | 136,19 | 83,19 | 6,8012 | ZH | |
| RZ-090I | | 180,00 | 48,00 | 80,00 | | | 1,80 | 67,50 | 6,25 | 2,751 | 6,25 | 2,751 | 33,650 | 2,02 | 0,222 | 219,18 | 139,18 | 11,1851 | ZH | |
| RZ-090X | | 270,00 | 48,00 | 80,00 | | | 1,80 | 67,75 | 6,12 | 2,751 | 6,12 | 2,751 | 33,650 | 2,01 | 0,221 | 219,70 | 139,70 | 11,2261 | ZH | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-084AX | 1,00 | 13,50 | 0,35 | 15,40 | 270,00 | 55,00 | 73,40 | 1,80 | 54,75 | 9,32 | 1,771 | 28,630 | 1,58 | 0,097 | 350,17 | 276,77 | 13,5000 | ZG | | |
| Z-085I | | 11,00 | 0,30 | 12,80 | 180,00 | 22,00 | 27,40 | 0,90 | 12,50 | 7,45 | 2,991 | 34,880 | 2,46 | 0,886 | 63,40 | 36,00 | 2,6170 | ZD | | |
| Z-085X | | | | | | 270,00 | 22,00 | 27,40 | 0,90 | 12,75 | 7,32 | 2,991 | 34,880 | 2,44 | 0,867 | 64,18 | 36,78 | 2,6650 | ZD | |
| Z-086I | | | | | | 180,00 | 32,00 | 40,40 | 1,30 | 25,50 | 7,45 | 2,991 | 34,880 | 2,05 | 0,416 | 117,10 | 76,70 | 5,1380 | ZE | |
| Z-086X | | | | | | 270,00 | 32,00 | 40,40 | 1,30 | 25,75 | 7,32 | 2,991 | 34,880 | 2,05 | 0,412 | 117,88 | 77,48 | 5,1860 | ZE | |
| Z-087I | | | | | | 180,00 | 41,00 | 55,40 | 1,30 | 40,50 | 7,45 | 2,991 | 34,880 | 1,89 | 0,258 | 179,06 | 123,66 | 8,0470 | ZF | |
| Z-087X | | | | | | 270,00 | 41,00 | 55,40 | 1,30 | 40,75 | 7,32 | 2,991 | 34,880 | 1,89 | 0,256 | 179,84 | 124,44 | 8,0960 | ZF | |
| Z-087AI | | | | | | 180,00 | 44,00 | 62,40 | 1,30 | 47,50 | 7,45 | 2,991 | 34,880 | 1,85 | 0,219 | 207,97 | 145,57 | 9,4050 | ZG | |
| Z-087AX | | | | | | 270,00 | 44,00 | 62,40 | 1,30 | 47,75 | 7,32 | 2,991 | 34,880 | 1,84 | 0,218 | 208,75 | 146,35 | 9,4540 | ZG | |
| Z-087BI | | | | | | 180,00 | 47,00 | 69,40 | 1,80 | 54,50 | 7,45 | 2,991 | 34,880 | 1,82 | 0,190 | 236,89 | 167,49 | 10,7600 | ZG | |
| Z-087BX | | | | | | 270,00 | 47,00 | 69,40 | 1,80 | 54,75 | 7,32 | 2,991 | 34,880 | 1,82 | 0,190 | 237,67 | 168,27 | 10,8100 | ZG | |
| Z-087CI | | | | | | 180,00 | 51,00 | 77,40 | 1,80 | 62,50 | 7,45 | 2,991 | 34,880 | 1,80 | 0,166 | 269,93 | 192,53 | 12,3100 | ZH | |
| Z-087CX | | | | | | 270,00 | 51,00 | 77,40 | 1,80 | 62,75 | 7,32 | 2,991 | 34,880 | 1,80 | 0,165 | 270,71 | 193,31 | 12,3600 | ZH | |
| Z-087DI | | | | | | 180,00 | 54,00 | 85,40 | 1,80 | 70,50 | 7,45 | 2,991 | 34,880 | 1,78 | 0,147 | 302,97 | 217,57 | 13,8600 | ZH | |
| Z-087DX | | | | | | 270,00 | 54,00 | 85,40 | 1,80 | 70,75 | 7,32 | 2,991 | 34,880 | 1,78 | 0,146 | 303,76 | 218,36 | 13,9100 | ZH | |
| Z-087EI | | | | | | 180,00 | 57,00 | 93,40 | 1,80 | 78,50 | 7,45 | 2,991 | 34,880 | 1,78 | 0,131 | 336,02 | 242,62 | 15,4100 | ZH | |
| Z-087EX | | | | | | 270,00 | 57,00 | 93,40 | 1,80 | 78,75 | 7,32 | 2,991 | 34,880 | 1,76 | 0,131 | 336,80 | 243,40 | 15,4600 | ZH | |
| Z-087FI | | 10,00 | 0,30 | 11,80 | 180,00 | 36,00 | 50,00 | 1,30 | 36,50 | 6,75 | 3,221 | 38,210 | 2,12 | 0,394 | 138,88 | 88,88 | 6,5460 | ZE | | |
| Z-087FX | | | | | 270,00 | 37,00 | 50,00 | 1,30 | 36,75 | 6,62 | 3,221 | 38,210 | 2,11 | 0,391 | 139,51 | 89,51 | 6,5400 | ZE | | |
| Z-087GI | | | | | 180,00 | 41,00 | 60,00 | 1,30 | 46,50 | 6,75 | 3,221 | 38,210 | 2,04 | 0,307 | 173,92 | 113,92 | 8,2920 | ZF | | |
| Z-087GX | 270,00 | | | | 41,00 | 60,00 | 1,30 | 46,75 | 6,62 | 3,221 | 38,210 | 2,04 | 0,305 | 174,55 | 114,55 | 8,3360 | ZF | | | |
| Z-087HI | 180,00 | | | | 49,00 | 80,00 | 1,80 | 66,50 | 6,75 | 3,221 | 38,210 | 1,97 | 0,213 | 244,00 | 164,00 | 11,7800 | ZH | | | |
| Z-087HX | 270,00 | | | | 50,00 | 80,00 | 1,80 | 66,75 | 6,62 | 3,221 | 38,210 | 1,97 | 0,213 | 244,62 | 164,62 | 11,8200 | ZH | | | |
| Z-087JI | 180,00 | | | | 57,00 | 100,00 | 1,80 | 86,50 | 6,75 | 3,221 | 38,210 | 1,93 | 0,163 | 314,07 | 214,07 | 15,2700 | ZJ | | | |
| Z-087JX | 270,00 | | | | 57,00 | 100,00 | 1,80 | 86,75 | 6,62 | 3,221 | 38,210 | 1,93 | 0,163 | 314,70 | 214,70 | 15,3100 | ZJ | | | |
| Z-087KI | 9,40 | | | | 0,30 | 11,20 | 180,00 | 20,00 | 26,00 | 0,90 | 13,50 | 6,25 | 3,441 | 40,520 | 2,39 | 1,375 | 52,97 | 26,97 | 2,3350 | ZE |
| Z-087KX | | | | | | | 270,00 | 20,00 | 26,00 | 0,90 | 13,75 | 6,13 | 3,441 | 40,520 | 2,39 | 1,348 | 53,50 | 27,50 | 2,3760 | ZE |
| Z-088I | | 180,00 | 29,00 | 38,00 | | | 0,90 | 25,50 | 6,25 | 3,441 | 40,520 | 2,28 | 0,702 | 90,86 | 52,86 | 4,3180 | ZE | | | |
| Z-088X | | 270,00 | 29,00 | 38,00 | | | 0,90 | 25,75 | 6,12 | 3,441 | 40,520 | 2,28 | 0,694 | 91,40 | 53,40 | 4,3590 | ZE | | | |
| Z-089I | | 180,00 | 37,00 | 53,00 | | | 1,30 | 40,50 | 6,25 | 3,441 | 40,520 | 2,25 | 0,435 | 138,22 | 85,22 | 6,7630 | ZE | | | |
| Z-089X | | 270,00 | 37,00 | 53,00 | | | 1,30 | 40,75 | 6,12 | 3,441 | 40,520 | 2,24 | 0,432 | 138,76 | 85,76 | 6,8040 | ZE | | | |
| Z-090I | | 180,00 | 48,00 | 80,00 | | | 1,80 | 67,50 | 6,25 | 3,441 | 40,520 | 2,12 | 0,258 | 223,47 | 143,47 | 11,1600 | ZE | | | |
| Z-090X | | 270,00 | 48,00 | 80,00 | | | 1,80 | 67,75 | 6,12 | 3,441 | 40,520 | 2,12 | 0,258 | 224,01 | 144,01 | 11,1200 | ZE | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|--------|--------|----|
| Z-090AI | 1,00 | 9,40 | 0,30 | 11,20 | 180,00 | 52,00 | 90,80 | 1,80 | 78,50 | 6,25 | 3,441 | 40,520 | 2,09 | 0,222 | 258,00 | 167,20 | 12,9500 | ZG | | | | |
| Z-090AX | | | | | 270,00 | 52,00 | 90,80 | 1,80 | 78,75 | 6,12 | 3,441 | 40,520 | 2,09 | 0,221 | 258,54 | 167,74 | 12,9900 | ZG | | | | |
| Z-091I | 9,00 | 0,25 | 10,80 | 180,00 | 20,00 | 24,00 | 0,60 | 12,50 | 5,75 | 3,881 | 42,220 | 3,11 | 1,730 | 46,16 | 22,16 | 2,0950 | ZD | | | | | |
| Z-091X | | | | | 270,00 | 20,00 | 24,00 | 0,60 | 12,75 | 5,62 | 3,881 | 42,220 | 3,09 | 1,693 | 46,64 | 22,64 | 2,1340 | ZD | | | | |
| Z-092I | | | | | 180,00 | 29,00 | 37,20 | 0,80 | 25,50 | 5,85 | 3,881 | 42,220 | 2,59 | 0,812 | 84,41 | 47,21 | 4,1130 | ZE | | | | |
| Z-092X | | | | | 270,00 | 29,00 | 37,20 | 0,80 | 25,75 | 5,72 | 3,881 | 42,220 | 2,58 | 0,804 | 84,89 | 47,69 | 4,1520 | ZE | | | | |
| Z-093I | | | | | 180,00 | 36,00 | 52,20 | 1,10 | 40,50 | 5,58 | 3,881 | 42,220 | 2,38 | 0,504 | 128,32 | 76,12 | 6,4420 | ZF | | | | |
| Z-093X | | | | | 270,00 | 36,00 | 52,20 | 1,10 | 40,75 | 5,72 | 3,881 | 42,220 | 2,38 | 0,501 | 128,80 | 76,60 | 6,4810 | ZF | | | | |
| Z-093AI | | | | | 180,00 | 39,00 | 59,20 | 1,10 | 47,50 | 5,58 | 3,881 | 42,220 | 2,32 | 0,428 | 148,80 | 89,60 | 7,5290 | ZF | | | | |
| Z-093AX | | | | | 270,00 | 39,00 | 59,20 | 1,10 | 47,75 | 5,72 | 3,881 | 42,220 | 2,32 | 0,426 | 149,29 | 90,09 | 7,5680 | ZF | | | | |
| Z-093BI | | | | | 180,00 | 42,00 | 66,20 | 1,50 | 54,50 | 5,58 | 3,881 | 42,220 | 2,29 | 0,372 | 169,29 | 103,09 | 8,6160 | ZF | | | | |
| Z-093BX | | | | | 270,00 | 42,00 | 66,20 | 1,50 | 54,75 | 5,72 | 3,881 | 42,220 | 2,29 | 0,370 | 169,78 | 103,58 | 8,6550 | ZF | | | | |
| Z-093CI | | | | | 180,00 | 45,00 | 74,20 | 1,50 | 62,50 | 5,58 | 3,881 | 42,220 | 2,26 | 0,324 | 192,71 | 118,51 | 9,8570 | ZG | | | | |
| Z-093CX | | | | | 270,00 | 45,00 | 74,20 | 1,50 | 62,75 | 5,72 | 3,881 | 42,220 | 2,26 | 0,322 | 193,19 | 118,99 | 9,8960 | ZG | | | | |
| Z-093DI | | | | | 180,00 | 48,00 | 82,20 | 1,50 | 70,50 | 5,58 | 3,881 | 42,220 | 2,24 | 0,286 | 216,13 | 133,93 | 11,1000 | ZH | | | | |
| Z-093DX | | | | | 270,00 | 48,00 | 82,20 | 1,50 | 70,25 | 5,72 | 3,881 | 42,220 | 2,24 | 0,285 | 215,63 | 133,43 | 11,1300 | ZH | | | | |
| Z-093EI | | | | | 180,00 | 51,00 | 90,20 | 1,50 | 78,50 | 5,58 | 3,881 | 42,220 | 2,22 | 0,257 | 239,54 | 149,34 | 12,3400 | ZH | | | | |
| Z-093EX | | | | | 270,00 | 51,00 | 90,20 | 1,50 | 78,75 | 5,72 | 3,881 | 42,220 | 2,22 | 0,256 | 240,02 | 149,82 | 12,3800 | ZH | | | | |
| Z-093GI | | | | | 8,00 | 0,25 | 9,80 | 180,00 | 17,00 | 21,00 | 0,60 | 10,50 | 5,25 | 4,221 | 47,150 | 3,16 | 3,126 | 34,73 | 13,73 | 1,5630 | ZE | |
| Z-093GX | | | | | | | | | 270,00 | 17,00 | 21,00 | 0,60 | 10,75 | 5,13 | 4,221 | 47,150 | 3,16 | 3,046 | 35,09 | 14,09 | 1,5710 | ZE |
| Z-093HI | | | | | | | | | 180,00 | 24,00 | 30,00 | 0,80 | 19,50 | 5,25 | 4,221 | 47,150 | 2,97 | 1,605 | 56,74 | 26,74 | 2,7860 | ZE |
| Z-093HX | | | | | | | | | 270,00 | 24,00 | 30,00 | 0,80 | 19,75 | 5,12 | 4,221 | 47,150 | 2,97 | 1,584 | 57,10 | 27,10 | 2,8200 | ZE |
| Z-094I | 180,00 | 31,00 | 42,00 | 1,10 | | | | | 31,50 | 5,25 | 4,221 | 47,150 | 2,88 | 0,974 | 86,00 | 44,00 | 4,4160 | ZF | | | | |
| Z-094X | 270,00 | 31,00 | 42,00 | 1,10 | | | | | 31,75 | 5,12 | 4,221 | 47,150 | 2,88 | 0,966 | 86,44 | 44,44 | 4,4500 | ZF | | | | |
| Z-094AI | 180,00 | 35,00 | 50,00 | 1,10 | | | | | 39,50 | 5,25 | 4,221 | 47,150 | 2,85 | 0,771 | 105,65 | 55,65 | 5,5040 | ZE | | | | |
| Z-094AX | 270,00 | 35,00 | 50,00 | 1,10 | | | | | 39,75 | 5,12 | 4,221 | 47,150 | 2,85 | 0,766 | 106,01 | 56,01 | 5,5380 | ZF | | | | |
| Z-094BI | 180,00 | 39,00 | 60,00 | 1,10 | | | | | 49,50 | 5,25 | 4,221 | 47,150 | 2,78 | 0,612 | 130,10 | 70,10 | 6,8630 | ZF | | | | |
| Z-094BX | 270,00 | 39,00 | 60,00 | 1,10 | | | | | 49,75 | 5,12 | 4,221 | 47,150 | 2,78 | 0,609 | 130,46 | 70,46 | 6,8970 | ZF | | | | |
| Z-094CI | 180,00 | 47,00 | 80,00 | 1,50 | | | | | 69,50 | 5,25 | 4,221 | 47,150 | 2,78 | 0,434 | 179,01 | 99,01 | 9,5820 | ZG | | | | |
| Z-094CX | 270,00 | 47,00 | 80,00 | 1,50 | | | | | 69,75 | 5,12 | 4,221 | 47,150 | 2,70 | 0,432 | 179,37 | 99,37 | 9,6160 | ZG | | | | |
| Z-095I | 7,30 | 0,20 | 9,00 | 180,00 | | | | | 19,00 | 21,40 | 0,60 | 12,50 | 4,45 | 4,661 | 51,300 | 4,49 | 3,543 | 34,57 | 13,17 | 1,6510 | ZD | |
| Z-095X | | | | | | | | | 270,00 | 19,00 | 21,40 | 0,60 | 12,75 | 4,32 | 4,661 | 51,300 | 4,46 | 3,467 | 34,85 | 13,45 | 1,6820 | ZD |
| Z-096I | | | | | 180,00 | 27,00 | 34,40 | 0,80 | 25,50 | 4,45 | 4,661 | 51,300 | 3,70 | 1,663 | 62,45 | 28,05 | 3,2430 | ZE | | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|--------|--------|
| RZ-090AI | 1,00 | 9,40 | 0,30 | 11,20 | 180,00 | 52,00 | 90,80 | 1,80 | 78,50 | 6,25 | 2,751 | 33,650 | 1,99 | 0,190 | 253,00 | 162,20 | 12,9878 | ZK | | | |
| RZ-090AX | | | | | 270,00 | 52,00 | 90,80 | 1,80 | 78,75 | 6,12 | 2,751 | 33,650 | 1,99 | 0,190 | 253,52 | 162,72 | 13,0288 | ZK | | | |
| RZ-091I | 9,00 | 0,25 | 10,80 | 18,00 | 20,00 | 24,00 | 0,60 | 12,50 | 5,75 | 3,101 | 35,060 | 3,00 | 1,486 | 45,51 | 21,51 | 2,0681 | ZG | | | | |
| RZ-091X | | | | | 270,00 | 20,00 | 24,00 | 0,60 | 12,75 | 5,62 | 3,101 | 35,060 | 2,98 | 1,454 | 45,97 | 21,97 | 2,1071 | ZG | | | |
| RZ-092I | | | | | 180,00 | 29,00 | 37,20 | 0,80 | 25,50 | 5,85 | 3,101 | 35,060 | 2,48 | 0,698 | 83,02 | 45,82 | 4,0971 | ZH | | | |
| RZ-092X | | | | | 270,00 | 29,00 | 37,20 | 0,80 | 25,75 | 5,72 | 3,101 | 35,060 | 2,47 | 0,690 | 83,48 | 46,28 | 4,1361 | ZH | | | |
| RZ-093I | | | | | 180,00 | 36,00 | 52,20 | 1,10 | 40,50 | 5,58 | 3,101 | 35,060 | 2,28 | 0,433 | 126,07 | 73,87 | 6,4383 | ZJ | | | |
| RZ-093X | | | | | 270,00 | 36,00 | 52,20 | 1,10 | 40,75 | 5,72 | 3,101 | 35,060 | 2,27 | 0,430 | 126,54 | 74,34 | 6,4773 | ZJ | | | |
| RZ-093AI | | | | | 180,00 | 39,00 | 59,20 | 1,10 | 47,50 | 5,58 | 3,101 | 35,060 | 2,22 | 0,368 | 146,16 | 86,96 | 7,5309 | ZJ | | | |
| RZ-093AX | | | | | 270,00 | 39,00 | 59,20 | 1,10 | 47,75 | 5,72 | 3,101 | 35,060 | 2,22 | 0,366 | 146,63 | 87,43 | 7,5699 | ZJ | | | |
| RZ-093BI | | | | | 180,00 | 42,00 | 66,20 | 1,50 | 54,50 | 5,58 | 3,101 | 35,060 | 2,18 | 0,319 | 166,25 | 100,05 | 8,6234 | ZJ | | | |
| RZ-093BX | | | | | 270,00 | 42,00 | 66,20 | 1,50 | 54,75 | 5,72 | 3,101 | 35,060 | 2,18 | 0,318 | 166,72 | 100,52 | 8,6625 | ZJ | | | |
| RZ-093CI | | | | | 180,00 | 45,00 | 74,20 | 1,50 | 62,50 | 5,58 | 3,101 | 35,060 | 2,15 | 0,278 | 189,21 | 115,01 | 9,8721 | ZK | | | |
| RZ-093CX | | | | | 270,00 | 45,00 | 74,20 | 1,50 | 62,75 | 5,72 | 3,101 | 35,060 | 2,15 | 0,277 | 189,68 | 115,48 | 9,9111 | ZK | | | |
| RZ-093DI | | | | | 180,00 | 48,00 | 82,20 | 1,50 | 70,50 | 5,58 | 3,101 | 35,060 | 2,13 | 0,246 | 212,17 | 129,97 | 11,1207 | ZL | | | |
| RZ-093DX | | | | | 270,00 | 48,00 | 82,20 | 1,50 | 70,25 | 5,72 | 3,101 | 35,060 | 2,13 | 0,247 | 211,70 | 129,50 | 11,0817 | ZL | | | |
| RZ-093EI | | | | | 180,00 | 51,00 | 90,20 | 1,50 | 78,50 | 5,58 | 3,101 | 35,060 | 2,11 | 0,221 | 235,13 | 144,93 | 12,3694 | ZL | | | |
| RZ-093EX | | | | | 270,00 | 51,00 | 90,20 | 1,50 | 78,75 | 5,72 | 3,101 | 35,060 | 2,11 | 0,220 | 235,60 | 145,40 | 12,4084 | ZL | | | |
| RZ-093GI | | | | | 8,00 | 0,25 | 9,80 | 18,00 | 17,00 | 21,00 | 0,60 | 10,50 | 5,25 | 3,371 | 39,100 | 3,25 | 2,685 | 34,73 | 13,73 | 1,5364 | ZH |
| RZ-093GX | | | | | | | | | 270,00 | 17,00 | 21,00 | 0,60 | 10,75 | 5,13 | 3,371 | 39,100 | 3,25 | 2,616 | 35,09 | 14,09 | 1,5706 |
| RZ-093HI | 180,00 | 24,00 | 30,00 | 0,80 | | | | | 19,50 | 5,25 | 3,371 | 39,100 | 3,19 | 1,379 | 55,95 | 25,95 | 2,7655 | ZH | | | |
| RZ-093HX | 270,00 | 24,00 | 30,00 | 0,80 | | | | | 19,75 | 5,12 | 3,371 | 39,100 | 3,18 | 1,361 | 56,30 | 26,30 | 2,7997 | ZH | | | |
| RZ-094I | 180,00 | 31,00 | 42,00 | 1,10 | | | | | 31,50 | 5,25 | 3,371 | 39,100 | 2,87 | 0,836 | 84,78 | 42,78 | 4,4044 | ZJ | | | |
| RZ-094X | 270,00 | 31,00 | 42,00 | 1,10 | | | | | 31,75 | 5,12 | 3,371 | 39,100 | 2,86 | 0,830 | 85,13 | 43,13 | 4,4385 | ZJ | | | |
| RZ-094AI | 180,00 | 35,00 | 50,00 | 1,10 | | | | | 39,50 | 5,25 | 3,371 | 39,100 | 2,76 | 0,663 | 104,00 | 54,00 | 5,4970 | ZH | | | |
| RZ-094AX | 270,00 | 35,00 | 50,00 | 1,10 | | | | | 39,75 | 5,12 | 3,371 | 39,100 | 2,76 | 0,658 | 104,35 | 54,35 | 5,5311 | ZJ | | | |
| RZ-094BI | 180,00 | 39,00 | 60,00 | 1,10 | | | | | 49,50 | 5,25 | 3,371 | 39,100 | 2,66 | 0,526 | 128,03 | 68,03 | 6,8627 | ZJ | | | |
| RZ-094BX | 270,00 | 39,00 | 60,00 | 1,10 | | | | | 49,75 | 5,12 | 3,371 | 39,100 | 2,66 | 0,523 | 128,38 | 68,38 | 6,8968 | ZJ | | | |
| RZ-094CI | 180,00 | 47,00 | 80,00 | 1,50 | | | | | 69,50 | 5,25 | 3,371 | 39,100 | 2,58 | 0,372 | 176,08 | 96,08 | 9,5941 | ZK | | | |
| RZ-094CX | 270,00 | 47,00 | 80,00 | 1,50 | | | | | 69,75 | 5,12 | 3,371 | 39,100 | 2,58 | 0,371 | 176,43 | 96,43 | 9,6282 | ZK | | | |
| RZ-095I | 7,30 | 0,20 | 9,00 | 18,00 | 19,00 | 21,40 | 0,60 | 12,50 | 4,45 | 3,711 | 42,600 | 4,36 | 3,043 | 34,18 | 12,78 | 1,6286 | ZG | | | | |
| RZ-095X | | | | | 270,00 | 19,00 | 21,40 | 0,60 | 12,75 | 4,32 | 3,711 | 42,600 | 4,33 | 2,978 | 34,46 | 13,06 | 1,6593 | ZG | | | |
| RZ-096I | | | | | 180,00 | 27,00 | 34,40 | 0,80 | 25,50 | 4,45 | 3,711 | 42,600 | 3,57 | 1,428 | 61,63 | 27,23 | 3,2265 | ZH | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| RZ-096X | 1,00 | 7,30 | 0,20 | 9,00 | 270,00 | 27,00 | 34,40 | 0,80 | 25,75 | 4,32 | 3,711 | 42,600 | 3,57 | 1,414 | 61,91 | 27,51 | 3,2572 | ZH |
| RZ-097I | | | | | 180,00 | 35,00 | 49,40 | 1,10 | 40,50 | 4,45 | 3,711 | 42,600 | 3,27 | 0,886 | 93,31 | 43,91 | 5,0702 | ZH |
| RZ-097X | | | | | 270,00 | 35,00 | 49,40 | 1,10 | 40,75 | 4,32 | 3,711 | 42,600 | 3,27 | 0,880 | 93,59 | 44,19 | 5,1009 | ZH |
| RZ-097AI | | | | | 180,00 | 38,00 | 56,50 | 1,10 | 47,50 | 4,50 | 3,711 | 42,600 | 3,18 | 0,753 | 108,19 | 51,69 | 5,9306 | ZJ |
| RZ-097AX | | | | | 270,00 | 38,00 | 56,50 | 1,10 | 47,75 | 4,37 | 3,711 | 42,600 | 3,18 | 0,749 | 108,47 | 51,97 | 5,9613 | ZJ |
| RZ-097BI | | | | | 180,00 | 40,00 | 63,50 | 1,50 | 54,50 | 4,50 | 3,711 | 42,600 | 3,12 | 0,654 | 122,97 | 59,47 | 6,7910 | ZJ |
| RZ-097BX | | | | | 270,00 | 41,00 | 63,50 | 1,50 | 54,75 | 4,37 | 3,711 | 42,600 | 3,12 | 0,651 | 123,25 | 59,75 | 6,8217 | ZJ |
| RZ-097CI | | | | | 180,00 | 43,00 | 71,50 | 1,50 | 62,50 | 4,50 | 3,711 | 42,600 | 3,09 | 0,569 | 139,86 | 68,36 | 7,7743 | ZJ |
| RZ-097CX | | | | | 270,00 | 43,00 | 71,50 | 1,50 | 62,75 | 4,37 | 3,711 | 42,600 | 3,09 | 0,567 | 140,14 | 68,64 | 7,8050 | ZJ |
| RZ-097DI | | | | | 180,00 | 46,00 | 79,50 | 1,50 | 70,50 | 4,50 | 3,711 | 42,600 | 3,05 | 0,504 | 156,75 | 77,25 | 8,7576 | ZJ |
| RZ-097DX | | | | | 270,00 | 46,00 | 79,50 | 1,50 | 70,75 | 4,37 | 3,711 | 42,600 | 3,05 | 0,502 | 157,03 | 77,53 | 8,7883 | ZJ |
| RZ-097EI | | | | | 180,00 | 49,00 | 87,50 | 1,50 | 78,50 | 4,50 | 3,711 | 42,600 | 3,02 | 0,452 | 173,65 | 86,15 | 9,7409 | ZK |
| RZ-097EX | | | | | 270,00 | 49,00 | 87,50 | 1,50 | 78,75 | 4,37 | 3,711 | 42,600 | 3,02 | 0,450 | 173,93 | 86,43 | 9,7716 | ZK |
| RZ-098I | | | | | 6,00 | 0,20 | 7,70 | 180,00 | 18,00 | 19,40 | 0,60 | 12,50 | 3,45 | 4,251 | 50,820 | 6,76 | 6,087 | 27,05 |
| RZ-098X | 270,00 | 18,00 | 19,40 | 0,60 | | | | 12,75 | 3,32 | 4,251 | 50,820 | 6,71 | 5,957 | 27,22 | 7,82 | 1,3169 | ZG | |
| RZ-099I | 180,00 | 26,00 | 32,40 | 0,80 | | | | 25,50 | 3,45 | 4,251 | 50,820 | 5,49 | 2,857 | 48,71 | 16,31 | 2,5607 | ZG | |
| RZ-099X | 270,00 | 27,00 | 32,40 | 0,80 | | | | 25,75 | 3,32 | 4,251 | 50,820 | 5,48 | 2,828 | 48,87 | 16,47 | 2,5851 | ZG | |
| RZ-099AI | 180,00 | 29,00 | 36,40 | 0,80 | | | | 29,50 | 3,45 | 4,251 | 50,820 | 5,31 | 2,456 | 55,37 | 18,97 | 2,9509 | ZH | |
| RZ-099AX | 270,00 | 29,00 | 36,40 | 0,80 | | | | 29,75 | 3,32 | 4,251 | 50,820 | 5,30 | 2,435 | 55,54 | 19,14 | 2,9753 | ZH | |
| RZ-100I | 180,00 | 34,00 | 47,40 | 1,10 | | | | 40,50 | 3,45 | 4,251 | 50,820 | 5,00 | 1,772 | 73,69 | 26,29 | 4,0239 | ZH | |
| RZ-100X | 270,00 | 34,00 | 47,40 | 1,10 | | | | 40,75 | 3,32 | 4,251 | 50,820 | 5,00 | 1,761 | 73,86 | 26,46 | 4,0483 | ZH | |
| RZ-100AAI | 180,00 | 34,00 | 48,40 | 1,10 | | | | 41,50 | 3,45 | 4,251 | 50,820 | 4,98 | 1,728 | 75,36 | 26,96 | 4,1215 | ZJ | |
| RZ-100AAX | 270,00 | 34,00 | 48,40 | 1,10 | | | | 41,75 | 3,32 | 4,251 | 50,820 | 4,98 | 1,718 | 75,52 | 27,12 | 4,1459 | ZJ | |
| RZ-100AI | 180,00 | 36,00 | 54,40 | 1,10 | | | | 47,50 | 3,45 | 4,251 | 50,820 | 4,86 | 1,505 | 85,35 | 30,95 | 4,7068 | ZJ | |
| RZ-100AX | 270,00 | 37,00 | 54,40 | 1,10 | | | | 47,75 | 3,32 | 4,251 | 50,820 | 4,86 | 1,497 | 85,52 | 31,12 | 4,7312 | ZJ | |
| RZ-100BI | 180,00 | 39,00 | 61,40 | 1,10 | | | | 54,50 | 3,45 | 4,251 | 50,820 | 4,77 | 1,308 | 97,01 | 35,61 | 5,3897 | ZJ | |
| RZ-100BX | 270,00 | 39,00 | 61,40 | 1,10 | | | | 54,75 | 3,32 | 4,251 | 50,820 | 4,77 | 1,302 | 97,17 | 35,77 | 5,4140 | ZJ | |
| RZ-100B-01I | 180,00 | 40,00 | 63,40 | 1,50 | | | | 56,50 | 3,45 | 4,251 | 50,820 | 4,75 | 1,261 | 100,34 | 36,94 | 5,5848 | ZJ | |
| RZ-100B-01X | 270,00 | 40,00 | 63,40 | 1,50 | | | | 56,75 | 3,32 | 4,251 | 50,820 | 4,75 | 1,256 | 100,51 | 37,11 | 5,6091 | ZJ | |
| RZ-100CI | 180,00 | 42,00 | 69,40 | 1,50 | | | | 62,50 | 3,45 | 4,251 | 50,820 | 4,71 | 1,138 | 110,33 | 40,93 | 6,1701 | ZJ | |
| RZ-100CX | 270,00 | 42,00 | 69,40 | 1,50 | | | | 62,72 | 3,32 | 4,251 | 50,820 | 4,71 | 1,134 | 110,50 | 41,10 | 6,1915 | ZJ | |
| RZ-100DI | 180,00 | 45,00 | 77,40 | 1,50 | | | | 70,50 | 3,45 | 4,251 | 50,820 | 4,66 | 1,007 | 123,66 | 46,26 | 6,9505 | ZJ | |
| RZ-100DX | 270,00 | 45,00 | 77,40 | 1,50 | | | | 70,75 | 3,32 | 4,251 | 50,820 | 4,65 | 1,004 | 123,82 | 46,42 | 6,9748 | ZJ | |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| Z-096X | 1,00 | 7,30 | 0,20 | 9,00 | 270,00 | 27,00 | 34,40 | 0,80 | 25,75 | 4,32 | 4,661 | 51,300 | 3,70 | 1,646 | 62,73 | 28,33 | 3,2730 | ZE |
| Z-097I | | | | | 180,00 | 35,00 | 49,40 | 1,10 | 40,50 | 4,45 | 4,661 | 51,300 | 3,40 | 1,031 | 94,63 | 45,23 | 5,0790 | ZE |
| Z-097X | | | | | 270,00 | 35,00 | 49,40 | 1,10 | 40,75 | 4,32 | 4,661 | 51,300 | 3,40 | 1,025 | 94,90 | 45,50 | 5,1090 | ZE |
| Z-097AI | | | | | 180,00 | 38,00 | 56,50 | 1,10 | 47,50 | 4,50 | 4,661 | 51,300 | 3,31 | 0,876 | 109,74 | 53,24 | 5,9360 | ZF |
| Z-097AX | | | | | 270,00 | 38,00 | 56,50 | 1,10 | 47,75 | 4,37 | 4,661 | 51,300 | 3,31 | 0,871 | 110,04 | 53,54 | 5,9660 | ZF |
| Z-097BI | | | | | 180,00 | 40,00 | 63,50 | 1,50 | 54,50 | 4,50 | 4,661 | 51,300 | 3,25 | 0,762 | 124,70 | 61,20 | 6,7930 | ZF |
| Z-097BX | | | | | 270,00 | 41,00 | 63,50 | 1,50 | 54,75 | 4,37 | 4,661 | 51,300 | 3,25 | 0,758 | 125,02 | 61,52 | 6,8230 | ZF |
| Z-097CI | | | | | 180,00 | 43,00 | 71,50 | 1,50 | 62,50 | 4,50 | 4,661 | 51,300 | 3,22 | 0,662 | 141,95 | 70,45 | 7,7720 | ZF |
| Z-097CX | | | | | 270,00 | 43,00 | 71,50 | 1,50 | 62,75 | 4,37 | 4,661 | 51,300 | 3,22 | 0,660 | 142,16 | 70,66 | 7,8020 | ZF |
| Z-097DI | | | | | 180,00 | 46,00 | 79,50 | 1,50 | 70,50 | 4,50 | 4,661 | 51,300 | 3,18 | 0,586 | 159,08 | 79,58 | 8,7510 | ZF |
| Z-097DX | | | | | 270,00 | 46,00 | 79,50 | 1,50 | 70,75 | 4,37 | 4,661 | 51,300 | 3,18 | 0,584 | 159,36 | 79,86 | 8,7810 | ZF |
| Z-097EI | | | | | 180,00 | 49,00 | 87,50 | 1,50 | 78,50 | 4,50 | 4,661 | 51,300 | 3,16 | 0,526 | 176,16 | 88,66 | 9,7300 | ZG |
| Z-097EX | | | | | 270,00 | 49,00 | 87,50 | 1,50 | 78,75 | 4,37 | 4,661 | 51,300 | 3,15 | 0,524 | 176,50 | 89,00 | 9,7610 | ZG |
| Z-098I | | | | | 6,00 | 0,20 | 7,70 | 180,00 | 18,00 | 19,40 | 0,60 | 12,50 | 3,45 | 5,331 | 61,210 | 6,91 | 7,087 | 27,29 |
| Z-098X | 270,00 | 18,00 | 19,40 | 0,60 | | | | 12,75 | 3,32 | 5,331 | 61,210 | 6,86 | 6,936 | 27,46 | 8,06 | 1,3370 | ZD | |
| Z-099I | 180,00 | 26,00 | 32,40 | 0,80 | | | | 25,50 | 3,45 | 5,331 | 61,210 | 5,65 | 3,327 | 49,20 | 16,80 | 2,5780 | ZD | |
| Z-099X | 270,00 | 27,00 | 32,40 | 0,80 | | | | 25,75 | 3,32 | 5,331 | 61,210 | 5,64 | 3,293 | 49,37 | 16,97 | 2,6020 | ZD | |
| Z-099AI | 180,00 | 29,00 | 36,40 | 0,80 | | | | 29,50 | 3,45 | 5,331 | 61,210 | 5,46 | 2,860 | 55,95 | 19,55 | 2,9670 | ZE | |
| Z-099AX | 270,00 | 29,00 | 36,40 | 0,80 | | | | 29,75 | 3,32 | 5,331 | 61,210 | 5,45 | 2,835 | 56,11 | 19,71 | 2,9920 | ZE | |
| Z-100I | 180,00 | 34,00 | 47,40 | 1,10 | | | | 40,50 | 3,45 | 5,331 | 61,210 | 5,16 | 2,063 | 74,48 | 27,08 | 4,0380 | ZE | |
| Z-100X | 270,00 | 34,00 | 47,40 | 1,10 | | | | 40,75 | 3,32 | 5,331 | 61,210 | 5,15 | 2,050 | 74,65 | 27,25 | 4,0620 | ZE | |
| Z-100AAI | 180,00 | 34,00 | 48,40 | 1,10 | | | | 41,50 | 3,45 | 5,331 | 61,210 | 5,14 | 2,012 | 76,17 | 27,77 | 4,1350 | ZF | |
| Z-100AAX | 270,00 | 34,00 | 48,40 | 1,10 | | | | 41,75 | 3,32 | 5,331 | 61,210 | 5,13 | 2,000 | 76,34 | 27,94 | 4,1590 | ZF | |
| Z-100AI | 180,00 | 36,00 | 54,40 | 1,10 | | | | 47,50 | 3,45 | 5,331 | 61,210 | 5,02 | 1,753 | 86,27 | 31,87 | 4,7190 | ZF | |
| Z-100AX | 270,00 | 37,00 | 54,40 | 1,10 | | | | 47,75 | 3,32 | 5,331 | 61,210 | 5,01 | 1,743 | 86,45 | 32,05 | 4,7430 | ZF | |
| Z-100BI | 180,00 | 39,00 | 61,40 | 1,10 | | | | 54,50 | 3,45 | 5,331 | 61,210 | 4,92 | 1,523 | 98,09 | 36,69 | 5,4000 | ZF | |
| Z-100BX | 270,00 | 39,00 | 61,40 | 1,10 | | | | 54,75 | 3,32 | 5,331 | 61,210 | 4,92 | 1,516 | 98,25 | 36,85 | 5,4240 | ZF | |
| Z-100B-01I | 180,00 | 40,00 | 63,40 | 1,50 | | | | 56,50 | 3,45 | 5,331 | 61,210 | 4,91 | 1,468 | 101,46 | 38,06 | 5,5950 | ZF | |
| Z-100B-01X | 270,00 | 40,00 | 63,40 | 1,50 | | | | 56,75 | 3,32 | 5,331 | 61,210 | 4,91 | 1,462 | 101,62 | 38,22 | 5,6190 | ZF | |
| Z-100CI | 180,00 | 42,00 | 69,40 | 1,50 | | | | 62,50 | 3,45 | 5,331 | 61,210 | 4,86 | 1,325 | 111,57 | 42,17 | 6,1790 | ZF | |
| Z-100CX | 270,00 | 42,00 | 69,40 | 1,50 | | | | 62,72 | 3,32 | 5,331 | 61,210 | 4,86 | 1,320 | 111,73 | 42,33 | 6,2030 | ZF | |
| Z-100DI | 180,00 | 45,00 | 77,40 | 1,50 | | | | 70,50 | 3,45 | 5,331 | 61,210 | 4,81 | 1,173 | 125,03 | 47,63 | 6,9580 | ZF | |
| Z-100DX | 270,00 | 45,00 | 77,40 | 1,50 | | | | 70,75 | 3,32 | 5,331 | 61,210 | 4,81 | 1,168 | 125,24 | 47,84 | 6,9820 | ZF | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|--------|----|
| Z-100EI | 1,00 | 6,00 | 0,20 | 7,70 | 180,00 | 47,00 | 85,40 | 1,50 | 78,50 | 3,45 | 5,331 | 61,210 | 4,76 | 1,052 | 138,51 | 53,11 | 7,7360 | ZG | | | |
| Z-100EX | | | | | 270,00 | 47,00 | 85,40 | 1,50 | 78,75 | 3,32 | 5,331 | 61,210 | 4,76 | 1,048 | 138,72 | 53,32 | 7,7610 | ZG | | | |
| Z-100E-10I | 1,10 | 14,00 | 0,35 | 16,20 | 180,00 | 22,00 | 31,20 | 0,90 | 11,55 | 9,82 | 2,300 | 34,480 | 3,11 | 0,731 | 75,20 | 44,00 | 3,4300 | ZE | | | |
| Z-100E-10X | | | | | 270,00 | 22,00 | 31,20 | 0,90 | 11,83 | 9,68 | 2,300 | 34,480 | 3,08 | 0,712 | 76,40 | 45,20 | 3,5000 | ZE | | | |
| Z-100E-11I | | | | | 180,00 | 30,00 | 38,00 | 0,90 | 18,15 | 9,92 | 2,300 | 34,480 | 2,68 | 0,448 | 109,83 | 71,83 | 5,2500 | ZE | | | |
| Z-100E-11X | | | | | 270,00 | 30,00 | 38,00 | 0,90 | 18,42 | 9,79 | 2,300 | 34,480 | 2,67 | 0,441 | 110,97 | 72,97 | 5,3300 | ZE | | | |
| Z-100E-12I | | | | | 180,00 | 37,00 | 49,00 | 1,30 | 28,05 | 10,48 | 2,300 | 34,480 | 2,44 | 0,284 | 162,31 | 113,31 | 7,9900 | ZE | | | |
| Z-100E-12X | | | | | 270,00 | 37,00 | 49,00 | 1,30 | 28,33 | 10,33 | 2,300 | 34,480 | 2,43 | 0,281 | 163,52 | 114,52 | 8,0700 | ZE | | | |
| Z-100E-13I | | | | | 180,00 | 43,00 | 65,30 | 1,80 | 44,55 | 10,37 | 2,300 | 34,480 | 2,25 | 0,176 | 248,14 | 182,84 | 12,5600 | ZF | | | |
| Z-100E-13X | | | | | 270,00 | 43,00 | 65,30 | 1,80 | 44,83 | 10,23 | 2,300 | 34,480 | 2,25 | 0,176 | 248,60 | 182,84 | 12,6400 | ZF | | | |
| Z-100E-14I | | | | | 180,00 | 58,00 | 86,40 | 1,80 | 66,55 | 9,92 | 2,300 | 34,480 | 2,14 | 0,117 | 361,45 | 275,05 | 18,6500 | ZG | | | |
| Z-100E-14X | | | | | 270,00 | 58,00 | 86,40 | 1,80 | 66,83 | 9,78 | 2,300 | 34,480 | 2,14 | 0,116 | 363,81 | 277,41 | 18,7300 | ZG | | | |
| Z-100FI | | | | | 12,00 | 0,35 | 14,00 | 180,00 | 20,00 | 27,80 | 0,90 | 11,55 | 8,12 | 2,991 | 41,950 | 3,11 | 1,212 | 59,94 | 32,14 | 2,9400 | ZE |
| Z-100FX | | | | | | | | 270,00 | 20,00 | 27,80 | 0,90 | 11,83 | 7,98 | 2,991 | 41,950 | 3,08 | 1,181 | 60,78 | 32,98 | 3,0040 | ZE |
| Z-100GI | | | | | | | | 180,00 | 25,00 | 34,40 | 0,90 | 18,15 | 8,12 | 2,991 | 41,950 | 2,68 | 0,743 | 86,84 | 52,44 | 4,4750 | ZE |
| Z-100GX | | | | | | | | 270,00 | 26,00 | 34,40 | 0,90 | 18,42 | 7,98 | 2,991 | 41,950 | 2,67 | 0,731 | 87,68 | 53,28 | 4,5390 | ZE |
| Z-100HI | 180,00 | 32,00 | 44,30 | 1,30 | | | | 28,05 | 8,12 | 2,991 | 41,950 | 2,44 | 0,470 | 127,18 | 82,88 | 6,7770 | ZE | | | | |
| Z-100HX | 270,00 | 32,00 | 44,30 | 1,30 | | | | 28,33 | 7,98 | 2,991 | 41,950 | 2,43 | 0,465 | 128,08 | 83,78 | 6,8410 | ZE | | | | |
| Z-100JI | 180,00 | 40,00 | 60,80 | 1,30 | | | | 44,55 | 8,12 | 2,991 | 41,950 | 2,25 | 0,292 | 194,22 | 133,42 | 10,6100 | ZF | | | | |
| Z-100JX | 270,00 | 41,00 | 60,80 | 1,30 | | | | 44,83 | 7,98 | 2,991 | 41,950 | 2,25 | 0,290 | 195,14 | 134,34 | 10,6700 | ZF | | | | |
| Z-100KI | 180,00 | 50,00 | 82,80 | 1,80 | | | | 66,55 | 8,12 | 2,991 | 41,950 | 2,14 | 0,194 | 283,62 | 200,82 | 15,7300 | ZG | | | | |
| Z-100KX | 270,00 | 50,00 | 82,80 | 1,80 | | | | 66,83 | 7,98 | 2,991 | 41,950 | 2,14 | 0,193 | 284,66 | 201,86 | 15,7900 | ZG | | | | |
| Z-100LI | 7,50 | 0,25 | 9,40 | 180,00 | | | | 17,00 | 20,60 | 0,60 | 11,55 | 4,52 | 5,551 | 65,140 | 6,53 | 5,989 | 30,55 | 9,95 | 1,7300 | ZE | |
| Z-100LX | | | | 270,00 | | | | 17,00 | 20,60 | 0,60 | 11,83 | 4,38 | 5,551 | 65,140 | 6,46 | 5,836 | 30,82 | 10,22 | 1,7680 | ZE | |
| Z-100MI | | | | 180,00 | | | | 21,00 | 27,20 | 0,80 | 18,15 | 4,52 | 5,551 | 65,140 | 5,57 | 3,671 | 43,44 | 16,24 | 2,6330 | ZE | |
| Z-100MX | | | | 270,00 | | | | 22,00 | 27,20 | 0,80 | 18,42 | 4,38 | 5,551 | 65,140 | 5,55 | 3,613 | 43,70 | 16,50 | 2,6710 | ZE | |
| Z-100NI | | | | 180,00 | 27,00 | 37,10 | 0,80 | 28,05 | 4,52 | 5,551 | 65,140 | 5,02 | 2,322 | 62,77 | 25,67 | 3,9880 | ZE | | | | |
| Z-100NX | | | | 270,00 | 27,00 | 37,10 | 0,80 | 28,33 | 4,38 | 5,551 | 65,140 | 5,01 | 2,299 | 63,03 | 25,93 | 4,0260 | ZE | | | | |
| Z-100OI | | | | 180,00 | 34,00 | 53,60 | 1,10 | 44,55 | 4,52 | 5,551 | 65,140 | 4,60 | 1,440 | 94,98 | 41,38 | 6,2460 | ZF | | | | |
| Z-100OX | | | | 270,00 | 34,00 | 53,60 | 1,10 | 44,83 | 4,38 | 5,551 | 65,140 | 4,60 | 1,431 | 95,24 | 41,64 | 6,2840 | ZF | | | | |
| Z-100PI | | | | 180,00 | 42,00 | 75,60 | 1,50 | 66,55 | 4,52 | 5,551 | 65,140 | 4,36 | 0,956 | 137,93 | 62,33 | 9,2570 | ZG | | | | |
| Z-100PX | | | | 270,00 | 42,00 | 75,60 | 1,50 | 66,83 | 4,38 | 5,551 | 65,140 | 4,36 | 0,952 | 138,19 | 62,59 | 9,2950 | ZG | | | | |
| Z-100QI | | | | 5,50 | 0,30 | 7,50 | 180,00 | 16,00 | 17,40 | 0,60 | 11,55 | 2,92 | 8,881 | 85,360 | 13,68 | 18,431 | 21,55 | 4,15 | 1,1930 | ZE | |

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-100EI | 1,00 | 6,00 | 0,20 | 7,70 | 180,00 | 47,00 | 85,40 | 1,50 | 78,50 | 3,45 | 4,251 | 50,820 | 4,61 | 0,903 | 136,98 | 51,58 | 7,7309 | ZK |
| RZ-100EX | | | | | 270,00 | 47,00 | 85,40 | 1,50 | 78,75 | 3,32 | 4,251 | 50,820 | 4,61 | 0,900 | 137,15 | 51,75 | 7,7552 | ZK |
| RZ-100E-10I | 1,10 | 14,00 | 0,35 | 16,20 | 180,00 | 22,00 | 31,20 | 0,90 | 11,55 | 9,82 | 1,700 | 29,340 | 2,30 | 0,628 | 75,20 | 43,80 | 3,4260 | ZH |
| RZ-100E-10X | | | | | 270,00 | 22,00 | 31,20 | 0,90 | 11,83 | 9,68 | 1,700 | 29,340 | 2,30 | 0,612 | 76,36 | 45,16 | 3,5035 | ZH |
| RZ-100E-11I | | | | | 180,00 | 30,00 | 38,00 | 0,90 | 18,15 | 9,92 | 1,700 | 29,340 | 2,20 | 0,385 | 109,79 | 71,79 | 5,2532 | ZJ |
| RZ-100E-11X | | | | | 270,00 | 30,00 | 38,00 | 0,90 | 18,42 | 9,79 | 1,700 | 29,340 | 2,20 | 0,379 | 110,93 | 72,93 | 5,3279 | ZJ |
| RZ-100E-12I | | | | | 180,00 | 37,00 | 49,00 | 1,30 | 28,05 | 10,48 | 1,700 | 29,340 | 2,00 | 0,244 | 162,28 | 113,28 | 7,9940 | ZJ |
| RZ-100E-12X | | | | | 270,00 | 37,00 | 49,00 | 1,30 | 28,33 | 10,33 | 1,700 | 29,340 | 2,00 | 0,241 | 163,69 | 114,69 | 8,0715 | ZJ |
| RZ-100E-13I | | | | | 180,00 | 43,00 | 65,30 | 1,80 | 44,55 | 10,37 | 1,700 | 29,340 | 1,92 | 0,151 | 248,35 | 183,05 | 12,5620 | ZK |
| RZ-100E-13X | | | | | 270,00 | 43,00 | 65,30 | 1,80 | 44,83 | 10,23 | 1,700 | 29,340 | 1,92 | 0,150 | 249,57 | 184,27 | 12,6395 | ZK |
| RZ-100E-14I | | | | | 180,00 | 58,00 | 86,40 | 1,80 | 66,55 | 9,92 | 1,700 | 29,340 | 1,90 | 0,100 | 362,80 | 276,40 | 18,6526 | ZK |
| RZ-100E-14X | | | | | 270,00 | 58,00 | 86,40 | 1,80 | 66,83 | 9,78 | 1,700 | 29,340 | 1,90 | 0,100 | 362,95 | 276,55 | 18,7301 | ZK |
| RZ-100FI | | 12,00 | 0,35 | 14,00 | 180,00 | 20,00 | 27,80 | 0,90 | 11,55 | 8,12 | 2,411 | 34,950 | 3,01 | 1,041 | 59,05 | 31,25 | 2,8948 | ZH |
| RZ-100FX | | | | | 270,00 | 20,00 | 27,80 | 0,90 | 11,83 | 7,98 | 2,411 | 34,950 | 2,97 | 1,014 | 59,87 | 32,07 | 2,9603 | ZH |
| RZ-100GI | | | | | 180,00 | 25,00 | 34,40 | 0,90 | 18,15 | 8,12 | 2,411 | 34,950 | 2,58 | 0,638 | 85,38 | 50,98 | 4,4387 | ZH |
| RZ-100GX | | | | | 270,00 | 26,00 | 34,40 | 0,90 | 18,42 | 7,98 | 2,411 | 34,950 | 2,57 | 0,628 | 86,20 | 51,80 | 4,5019 | ZH |
| RZ-100HI | | | | | 180,00 | 32,00 | 44,30 | 1,30 | 28,05 | 8,12 | 2,411 | 34,950 | 2,33 | 0,404 | 124,89 | 80,59 | 6,7546 | ZH |
| RZ-100HX | | | | | 270,00 | 32,00 | 44,30 | 1,30 | 28,33 | 7,98 | 2,411 | 34,950 | 2,33 | 0,400 | 125,71 | 81,41 | 6,8201 | ZH |
| RZ-100JI | | | | | 180,00 | 40,00 | 60,80 | 1,30 | 44,55 | 8,12 | 2,411 | 34,950 | 2,33 | 0,250 | 190,73 | 129,93 | 10,6144 | ZJ |
| RZ-100JX | | | | | 270,00 | 41,00 | 60,80 | 1,30 | 44,83 | 7,98 | 2,411 | 34,950 | 2,15 | 0,249 | 191,60 | 130,80 | 10,6799 | ZJ |
| RZ-100KI | | | | | 180,00 | 50,00 | 82,80 | 1,80 | 66,55 | 8,12 | 2,411 | 34,950 | 2,04 | 0,166 | 278,51 | 195,71 | 15,7607 | ZK |
| RZ-100KX | | | | | 270,00 | 50,00 | 82,80 | 1,80 | 66,83 | 7,98 | 2,411 | 34,950 | 2,04 | 0,166 | 279,33 | 196,53 | 15,8262 | ZK |
| RZ-100LI | | 7,50 | 0,25 | 9,40 | 180,00 | 17,00 | 20,60 | 0,60 | 11,55 | 4,52 | 4,441 | 54,280 | 6,37 | 5,144 | 30,29 | 9,69 | 1,6997 | ZH |
| RZ-100LX | | | | | 270,00 | 17,00 | 20,60 | 0,60 | 11,83 | 4,38 | 4,441 | 54,280 | 6,29 | 5,010 | 30,54 | 9,94 | 1,7382 | ZH |
| RZ-100MI | | | | | 180,00 | 21,00 | 27,20 | 0,80 | 18,15 | 4,52 | 4,441 | 54,280 | 5,41 | 3,153 | 43,01 | 15,81 | 2,6062 | ZH |
| RZ-100MX | | | | | 270,00 | 22,00 | 27,20 | 0,80 | 18,42 | 4,38 | 4,441 | 54,280 | 5,39 | 3,104 | 43,26 | 16,06 | 2,6433 | ZH |
| RZ-100NI | | | | | 180,00 | 27,00 | 37,10 | 0,80 | 28,05 | 4,52 | 4,441 | 54,280 | 4,86 | 1,995 | 62,09 | 24,99 | 3,9660 | ZH |
| RZ-100NX | | | | | 270,00 | 27,00 | 37,10 | 0,80 | 28,33 | 4,38 | 4,441 | 54,280 | 4,85 | 1,974 | 62,34 | 25,24 | 4,0045 | ZH |
| RZ-100OI | | | | | 180,00 | 34,00 | 53,60 | 1,10 | 44,55 | 4,52 | 4,441 | 54,280 | 4,44 | 1,237 | 93,88 | 40,28 | 6,2323 | ZJ |
| RZ-100OX | | | | | 270,00 | 34,00 | 53,60 | 1,10 | 44,83 | 4,38 | 4,441 | 54,280 | 4,43 | 1,229 | 94,14 | 40,54 | 6,2707 | ZJ |
| RZ-100PI | | | | | 180,00 | 42,00 | 75,60 | 1,50 | 66,55 | 4,52 | 4,441 | 54,280 | 4,20 | 0,821 | 136,28 | 60,68 | 9,2540 | ZK |
| RZ-100PX | | | | | 270,00 | 42,00 | 75,60 | 1,50 | 66,83 | 4,38 | 4,441 | 54,280 | 4,20 | 0,818 | 136,54 | 60,94 | 9,2925 | ZK |
| RZ-100QI | | 5,50 | 0,30 | 7,50 | 180,00 | 16,00 | 17,40 | 0,60 | 11,55 | 2,92 | 7,101 | 71,060 | 13,42 | 15,831 | 21,44 | 4,04 | 1,1686 | ZH |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|--------|--------|
| RZ-100QX | 1,10 | 5,50 | 0,30 | 7,50 | 270,00 | 16,00 | 17,40 | 0,60 | 11,83 | 2,78 | 7,101 | 71,060 | 13,31 | 15,417 | 21,55 | 4,15 | 1,1950 | ZH | | | |
| RZ-100RI | | | | | 180,00 | 20,00 | 24,00 | 0,60 | 18,15 | 2,92 | 7,101 | 71,060 | 11,33 | 9,703 | 30,60 | 6,60 | 1,7918 | ZH | | | |
| RZ-100RX | | | | | 270,00 | 21,00 | 24,00 | 0,60 | 18,42 | 2,78 | 7,101 | 71,060 | 11,28 | 9,551 | 30,71 | 6,71 | 1,8173 | ZH | | | |
| RZ-100SI | | | | | 180,00 | 26,00 | 33,90 | 0,80 | 28,05 | 2,92 | 7,101 | 71,060 | 10,10 | 6,138 | 44,33 | 10,43 | 2,7266 | ZH | | | |
| RZ-100SX | | | | | 270,00 | 26,00 | 33,90 | 0,80 | 28,33 | 2,78 | 7,101 | 71,060 | 10,08 | 6,075 | 44,44 | 10,54 | 2,7531 | ZH | | | |
| RZ-100TI | | | | | 180,00 | 33,00 | 50,40 | 1,10 | 44,55 | 2,92 | 7,101 | 71,060 | 9,17 | 3,807 | 67,22 | 16,82 | 4,2847 | ZH | | | |
| RZ-100TX | | | | | 270,00 | 33,00 | 50,40 | 1,10 | 44,83 | 2,78 | 7,101 | 71,060 | 9,16 | 3,783 | 67,32 | 16,92 | 4,3111 | ZH | | | |
| RZ-100UI | | | | | 180,00 | 40,00 | 72,40 | 1,50 | 66,55 | 2,92 | 7,101 | 71,060 | 8,63 | 2,528 | 97,73 | 25,33 | 6,3621 | ZJ | | | |
| RZ-100UX | | | | | 270,00 | 40,00 | 72,40 | 1,50 | 66,83 | 2,78 | 7,101 | 71,060 | 8,62 | 2,517 | 97,84 | 25,44 | 6,3886 | ZJ | | | |
| RZ-101I | | | | | 1,25 | 17,20 | 0,35 | 19,50 | 180,00 | 26,00 | 39,80 | 0,90 | 15,63 | 12,08 | 2,211 | 35,500 | 3,04 | 0,458 | 112,53 | 72,73 | 6,4445 |
| RZ-101X | 270,00 | 26,00 | 39,80 | 0,90 | | | | | 15,94 | 11,93 | 2,211 | 35,500 | 3,01 | 0,448 | 114,11 | 74,31 | 6,5650 | ZH | | | |
| RZ-102I | 180,00 | 38,00 | 56,10 | 1,30 | | | | | 31,88 | 12,11 | 2,211 | 35,500 | 2,51 | 0,215 | 211,04 | 154,94 | 12,7654 | ZJ | | | |
| RZ-102X | 270,00 | 38,00 | 56,10 | 1,30 | | | | | 32,19 | 11,95 | 2,211 | 35,500 | 2,50 | 0,213 | 212,32 | 156,22 | 12,8860 | ZJ | | | |
| RZ-103I | 180,00 | 46,00 | 70,80 | 1,80 | | | | | 46,88 | 11,96 | 2,211 | 35,500 | 2,33 | 0,144 | 301,63 | 230,83 | 18,6001 | ZL | | | |
| RZ-103X | 270,00 | 46,00 | 70,80 | 1,80 | | | | | 47,19 | 11,80 | 2,211 | 35,500 | 2,33 | 0,143 | 303,21 | 232,41 | 18,7207 | ZL | | | |
| RZ-103AI | 180,00 | 55,00 | 91,90 | 1,80 | | | | | 66,88 | 12,51 | 2,211 | 35,500 | 2,21 | 0,100 | 423,92 | 332,02 | 26,3798 | ZM | | | |
| RZ-103AX | 270,00 | 55,00 | 91,90 | 1,80 | | | | | 67,19 | 12,35 | 2,211 | 35,500 | 2,21 | 0,100 | 425,50 | 333,60 | 26,5003 | ZM | | | |
| RZ-104I | 13,70 | 0,35 | 16,90 | 180,00 | | | | | 22,00 | 34,20 | 0,90 | 15,63 | 9,28 | 3,101 | 44,220 | 3,50 | 0,962 | 76,92 | 42,72 | 5,0303 | ZH |
| RZ-104X | | | | 270,00 | | | | | 22,00 | 34,20 | 0,90 | 15,94 | 9,13 | 3,101 | 44,220 | 3,48 | 0,942 | 77,85 | 43,65 | 5,1244 | ZH |
| RZ-105I | | | | 180,00 | 32,00 | 50,50 | 1,30 | 31,88 | 9,31 | 3,101 | 44,220 | 2,90 | 0,452 | 141,51 | 91,01 | 9,9642 | ZJ | | | | |
| RZ-105X | | | | 270,00 | 32,00 | 50,50 | 1,30 | 32,19 | 9,15 | 3,101 | 44,220 | 2,90 | 0,447 | 142,44 | 91,94 | 10,0583 | ZJ | | | | |
| RZ-106I | | | | 180,00 | 39,00 | 65,20 | 1,80 | 46,88 | 9,16 | 3,101 | 44,220 | 2,70 | 0,303 | 200,79 | 135,59 | 14,5186 | ZJ | | | | |
| RZ-106X | | | | 270,00 | 39,00 | 65,20 | 1,80 | 47,19 | 9,00 | 3,101 | 44,220 | 2,70 | 0,301 | 201,72 | 136,52 | 14,6127 | ZJ | | | | |
| RZ-106AI | | | | 180,00 | 45,00 | 80,00 | 1,80 | 61,88 | 9,06 | 3,101 | 44,220 | 2,59 | 0,228 | 260,17 | 180,17 | 19,0730 | ZK | | | | |
| RZ-106AX | | | | 270,00 | 45,00 | 80,00 | 1,80 | 62,19 | 8,90 | 3,101 | 44,220 | 2,58 | 0,227 | 261,10 | 181,10 | 19,1671 | ZK | | | | |
| RZ-106BI | | | | 180,00 | 48,00 | 88,70 | 1,80 | 70,63 | 9,03 | 3,101 | 44,220 | 2,55 | 0,199 | 294,87 | 206,17 | 21,7297 | ZL | | | | |
| RZ-106BX | | | | 270,00 | 48,00 | 88,70 | 1,80 | 70,94 | 8,88 | 3,101 | 44,220 | 2,55 | 0,199 | 295,80 | 207,10 | 21,8238 | ZL | | | | |
| RZ-106CI | 180,00 | 51,00 | 98,70 | 1,80 | 80,63 | 9,03 | 3,101 | 44,220 | 2,52 | 0,174 | 334,59 | 235,89 | 24,7659 | ZL | | | | | | | |
| RZ-106CX | 270,00 | 52,00 | 98,70 | 1,80 | 80,94 | 8,88 | 3,101 | 44,220 | 2,52 | 0,174 | 335,52 | 236,82 | 24,8601 | ZL | | | | | | | |
| RZ-106DI | 180,00 | 55,00 | 108,70 | 2,40 | 90,63 | 9,03 | 3,101 | 44,220 | 2,50 | 0,155 | 374,31 | 265,61 | 27,8022 | ZM | | | | | | | |
| RZ-106DX | 270,00 | 55,00 | 108,70 | 2,40 | 90,94 | 8,88 | 3,101 | 44,220 | 2,50 | 0,154 | 375,24 | 266,54 | 27,8963 | ZM | | | | | | | |
| RZ-106EI | 180,00 | 58,00 | 118,70 | 2,40 | 100,63 | 9,03 | 3,101 | 44,220 | 2,48 | 0,139 | 414,03 | 295,33 | 30,8384 | ZM | | | | | | | |
| RZ-106EX | 270,00 | 58,00 | 118,70 | 2,40 | 100,94 | 8,88 | 3,101 | 44,220 | 2,48 | 0,139 | 414,96 | 296,26 | 30,9326 | ZM | | | | | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|---------|--------|
| Z-100QX | 1,10 | 5,50 | 0,30 | 7,50 | 270,00 | 16,00 | 17,40 | 0,60 | 11,83 | 2,78 | 8,881 | 85,360 | 13,52 | 17,959 | 21,66 | 4,26 | 1,2190 | ZE | | | |
| Z-100RI | | | | | 180,00 | 20,00 | 24,00 | 0,60 | 18,15 | 2,92 | 8,881 | 85,360 | 11,54 | 11,297 | 30,77 | 6,77 | 1,8170 | ZE | | | |
| Z-100RX | | | | | 270,00 | 21,00 | 24,00 | 0,60 | 18,42 | 2,78 | 8,881 | 85,360 | 11,49 | 11,117 | 30,87 | 6,87 | 1,8430 | ZE | | | |
| Z-100SI | | | | | 180,00 | 26,00 | 33,90 | 0,80 | 28,05 | 2,92 | 8,881 | 85,360 | 10,32 | 7,147 | 44,60 | 10,70 | 2,7520 | ZE | | | |
| Z-100SX | | | | | 270,00 | 26,00 | 33,90 | 0,80 | 28,33 | 2,78 | 8,881 | 85,360 | 10,29 | 7,075 | 44,71 | 10,81 | 2,7780 | ZE | | | |
| Z-100TI | | | | | 180,00 | 33,00 | 50,40 | 1,10 | 44,55 | 2,92 | 8,881 | 85,360 | 9,38 | 4,433 | 67,65 | 17,25 | 4,3110 | ZE | | | |
| Z-100TX | | | | | 270,00 | 33,00 | 50,40 | 1,10 | 44,83 | 2,78 | 8,881 | 85,360 | 9,37 | 4,405 | 67,76 | 17,36 | 4,3370 | ZE | | | |
| Z-100UI | | | | | 180,00 | 40,00 | 72,40 | 1,50 | 66,55 | 2,92 | 8,881 | 85,360 | 8,84 | 2,943 | 98,38 | 25,98 | 6,3890 | ZF | | | |
| Z-100UX | | | | | 270,00 | 40,00 | 72,40 | 1,50 | 66,83 | 2,78 | 8,881 | 85,360 | 8,84 | 2,931 | 98,49 | 26,09 | 6,4150 | ZF | | | |
| Z-101I | | | | | 1,25 | 17,20 | 0,35 | 19,50 | 180,00 | 26,00 | 39,80 | 0,90 | 15,63 | 12,08 | 2,771 | 42,350 | 3,14 | 0,533 | 114,05 | 74,25 | 6,5200 |
| Z-101X | 270,00 | 26,00 | 39,80 | 0,90 | | | | | 15,94 | 11,93 | 2,771 | 42,350 | 3,12 | 0,522 | 115,62 | 75,82 | 6,6410 | ZE | | | |
| Z-102I | 180,00 | 38,00 | 56,10 | 1,30 | | | | | 31,88 | 12,11 | 2,771 | 42,350 | 2,61 | 0,250 | 214,28 | 158,18 | 12,8000 | ZF | | | |
| Z-102X | 270,00 | 38,00 | 56,10 | 1,30 | | | | | 32,19 | 11,95 | 2,771 | 42,350 | 2,61 | 0,248 | 215,69 | 159,59 | 12,9200 | ZF | | | |
| Z-103I | 180,00 | 46,00 | 70,80 | 1,80 | | | | | 46,88 | 11,96 | 2,771 | 42,350 | 2,44 | 0,168 | 306,38 | 235,58 | 18,5900 | ZH | | | |
| Z-103X | 270,00 | 46,00 | 70,80 | 1,80 | | | | | 47,19 | 11,80 | 2,771 | 42,350 | 2,43 | 0,167 | 308,07 | 237,27 | 18,7100 | ZH | | | |
| Z-103AI | 180,00 | 55,00 | 91,90 | 1,80 | | | | | 66,88 | 12,51 | 2,771 | 42,350 | 2,31 | 0,117 | 430,18 | 338,28 | 26,3200 | ZJ | | | |
| Z-103AX | 270,00 | 55,00 | 91,90 | 1,80 | | | | | 67,19 | 12,35 | 2,771 | 42,350 | 2,31 | 0,116 | 432,50 | 340,60 | 26,4400 | ZJ | | | |
| Z-104I | 13,70 | 0,35 | 16,90 | 180,00 | | | | | 22,00 | 34,20 | 0,90 | 15,63 | 9,28 | 3,881 | 52,740 | 3,63 | 1,121 | 77,80 | 43,60 | 5,0920 | ZE |
| Z-104X | | | | 270,00 | | | | | 22,00 | 34,20 | 0,90 | 15,94 | 9,13 | 3,881 | 52,740 | 3,60 | 1,097 | 78,73 | 44,53 | 5,1860 | ZE |
| Z-105I | | | | 180,00 | | | | | 32,00 | 50,50 | 1,30 | 31,88 | 9,31 | 3,881 | 52,740 | 3,03 | 0,526 | 143,38 | 92,88 | 9,9960 | ZF |
| Z-105X | | | | 270,00 | | | | | 32,00 | 50,50 | 1,30 | 32,19 | 9,15 | 3,881 | 52,740 | 3,02 | 0,521 | 144,33 | 93,83 | 10,0900 | ZF |
| Z-106I | | | | 180,00 | | | | | 39,00 | 65,20 | 1,80 | 46,88 | 9,16 | 3,881 | 52,740 | 2,83 | 0,353 | 203,50 | 138,30 | 14,5200 | ZF |
| Z-106X | | | | 270,00 | | | | | 39,00 | 65,20 | 1,80 | 47,19 | 9,00 | 3,881 | 52,740 | 2,83 | 0,351 | 204,52 | 139,32 | 14,6100 | ZF |
| Z-106AI | | | | 180,00 | | | | | 45,00 | 80,00 | 1,80 | 61,88 | 9,06 | 3,881 | 52,740 | 2,71 | 0,266 | 263,87 | 183,87 | 19,0500 | ZG |
| Z-106AX | | | | 270,00 | | 45,00 | 80,00 | 1,80 | 62,19 | 8,90 | 3,881 | 52,740 | 2,71 | 0,264 | 264,82 | 184,82 | 19,1700 | ZG | | | |
| Z-106BI | | | | 180,00 | | 48,00 | 88,70 | 1,80 | 70,63 | 9,03 | 3,881 | 52,740 | 2,68 | 0,232 | 299,11 | 210,41 | 21,6900 | ZH | | | |
| Z-106BX | | | | 270,00 | | 48,00 | 88,70 | 1,80 | 70,94 | 8,88 | 3,881 | 52,740 | 2,68 | 0,231 | 300,06 | 211,36 | 21,7800 | ZH | | | |
| Z-106CI | | | | 180,00 | | 51,00 | 98,70 | 1,80 | 80,63 | 9,03 | 3,881 | 52,740 | 2,65 | 0,203 | 339,44 | 240,74 | 24,7000 | ZH | | | |
| Z-106CX | | | | 270,00 | | 52,00 | 98,70 | 1,80 | 80,94 | 8,88 | 3,881 | 52,740 | 2,65 | 0,202 | 340,39 | 241,69 | 24,8000 | ZH | | | |
| Z-106DI | | | | 180,00 | | 55,00 | 108,70 | 2,40 | 90,63 | 9,03 | 3,881 | 52,740 | 2,63 | 0,180 | 379,77 | 271,07 | 27,7200 | ZJ | | | |
| Z-106DX | | | | 270,00 | | 55,00 | 108,70 | 2,40 | 90,94 | 8,88 | 3,881 | 52,740 | 2,63 | 0,180 | 380,71 | 272,01 | 27,8200 | ZJ | | | |
| Z-106EI | | | | 180,00 | | 58,00 | 118,70 | 2,40 | 100,63 | 9,03 | 3,881 | 52,740 | 2,61 | 0,162 | 420,10 | 301,40 | 30,7400 | ZJ | | | |
| Z-106EX | 270,00 | 58,00 | 118,70 | 2,40 | | 100,94 | 8,88 | 3,881 | 52,740 | 2,60 | 0,162 | 421,04 | 302,34 | 30,8400 | ZJ | | | | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----|
| Z-106E-10I | 1,25 | 12,70 | 0,35 | 15,00 | 180,00 | 18,00 | 32,70 | 0,90 | 15,63 | 8,54 | 4,661 | 56,710 | 3,24 | 1,441 | 68,83 | 36,13 | 4,6260 | ZF | | |
| Z-106E-10X | | | | | 270,00 | 18,00 | 32,70 | 0,90 | 15,94 | 8,38 | 4,661 | 56,710 | 3,24 | 1,410 | 69,61 | 36,91 | 4,7130 | ZF | | |
| Z-106E-11I | | | | | 180,00 | 27,00 | 50,20 | 1,30 | 33,13 | 8,54 | 4,661 | 56,710 | 3,05 | 0,650 | 130,31 | 80,11 | 9,5130 | ZF | | |
| Z-106E-11X | | | | | 270,00 | 27,00 | 50,20 | 1,30 | 33,44 | 8,38 | 4,661 | 56,710 | 3,05 | 0,643 | 131,09 | 80,89 | 9,5990 | ZF | | |
| Z-106FI | | | | | 180,00 | 40,00 | 71,30 | 1,80 | 54,38 | 8,46 | 4,661 | 56,710 | 2,98 | 0,390 | 204,80 | 133,50 | 15,4400 | ZF | | |
| Z-106FX | | | | | 270,00 | 40,00 | 71,30 | 1,80 | 54,69 | 8,30 | 4,661 | 56,710 | 2,98 | 0,388 | 205,59 | 134,29 | 15,5200 | ZF | | |
| Z-106GI | | | | | 180,00 | 49,00 | 96,30 | 1,80 | 79,38 | 8,46 | 4,661 | 56,710 | 2,86 | 0,265 | 292,63 | 196,33 | 22,3800 | ZJ | | |
| Z-106GX | | | | | 270,00 | 49,00 | 96,30 | 1,80 | 79,69 | 8,30 | 4,661 | 56,710 | 2,86 | 0,264 | 293,41 | 197,11 | 22,4700 | ZJ | | |
| Z-106HI | | | | | 180,00 | 56,00 | 121,00 | 2,40 | 104,38 | 8,31 | 4,661 | 56,710 | 2,80 | 0,201 | 380,15 | 259,15 | 29,3200 | ZK | | |
| Z-106HX | | | | | 270,00 | 56,00 | 121,00 | 2,40 | 104,69 | 8,15 | 4,661 | 56,710 | 2,80 | 0,200 | 380,93 | 259,93 | 29,4100 | ZK | | |
| Z-106JI | | | | | 180,00 | 62,00 | 146,00 | 2,40 | 129,38 | 8,31 | 4,661 | 56,710 | 2,76 | 0,162 | 467,97 | 321,97 | 36,2600 | ZL | | |
| Z-106JX | | | | | 270,00 | 63,00 | 146,00 | 2,40 | 129,69 | 8,15 | 4,661 | 56,710 | 2,76 | 0,161 | 468,76 | 322,76 | 36,3500 | ZL | | |
| Z-107I | 11,20 | 0,25 | 13,40 | 180,00 | 20,00 | 30,20 | 0,80 | 15,63 | 7,28 | 4,991 | 63,880 | 4,60 | 2,196 | 57,02 | 26,82 | 4,0720 | ZE | | | |
| Z-107X | | | | 270,00 | 20,00 | 30,20 | 0,80 | 15,94 | 7,13 | 4,991 | 63,880 | 4,57 | 2,149 | 57,60 | 27,40 | 4,1470 | ZE | | | |
| Z-108I | | | | 180,00 | 29,00 | 46,50 | 1,10 | 31,88 | 7,31 | 4,991 | 63,880 | 3,83 | 1,031 | 103,61 | 57,11 | 7,9940 | ZE | | | |
| Z-108X | | | | 270,00 | 29,00 | 46,50 | 1,10 | 32,19 | 7,15 | 4,991 | 63,880 | 3,82 | 1,020 | 104,23 | 57,73 | 8,0690 | ZE | | | |
| Z-109I | | | | 180,00 | 35,00 | 61,20 | 1,10 | 46,88 | 7,16 | 4,991 | 63,880 | 3,58 | 0,692 | 146,30 | 85,10 | 11,6100 | ZF | | | |
| Z-109X | | | | 270,00 | 35,00 | 61,20 | 1,10 | 47,19 | 7,00 | 4,991 | 63,880 | 3,57 | 0,687 | 146,92 | 85,72 | 11,6900 | ZF | | | |
| Z-109AI | | | | 180,00 | 39,00 | 74,00 | 1,50 | 59,38 | 7,31 | 4,991 | 63,880 | 3,45 | 0,543 | 182,46 | 108,46 | 14,6300 | ZF | | | |
| Z-109AX | | | | 270,00 | 39,00 | 74,00 | 1,50 | 59,69 | 7,15 | 4,991 | 63,880 | 3,44 | 0,540 | 183,05 | 109,05 | 14,7000 | ZF | | | |
| Z-109BI | | | | 180,00 | 42,00 | 82,70 | 1,50 | 68,13 | 7,28 | 4,991 | 63,880 | 3,39 | 0,478 | 207,40 | 124,70 | 16,7400 | ZG | | | |
| Z-109BX | | | | 270,00 | 42,00 | 82,70 | 1,50 | 68,44 | 7,13 | 4,991 | 63,880 | 3,39 | 0,470 | 207,99 | 125,29 | 16,8200 | ZG | | | |
| Z-109CI | | | | 180,00 | 45,00 | 92,70 | 1,50 | 78,13 | 7,28 | 4,991 | 63,880 | 3,35 | 0,411 | 235,98 | 143,28 | 19,1500 | ZH | | | |
| Z-109CX | | | | 270,00 | 45,00 | 92,70 | 1,50 | 78,44 | 7,13 | 4,991 | 63,880 | 3,35 | 0,409 | 236,68 | 143,98 | 19,2300 | ZH | | | |
| Z-109DI | | | | 180,00 | 48,00 | 102,00 | 2,00 | 86,88 | 7,56 | 4,991 | 63,880 | 3,33 | 0,369 | 261,78 | 159,78 | 21,2700 | ZJ | | | |
| Z-109DX | | | | 180,00 | 48,00 | 102,00 | 2,00 | 87,19 | 7,40 | 4,991 | 63,880 | 3,33 | 0,367 | 262,36 | 160,36 | 21,3400 | ZJ | | | |
| Z-109EI | | | | 180,00 | 50,00 | 112,00 | 2,00 | 96,88 | 7,56 | 4,991 | 63,880 | 3,30 | 0,330 | 290,44 | 178,44 | 23,6800 | ZJ | | | |
| Z-109EX | | | | 270,00 | 51,00 | 112,00 | 2,00 | 97,19 | 7,40 | 4,991 | 63,880 | 3,30 | 0,329 | 291,02 | 179,02 | 23,7500 | ZJ | | | |
| Z-109E-10I | | | | 10,00 | 0,25 | 12,20 | 180,00 | 19,00 | 32,00 | 0,80 | 19,38 | 6,31 | 5,661 | 71,040 | 4,45 | 2,560 | 57,53 | 25,53 | 4,3350 | ZF |
| Z-109E-10X | | | | | | | 270,00 | 19,00 | 32,00 | 0,80 | 19,69 | 6,16 | 5,661 | 71,040 | 4,45 | 2,517 | 57,97 | 25,97 | 4,4020 | ZF |
| Z-109FI | | | | | | | 180,00 | 29,00 | 47,00 | 1,10 | 34,38 | 6,31 | 5,661 | 71,040 | 4,28 | 1,401 | 93,67 | 46,67 | 7,5650 | ZF |
| Z-109FX | | | | | | | 270,00 | 29,00 | 47,00 | 1,10 | 34,69 | 6,16 | 5,661 | 71,040 | 4,28 | 1,388 | 94,11 | 47,11 | 7,6310 | ZF |
| Z-109GI | 180,00 | 34,00 | 59,50 | | | | 1,10 | 46,88 | 6,31 | 5,661 | 71,040 | 4,21 | 1,017 | 123,78 | 64,28 | 10,2200 | ZF | | | |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-106E-10I | 1,25 | 12,70 | 0,35 | 15,00 | 180,00 | 18,00 | 32,70 | 0,90 | 15,63 | 8,54 | 3,711 | 47,550 | 3,24 | 1,237 | 68,14 | 35,44 | 4,6263 | ZH | | |
| RZ-106E-10X | | | | | 270,00 | 18,00 | 32,70 | 0,90 | 15,94 | 8,38 | 3,711 | 47,550 | 3,24 | 1,211 | 68,90 | 36,20 | 4,7128 | ZH | | |
| RZ-106E-11I | | | | | 180,00 | 27,00 | 50,20 | 1,30 | 33,13 | 8,54 | 3,711 | 47,550 | 3,05 | 0,558 | 128,80 | 78,60 | 9,5129 | ZJ | | |
| RZ-106E-11X | | | | | 270,00 | 27,00 | 50,20 | 1,30 | 33,44 | 8,38 | 3,711 | 47,550 | 3,05 | 0,553 | 129,50 | 79,30 | 9,5995 | ZJ | | |
| RZ-106FI | | | | | 180,00 | 40,00 | 71,30 | 1,80 | 54,38 | 8,46 | 3,711 | 47,550 | 2,85 | 0,335 | 202,22 | 130,92 | 15,4467 | ZJ | | |
| RZ-106FX | | | | | 270,00 | 40,00 | 71,30 | 1,80 | 54,69 | 8,30 | 3,711 | 47,550 | 2,84 | 0,333 | 202,99 | 131,69 | 15,5333 | ZJ | | |
| RZ-106GI | | | | | 180,00 | 49,00 | 96,30 | 1,80 | 79,38 | 8,46 | 3,711 | 47,550 | 2,72 | 0,228 | 288,82 | 192,52 | 22,4277 | ZM | | |
| RZ-106GX | | | | | 270,00 | 49,00 | 96,30 | 1,80 | 79,69 | 8,30 | 3,711 | 47,550 | 2,72 | 0,227 | 289,59 | 193,29 | 22,5142 | ZM | | |
| RZ-106HI | | | | | 180,00 | 56,00 | 121,00 | 2,40 | 104,38 | 8,31 | 3,711 | 47,550 | 2,66 | 0,172 | 375,13 | 254,13 | 29,4086 | ZN | | |
| RZ-106HX | | | | | 270,00 | 56,00 | 121,00 | 2,40 | 104,69 | 8,15 | 3,711 | 47,550 | 2,66 | 0,172 | 375,90 | 254,90 | 29,4952 | ZN | | |
| RZ-106JI | | | | | 180,00 | 62,00 | 146,00 | 2,40 | 129,38 | 8,31 | 3,711 | 47,550 | 2,62 | 0,139 | 461,74 | 315,74 | 36,3895 | ZO | | |
| RZ-106JX | | | | | 270,00 | 63,00 | 146,00 | 2,40 | 129,69 | 8,15 | 3,711 | 47,550 | 2,62 | 0,138 | 462,50 | 316,50 | 36,4761 | ZO | | |
| RZ-107I | 11,20 | 0,25 | 13,40 | 180,00 | 20,00 | 30,20 | 0,80 | 15,63 | 7,28 | 3,991 | 53,560 | 4,44 | 1,885 | 56,49 | 26,29 | 4,0202 | ZH | | | |
| RZ-107X | | | | 270,00 | 20,00 | 30,20 | 0,80 | 15,94 | 7,13 | 3,991 | 53,560 | 4,41 | 1,845 | 57,06 | 26,86 | 4,0954 | ZH | | | |
| RZ-108I | | | | 180,00 | 29,00 | 46,50 | 1,10 | 31,88 | 7,31 | 3,991 | 53,560 | 3,68 | 0,885 | 102,51 | 56,01 | 7,9634 | ZH | | | |
| RZ-108X | | | | 270,00 | 29,00 | 46,50 | 1,10 | 32,19 | 7,15 | 3,991 | 53,560 | 3,67 | 0,876 | 103,08 | 56,58 | 8,0386 | ZH | | | |
| RZ-109I | | | | 180,00 | 35,00 | 61,20 | 1,10 | 46,88 | 7,16 | 3,991 | 53,560 | 3,42 | 0,594 | 144,64 | 83,44 | 11,6032 | ZJ | | | |
| RZ-109X | | | | 270,00 | 35,00 | 61,20 | 1,10 | 47,19 | 7,00 | 3,991 | 53,560 | 3,42 | 0,590 | 145,21 | 84,01 | 11,6784 | ZJ | | | |
| RZ-109AI | | | | 180,00 | 39,00 | 74,00 | 1,50 | 59,38 | 7,31 | 3,991 | 53,560 | 3,29 | 0,466 | 180,30 | 106,30 | 14,6364 | ZJ | | | |
| RZ-109AX | | | | 270,00 | 39,00 | 74,00 | 1,50 | 59,69 | 7,15 | 3,991 | 53,560 | 3,29 | 0,464 | 180,87 | 106,87 | 14,7116 | ZJ | | | |
| RZ-109BI | | | | 180,00 | 42,00 | 82,70 | 1,50 | 68,13 | 7,28 | 3,991 | 53,560 | 3,24 | 0,405 | 205,00 | 122,30 | 16,7597 | ZK | | | |
| RZ-109BX | | | | 270,00 | 42,00 | 82,70 | 1,50 | 68,44 | 7,13 | 3,991 | 53,560 | 3,24 | 0,403 | 205,70 | 123,00 | 16,8349 | ZK | | | |
| RZ-109CI | | | | 180,00 | 45,00 | 92,70 | 1,50 | 78,13 | 7,28 | 3,991 | 53,560 | 3,20 | 0,353 | 233,29 | 140,59 | 19,1862 | ZL | | | |
| RZ-109CX | | | | 270,00 | 45,00 | 92,70 | 1,50 | 78,44 | 7,13 | 3,991 | 53,560 | 3,20 | 0,351 | 233,86 | 141,16 | 19,2614 | ZL | | | |
| RZ-109DI | | | | 180,00 | 48,00 | 102,00 | 2,00 | 86,88 | 7,56 | 3,991 | 53,560 | 3,17 | 0,317 | 258,59 | 156,59 | 21,3095 | ZM | | | |
| RZ-109DX | | | | 180,00 | 48,00 | 102,00 | 2,00 | 87,19 | 7,40 | 3,991 | 53,560 | 3,17 | 0,315 | 259,17 | 157,17 | 21,3847 | ZM | | | |
| RZ-109EI | | | | 180,00 | 50,00 | 112,00 | 2,00 | 96,88 | 7,56 | 3,991 | 53,560 | 3,14 | 0,283 | 286,88 | 174,88 | 23,7360 | ZM | | | |
| RZ-109EX | | | | 270,00 | 51,00 | 112,00 | 2,00 | 97,19 | 7,40 | 3,991 | 53,560 | 3,14 | 0,283 | 287,45 | 175,45 | 23,8112 | ZM | | | |
| RZ-109E-10I | | | | 10,00 | 0,25 | 12,20 | 180,00 | 19,00 | 32,00 | 0,80 | 19,38 | 6,31 | 4,521 | 59,560 | 4,45 | 2,199 | 57,00 | 25,00 | 4,3356 | ZJ |
| RZ-109E-10X | | | | | | | 270,00 | 19,00 | 32,00 | 0,80 | 19,69 | 6,16 | 4,521 | 59,560 | 4,45 | 2,162 | 57,50 | 25,50 | 4,4017 | ZJ |
| RZ-109FI | | | | | | | 180,00 | 29,00 | 47,00 | 1,10 | 34,38 | 6,31 | 4,521 | 59,560 | 4,35 | 1,203 | 92,74 | 45,74 | 7,5364 | ZJ |
| RZ-109FX | | | | | | | 270,00 | 29,00 | 47,00 | 1,10 | 34,69 | 6,16 | 4,521 | 59,560 | 4,34 | 1,192 | 93,18 | 46,18 | 7,6026 | ZJ |
| RZ-109GI | 180,00 | 34,00 | 59,50 | | | | 1,10 | 46,88 | 6,31 | 4,521 | 59,560 | 4,11 | 0,874 | 122,51 | 63,01 | 10,2038 | ZJ | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| RZ-109GX | 1,25 | 10,00 | 0,25 | 12,20 | 270,00 | 34,00 | 59,50 | 1,10 | 47,19 | 6,15 | 4,521 | 59,560 | 4,10 | 0,868 | 122,94 | 63,44 | 10,2700 | ZJ |
| RZ-109HI | | | | | 180,00 | 38,00 | 72,00 | 1,50 | 59,38 | 6,31 | 4,521 | 59,560 | 3,95 | 0,686 | 152,27 | 80,27 | 12,8712 | ZK |
| RZ-109HX | | | | | 270,00 | 38,00 | 72,00 | 1,50 | 59,69 | 6,15 | 4,521 | 59,560 | 3,95 | 0,682 | 152,70 | 80,70 | 12,9374 | ZK |
| RZ-109JI | | | | | 180,00 | 46,00 | 97,00 | 1,50 | 84,38 | 6,31 | 4,521 | 59,560 | 3,81 | 0,479 | 211,79 | 114,79 | 18,2060 | ZM |
| RZ-109JX | | | | | 270,00 | 46,00 | 97,00 | 1,50 | 84,69 | 6,15 | 4,521 | 59,560 | 3,81 | 0,478 | 212,22 | 115,22 | 18,2721 | ZM |
| RZ-110I | 9,20 | 0,25 | 11,40 | 180,00 | 19,00 | 27,00 | 0,80 | 15,63 | 5,68 | 5,411 | 64,340 | 6,30 | 3,696 | 42,94 | 15,94 | 3,2121 | ZG | |
| RZ-110X | | | | 270,00 | 19,00 | 27,00 | 0,80 | 15,94 | 5,53 | 5,411 | 64,340 | 6,26 | 3,618 | 43,29 | 16,29 | 3,2722 | ZG | |
| RZ-111I | | | | 180,00 | 27,00 | 43,30 | 1,10 | 31,88 | 5,71 | 5,411 | 64,340 | 5,18 | 1,735 | 77,26 | 33,96 | 6,3627 | ZH | |
| RZ-111X | | | | 270,00 | 28,00 | 43,30 | 1,10 | 32,19 | 5,55 | 5,411 | 64,340 | 5,17 | 1,718 | 77,61 | 34,31 | 6,4228 | ZH | |
| RZ-112I | | | | 180,00 | 33,00 | 58,50 | 1,10 | 46,88 | 5,81 | 5,411 | 64,340 | 4,80 | 1,165 | 109,09 | 50,59 | 9,2709 | ZJ | |
| RZ-112X | | | | 270,00 | 34,00 | 58,50 | 1,10 | 47,19 | 5,65 | 5,411 | 64,340 | 4,80 | 1,157 | 109,44 | 50,94 | 9,3310 | ZJ | |
| RZ-112AI | | | | 180,00 | 38,00 | 70,80 | 1,50 | 59,38 | 5,71 | 5,411 | 64,340 | 4,61 | 0,914 | 135,25 | 64,45 | 11,6944 | ZJ | |
| RZ-112AX | | | | 270,00 | 38,00 | 70,80 | 1,50 | 59,69 | 5,55 | 5,411 | 64,340 | 4,61 | 0,909 | 135,60 | 64,80 | 11,7545 | ZJ | |
| RZ-112BI | | | | 180,00 | 40,00 | 79,50 | 1,50 | 68,13 | 5,68 | 5,411 | 64,340 | 4,53 | 0,795 | 153,66 | 74,16 | 13,3909 | ZJ | |
| RZ-112BX | | | | 270,00 | 41,00 | 79,50 | 1,50 | 68,44 | 5,53 | 5,411 | 64,340 | 4,53 | 0,791 | 154,00 | 74,50 | 13,4510 | ZJ | |
| RZ-112CI | | | | 180,00 | 43,00 | 89,50 | 1,50 | 78,13 | 5,68 | 5,411 | 64,340 | 4,48 | 0,691 | 174,74 | 85,24 | 15,3297 | ZJ | |
| RZ-112CX | | | | 270,00 | 43,00 | 89,50 | 1,50 | 78,88 | 5,53 | 5,411 | 64,340 | 4,47 | 0,685 | 175,09 | 85,59 | 15,4751 | ZJ | |
| RZ-112DI | | | | 180,00 | 46,00 | 99,50 | 1,50 | 88,13 | 5,68 | 5,411 | 64,340 | 4,43 | 0,612 | 195,83 | 96,33 | 17,2685 | ZK | |
| RZ-112DX | | | | 270,00 | 46,00 | 99,50 | 1,50 | 88,44 | 5,63 | 5,411 | 64,340 | 4,43 | 0,610 | 196,18 | 96,68 | 17,3286 | ZK | |
| RZ-112EI | | | | 180,00 | 49,00 | 109,00 | 2,00 | 98,13 | 5,43 | 5,411 | 64,340 | 4,39 | 0,549 | 216,42 | 107,42 | 19,2073 | ZK | |
| RZ-112EX | 270,00 | 49,00 | 109,00 | 2,00 | 98,44 | 5,28 | 5,411 | 64,340 | 4,39 | 0,547 | 216,77 | 107,77 | 19,2674 | ZK | | | | |
| RZ-113I | 7,50 | 0,20 | 9,60 | 180,00 | 18,00 | 24,30 | 0,60 | 15,63 | 4,33 | 6,661 | 77,330 | 9,92 | 7,606 | 33,59 | 9,29 | 2,5253 | ZG | |
| RZ-113X | | | | 270,00 | 18,00 | 24,30 | 0,60 | 15,94 | 4,18 | 6,661 | 77,330 | 9,85 | 7,446 | 33,79 | 9,49 | 2,5725 | ZG | |
| RZ-114I | | | | 180,00 | 26,00 | 40,50 | 1,10 | 31,88 | 4,31 | 6,661 | 77,330 | 8,07 | 3,571 | 60,29 | 19,79 | 5,0021 | ZH | |
| RZ-114X | | | | 270,00 | 27,00 | 40,50 | 1,10 | 32,19 | 4,15 | 6,661 | 77,330 | 8,06 | 3,535 | 60,50 | 20,00 | 5,0494 | ZH | |
| RZ-115I | | | | 180,00 | 32,00 | 55,30 | 1,10 | 46,88 | 4,21 | 6,661 | 77,330 | 7,46 | 2,397 | 84,79 | 29,49 | 7,2885 | ZH | |
| RZ-115X | | | | 270,00 | 32,00 | 55,30 | 1,10 | 47,00 | 4,05 | 6,661 | 77,330 | 7,45 | 2,391 | 84,99 | 29,69 | 7,3067 | ZH | |
| RZ-115AI | | | | 180,00 | 36,00 | 68,10 | 1,50 | 59,38 | 4,36 | 6,661 | 77,330 | 7,15 | 1,882 | 105,67 | 37,57 | 9,1937 | ZH | |
| RZ-115AX | | | | 270,00 | 37,00 | 68,10 | 1,50 | 59,69 | 4,20 | 6,661 | 77,330 | 7,14 | 1,872 | 105,87 | 37,77 | 9,2410 | ZH | |
| RZ-115BI | | | | 180,00 | 39,00 | 76,80 | 1,50 | 68,13 | 4,33 | 6,661 | 77,330 | 7,01 | 1,635 | 120,02 | 43,22 | 10,5274 | ZJ | |
| RZ-115BX | | | | 270,00 | 39,00 | 76,80 | 1,50 | 68,44 | 4,18 | 6,661 | 77,330 | 7,01 | 1,628 | 120,22 | 43,42 | 10,5747 | ZJ | |
| RZ-115CI | | | | 180,00 | 42,00 | 86,80 | 1,50 | 78,13 | 4,33 | 6,661 | 77,330 | 6,93 | 1,423 | 136,49 | 49,69 | 12,0516 | ZJ | |
| RZ-115CX | | | | 270,00 | 42,00 | 86,80 | 1,50 | 78,44 | 4,18 | 6,661 | 77,330 | 6,92 | 1,417 | 136,69 | 49,89 | 12,0989 | ZJ | |

Extension springs

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-109GX | 1,25 | 10,00 | 0,25 | 12,20 | 270,00 | 34,00 | 59,50 | 1,10 | 47,19 | 6,15 | 5,661 | 71,040 | 4,21 | 1,010 | 124,22 | 64,72 | 10,2800 | ZF |
| Z-109HI | | | | | 180,00 | 38,00 | 72,00 | 1,50 | 59,38 | 6,31 | 5,661 | 71,040 | 4,12 | 0,798 | 153,89 | 81,89 | 12,8700 | ZG |
| Z-109HX | | | | | 270,00 | 38,00 | 72,00 | 1,50 | 59,69 | 6,15 | 5,661 | 71,040 | 4,12 | 0,794 | 154,33 | 82,33 | 12,9400 | ZG |
| Z-109JI | | | | | 180,00 | 46,00 | 97,00 | 1,50 | 84,38 | 6,31 | 5,661 | 71,040 | 3,98 | 0,558 | 214,11 | 117,11 | 18,1800 | ZJ |
| Z-109JX | | | | | 270,00 | 46,00 | 97,00 | 1,50 | 84,69 | 6,15 | 5,661 | 71,040 | 3,98 | 0,556 | 214,55 | 117,55 | 18,2500 | ZJ |
| Z-110I | 9,20 | 0,25 | 11,40 | 180,00 | 19,00 | 27,00 | 0,80 | 15,63 | 5,68 | 6,771 | 76,720 | 6,49 | 4,304 | 43,25 | 16,25 | 3,2570 | ZD | |
| Z-110X | | | | 270,00 | 19,00 | 27,00 | 0,80 | 15,94 | 5,53 | 6,771 | 76,720 | 6,44 | 4,213 | 43,61 | 16,61 | 3,3160 | ZD | |
| Z-111I | | | | 180,00 | 27,00 | 43,30 | 1,10 | 31,88 | 5,71 | 6,771 | 76,720 | 5,36 | 2,020 | 77,93 | 34,63 | 6,3600 | ZE | |
| Z-111X | | | | 270,00 | 28,00 | 43,30 | 1,10 | 32,19 | 5,55 | 6,771 | 76,720 | 5,35 | 2,000 | 78,27 | 34,97 | 6,4540 | ZE | |
| Z-112I | | | | 180,00 | 33,00 | 58,50 | 1,10 | 46,88 | 5,81 | 6,771 | 76,720 | 4,99 | 1,356 | 110,08 | 51,58 | 9,2900 | ZF | |
| Z-112X | | | | 270,00 | 34,00 | 58,50 | 1,10 | 47,19 | 5,65 | 6,771 | 76,720 | 4,98 | 1,347 | 110,44 | 51,94 | 9,3500 | ZF | |
| Z-112AI | | | | 180,00 | 38,00 | 70,80 | 1,50 | 59,38 | 5,71 | 6,771 | 76,720 | 4,80 | 1,065 | 136,40 | 65,60 | 11,7000 | ZF | |
| Z-112AX | | | | 270,00 | 38,00 | 70,80 | 1,50 | 59,69 | 5,55 | 6,771 | 76,720 | 4,79 | 1,059 | 136,85 | 66,05 | 11,7600 | ZF | |
| Z-112BI | | | | 180,00 | 40,00 | 79,50 | 1,50 | 68,13 | 5,68 | 6,771 | 76,720 | 4,72 | 0,925 | 155,12 | 75,62 | 13,3900 | ZF | |
| Z-112BX | | | | 270,00 | 41,00 | 79,50 | 1,50 | 68,44 | 5,53 | 6,771 | 76,720 | 4,71 | 0,921 | 155,44 | 75,94 | 13,4500 | ZF | |
| Z-112CI | | | | 180,00 | 43,00 | 89,50 | 1,50 | 78,13 | 5,68 | 6,771 | 76,720 | 4,66 | 0,805 | 176,39 | 86,89 | 15,3200 | ZF | |
| Z-112CX | | | | 270,00 | 43,00 | 89,50 | 1,50 | 78,88 | 5,53 | 6,771 | 76,720 | 4,66 | 0,802 | 177,26 | 87,76 | 15,3800 | ZF | |
| Z-112DI | | | | 180,00 | 46,00 | 99,50 | 1,50 | 88,13 | 5,68 | 6,771 | 76,720 | 4,62 | 0,712 | 197,74 | 98,24 | 17,2500 | ZG | |
| Z-112DX | | | | 270,00 | 46,00 | 99,50 | 1,50 | 88,44 | 5,63 | 6,771 | 76,720 | 4,61 | 0,710 | 198,02 | 98,52 | 17,3100 | ZG | |
| Z-112EI | | | | 180,00 | 49,00 | 109,00 | 2,00 | 98,13 | 5,43 | 6,771 | 76,720 | 4,57 | 0,639 | 218,46 | 109,46 | 19,1800 | ZG | |
| Z-112EX | 270,00 | 49,00 | 109,00 | 2,00 | 98,44 | 5,28 | 6,771 | 76,720 | 4,57 | 0,637 | 218,81 | 109,81 | 19,2400 | ZG | | | | |
| Z-113I | 7,50 | 0,20 | 9,60 | 180,00 | 18,00 | 24,30 | 0,60 | 15,63 | 4,33 | 8,331 | 92,220 | 10,14 | 8,859 | 33,77 | 9,47 | 2,5640 | ZD | |
| Z-113X | | | | 270,00 | 18,00 | 24,30 | 0,60 | 15,94 | 4,18 | 8,331 | 92,220 | 10,07 | 8,670 | 33,98 | 9,68 | 2,6110 | ZD | |
| Z-114I | | | | 180,00 | 26,00 | 40,50 | 1,10 | 31,88 | 4,31 | 8,331 | 92,220 | 8,30 | 4,158 | 60,68 | 20,18 | 5,0350 | ZE | |
| Z-114X | | | | 270,00 | 27,00 | 40,50 | 1,10 | 32,19 | 4,15 | 8,331 | 92,220 | 8,28 | 4,116 | 60,88 | 20,38 | 5,0830 | ZE | |
| Z-115I | | | | 180,00 | 32,00 | 55,30 | 1,10 | 46,88 | 4,21 | 8,331 | 92,220 | 7,68 | 2,791 | 85,35 | 30,05 | 7,3160 | ZE | |
| Z-115X | | | | 270,00 | 32,00 | 55,30 | 1,10 | 47,00 | 4,05 | 8,331 | 92,220 | 7,67 | 2,772 | 85,56 | 30,26 | 7,3640 | ZE | |
| Z-115AI | | | | 180,00 | 36,00 | 68,10 | 1,50 | 59,38 | 4,36 | 8,331 | 92,220 | 7,37 | 2,191 | 106,38 | 38,28 | 9,2180 | ZE | |
| Z-115AX | | | | 270,00 | 37,00 | 68,10 | 1,50 | 59,69 | 4,20 | 8,331 | 92,220 | 7,37 | 2,179 | 106,59 | 38,49 | 9,2650 | ZE | |
| Z-115BI | | | | 180,00 | 39,00 | 76,80 | 1,50 | 68,13 | 4,33 | 8,331 | 92,220 | 7,24 | 1,904 | 120,85 | 44,05 | 10,5400 | ZF | |
| Z-115BX | | | | 270,00 | 39,00 | 76,80 | 1,50 | 68,44 | 4,18 | 8,331 | 92,220 | 7,23 | 1,895 | 121,06 | 44,26 | 10,5900 | ZF | |
| Z-115CI | | | | 180,00 | 42,00 | 86,80 | 1,50 | 78,13 | 4,33 | 8,331 | 92,220 | 7,15 | 1,657 | 137,42 | 50,62 | 12,0600 | ZF | |
| Z-115CX | | | | 270,00 | 42,00 | 86,80 | 1,50 | 78,44 | 4,18 | 8,331 | 92,220 | 7,15 | 1,650 | 137,64 | 50,84 | 12,1100 | ZF | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|---------|---------|----|
| Z-115DI | 1,25 | 7,50 | 0,20 | 9,60 | 180,00 | 45,00 | 96,80 | 1,50 | 88,13 | 4,33 | 8,331 | 92,220 | 7,07 | 1,466 | 154,02 | 57,22 | 13,5800 | ZF | | | | |
| Z-115DX | | | | | 270,00 | 45,00 | 96,80 | 1,50 | 88,44 | 4,18 | 8,331 | 92,220 | 7,07 | 1,461 | 154,21 | 57,41 | 13,6300 | ZF | | | | |
| Z-115EI | | | | | 180,00 | 47,00 | 106,00 | 2,00 | 98,13 | 3,93 | 8,331 | 92,220 | 7,00 | 1,315 | 169,79 | 63,79 | 15,1100 | ZG | | | | |
| Z-115EX | | | | | 270,00 | 47,00 | 106,00 | 2,00 | 98,44 | 3,78 | 8,331 | 92,220 | 7,00 | 1,310 | 170,03 | 64,03 | 15,1500 | ZG | | | | |
| Z-115E-01I | 5,50 | 0,20 | 7,60 | 180,00 | 18,00 | 17,30 | 0,60 | 11,88 | 2,71 | 11,330 | 119,400 | 18,30 | 38,117 | 20,14 | 2,84 | 1,3620 | ZD | | | | | |
| Z-115E-01X | | | | 270,00 | 18,00 | 17,30 | 0,60 | 12,19 | 2,55 | 11,330 | 119,400 | 18,30 | 37,028 | 20,22 | 2,92 | 1,3940 | ZD | | | | | |
| Z-115E-02I | | | | 180,00 | 20,00 | 24,80 | 0,60 | 19,38 | 2,71 | 11,330 | 119,400 | 17,10 | 22,345 | 29,64 | 4,84 | 2,1420 | ZD | | | | | |
| Z-115E-02X | | | | 270,00 | 20,00 | 24,80 | 0,60 | 19,69 | 2,55 | 11,330 | 119,400 | 17,10 | 21,966 | 29,72 | 4,92 | 2,1750 | ZD | | | | | |
| Z-115E-03I | | | | 180,00 | 26,00 | 34,80 | 0,80 | 29,38 | 2,71 | 11,330 | 119,400 | 16,40 | 14,400 | 42,31 | 7,51 | 3,1820 | ZE | | | | | |
| Z-115E-03X | | | | 270,00 | 26,00 | 34,80 | 0,80 | 29,69 | 2,55 | 11,330 | 119,400 | 16,40 | 14,242 | 42,39 | 7,59 | 3,2140 | ZE | | | | | |
| Z-115E-04I | | | | 180,00 | 32,00 | 58,80 | 1,10 | 53,13 | 2,84 | 11,330 | 119,400 | 15,90 | 7,807 | 71,98 | 13,84 | 5,6030 | ZF | | | | | |
| Z-115E-04X | | | | 270,00 | 32,00 | 58,80 | 1,10 | 53,44 | 2,70 | 11,330 | 119,400 | 15,90 | 7,760 | 72,06 | 13,93 | 5,6360 | ZF | | | | | |
| Z-115E-10I | | | | 1,30 | 11,30 | 0,25 | 13,50 | 180,00 | 25,00 | 42,10 | 1,10 | 26,65 | 7,73 | 5,771 | 70,590 | 4,06 | 1,492 | 85,54 | 43,44 | 7,0060 | ZF | |
| Z-115E-10X | | | | | | | | 270,00 | 25,00 | 42,10 | 1,10 | 26,98 | 7,56 | 5,771 | 70,590 | 4,06 | 1,473 | 86,10 | 44,00 | 7,0900 | ZF | |
| Z-115E-11I | | | | | | | | 180,00 | 32,00 | 59,00 | 1,10 | 43,55 | 7,73 | 5,771 | 70,590 | 3,95 | 0,895 | 131,40 | 72,40 | 11,2900 | ZF | |
| Z-115E-11X | | | | | | | | 270,00 | 32,00 | 59,00 | 1,10 | 43,88 | 7,56 | 5,771 | 70,590 | 9,95 | 0,888 | 131,96 | 72,96 | 11,3760 | ZF | |
| Z-115E-12I | 180,00 | 38,00 | 75,50 | | | | | 1,50 | 60,45 | 7,53 | 5,771 | 70,590 | 3,90 | 0,639 | 176,86 | 101,36 | 15,5790 | ZG | | | | |
| Z-115E-12X | 270,00 | 38,00 | 75,50 | | | | | 1,50 | 60,78 | 7,36 | 5,771 | 70,590 | 3,90 | 0,636 | 177,42 | 101,92 | 15,6630 | ZG | | | | |
| Z-115FI | 180,00 | 54,00 | 134,00 | | | | | 2,00 | 118,95 | 7,52 | 5,771 | 70,590 | 3,64 | 0,322 | 335,60 | 201,60 | 30,4170 | ZG | | | | |
| Z-115FX | 270,00 | 55,00 | 134,00 | | | | | 2,00 | 119,28 | 7,36 | 5,771 | 70,590 | 3,64 | 0,321 | 336,16 | 202,16 | 30,5000 | ZG | | | | |
| Z-115F-10I | 1,40 | 20,00 | 0,35 | | | | | 23,00 | 180,00 | 22,00 | 44,00 | 1,30 | 14,70 | 14,65 | 2,300 | 49,500 | 3,10 | 0,640 | 117,73 | 73,73 | 8,0010 | ZE |
| Z-115F-10X | | | | | | | | | 270,00 | 22,00 | 44,00 | 1,30 | 15,05 | 14,48 | 2,300 | 49,500 | 3,10 | 0,624 | 119,67 | 75,67 | 8,1750 | ZE |
| Z-115F-11I | | | | | | | | | 180,00 | 30,00 | 53,00 | 1,30 | 23,10 | 14,95 | 2,300 | 49,500 | 3,00 | 0,392 | 173,29 | 120,29 | 12,2690 | ZE |
| Z-115F-11X | | | | | | | | | 270,00 | 30,00 | 53,00 | 1,30 | 23,45 | 14,78 | 2,300 | 49,500 | 3,00 | 0,386 | 175,23 | 122,23 | 12,4470 | ZE |
| Z-115F-12I | | | | 180,00 | 37,00 | 65,30 | 1,80 | | 35,70 | 14,80 | 2,300 | 49,500 | 2,90 | 0,248 | 255,44 | 190,14 | 18,6700 | ZE | | | | |
| Z-115F-12X | | | | 270,00 | 37,00 | 65,30 | 1,80 | | 36,05 | 14,63 | 2,300 | 49,500 | 2,90 | 0,246 | 257,38 | 192,08 | 18,8480 | ZE | | | | |
| Z-115F-13I | | | | 180,00 | 48,00 | 86,30 | 1,80 | | 56,70 | 14,80 | 2,300 | 49,500 | 2,80 | 0,154 | 392,85 | 306,55 | 29,3390 | ZE | | | | |
| Z-115F-13X | | | | 270,00 | 48,00 | 86,30 | 1,80 | | 57,05 | 14,63 | 2,300 | 49,500 | 2,80 | 0,153 | 394,79 | 308,49 | 29,5170 | ZE | | | | |
| Z-115F-14I | | | | 180,00 | 52,00 | 114,50 | 2,40 | | 84,70 | 14,90 | 2,300 | 49,500 | 2,80 | 0,102 | 576,26 | 461,76 | 43,5640 | ZE | | | | |
| Z-115F-14X | | | | 270,00 | 52,00 | 114,50 | 2,40 | | 85,05 | 14,73 | 2,300 | 49,500 | 2,80 | 0,102 | 578,20 | 463,70 | 43,7420 | ZE | | | | |
| Z-115GI | | | | 15,00 | 0,35 | 17,50 | 180,00 | | 20,00 | 34,90 | 0,90 | 14,70 | 10,10 | 5,441 | 66,080 | 4,80 | 1,638 | 71,93 | 37,03 | 5,9440 | ZE | |
| Z-115GX | | | | | | | 270,00 | | 20,00 | 34,90 | 0,90 | 15,05 | 9,92 | 5,441 | 66,080 | 4,75 | 1,596 | 72,90 | 38,00 | 6,0730 | ZE | |
| Z-115HI | 180,00 | 25,00 | 43,30 | | | | 1,30 | 23,10 | 10,10 | 5,441 | 66,080 | 4,14 | 1,004 | 103,71 | 60,41 | 9,0460 | ZF | | | | | |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|---------|---------|----|
| RZ-115DI | 1,25 | 7,50 | 0,20 | 9,60 | 180,00 | 45,00 | 96,80 | 1,50 | 88,13 | 4,33 | 6,661 | 77,330 | 6,85 | 1,259 | 152,95 | 56,15 | 13,5759 | ZJ | | | | |
| RZ-115DX | | | | | 270,00 | 45,00 | 96,80 | 1,50 | 88,44 | 4,18 | 6,661 | 77,330 | 6,85 | 1,254 | 153,15 | 56,35 | 13,6231 | ZJ | | | | |
| RZ-115EI | | | | | 180,00 | 47,00 | 106,00 | 2,00 | 98,13 | 3,93 | 6,661 | 77,330 | 6,78 | 1,129 | 168,61 | 62,61 | 15,1001 | ZK | | | | |
| RZ-115EX | | | | | 270,00 | 47,00 | 106,00 | 2,00 | 98,44 | 3,78 | 6,661 | 77,330 | 6,78 | 1,125 | 168,81 | 62,81 | 15,1473 | ZK | | | | |
| RZ-115E-01I | 5,50 | 0,20 | 7,60 | 180,00 | 18,00 | 17,30 | 0,60 | 11,88 | 2,71 | 9,001 | 100,000 | 11,95 | 32,723 | 20,08 | 2,78 | 1,3285 | ZG | | | | | |
| RZ-115E-01X | | | | 270,00 | 18,00 | 17,30 | 0,60 | 12,19 | 2,55 | 9,001 | 100,000 | 11,95 | 31,796 | 20,17 | 2,87 | 1,3606 | ZG | | | | | |
| RZ-115E-02I | | | | 180,00 | 20,00 | 24,80 | 0,60 | 19,38 | 2,71 | 9,001 | 100,000 | 10,87 | 19,186 | 29,55 | 4,75 | 2,1059 | ZG | | | | | |
| RZ-115E-02X | | | | 270,00 | 20,00 | 24,80 | 0,60 | 19,69 | 2,55 | 9,001 | 100,000 | 10,87 | 18,864 | 29,63 | 4,83 | 2,1380 | ZG | | | | | |
| RZ-115E-03I | | | | 180,00 | 26,00 | 34,80 | 0,80 | 29,38 | 2,71 | 9,001 | 100,000 | 8,10 | 12,366 | 42,17 | 7,37 | 3,1423 | ZH | | | | | |
| RZ-115E-03X | | | | 270,00 | 26,00 | 34,80 | 0,80 | 29,69 | 2,55 | 9,001 | 100,000 | 8,10 | 12,231 | 42,25 | 7,45 | 3,1745 | ZH | | | | | |
| RZ-115E-04I | | | | 180,00 | 32,00 | 58,80 | 1,10 | 53,13 | 2,84 | 9,001 | 100,000 | 7,98 | 6,706 | 71,70 | 13,57 | 5,6039 | ZJ | | | | | |
| RZ-115E-04X | | | | 270,00 | 32,00 | 58,80 | 1,10 | 53,44 | 2,68 | 9,001 | 100,000 | 7,98 | 6,665 | 71,80 | 13,65 | 5,6361 | ZJ | | | | | |
| RZ-115E-10I | | | | 1,30 | 11,30 | 0,25 | 13,50 | 180,00 | 25,00 | 42,10 | 1,10 | 26,65 | 7,73 | 4,611 | 59,250 | 4,06 | 1,282 | 84,70 | 42,60 | 7,0065 | ZJ | |
| RZ-115E-10X | | | | | | | | 270,00 | 25,00 | 42,10 | 1,10 | 26,98 | 7,56 | 4,611 | 59,250 | 4,06 | 1,265 | 85,30 | 43,20 | 7,0902 | ZJ | |
| RZ-115E-11I | | | | | | | | 180,00 | 32,00 | 59,00 | 1,10 | 43,55 | 7,73 | 4,611 | 59,250 | 3,95 | 0,769 | 130,10 | 71,10 | 11,2929 | ZJ | |
| RZ-115E-11X | | | | | | | | 270,00 | 32,00 | 59,00 | 1,10 | 43,88 | 7,56 | 4,611 | 59,250 | 3,95 | 0,763 | 130,60 | 71,60 | 11,3766 | ZJ | |
| RZ-115E-12I | 180,00 | 38,00 | 75,50 | | | | | 1,50 | 60,45 | 7,53 | 4,611 | 59,250 | 3,90 | 0,549 | 175,00 | 99,50 | 15,5793 | ZK | | | | |
| RZ-115E-12X | 270,00 | 38,00 | 75,50 | | | | | 1,50 | 60,78 | 7,36 | 4,611 | 59,250 | 3,90 | 0,546 | 175,50 | 100,00 | 15,6630 | ZK | | | | |
| RZ-115FI | 180,00 | 54,00 | 134,00 | | | | | 2,00 | 118,95 | 7,52 | 4,611 | 59,250 | 3,47 | 0,276 | 331,90 | 197,90 | 30,4167 | ZK | | | | |
| RZ-115FX | 270,00 | 55,00 | 134,00 | | | | | 2,00 | 119,28 | 7,36 | 4,611 | 59,250 | 3,47 | 0,275 | 332,40 | 198,40 | 30,5003 | ZK | | | | |
| RZ-115F-10I | 1,40 | 20,00 | 0,35 | | | | | 23,00 | 180,00 | 22,00 | 44,00 | 1,30 | 14,70 | 14,65 | 2,000 | 44,200 | 3,10 | 0,550 | 120,75 | 76,75 | 8,0017 | ZH |
| RZ-115F-10X | | | | | | | | | 270,00 | 22,00 | 44,00 | 1,30 | 15,05 | 14,48 | 2,000 | 44,200 | 3,10 | 0,536 | 122,80 | 78,80 | 8,1795 | ZH |
| RZ-115F-11I | | | | | | | | | 180,00 | 30,00 | 53,00 | 1,30 | 23,10 | 14,95 | 2,000 | 44,200 | 3,00 | 0,337 | 178,20 | 125,20 | 12,2692 | ZJ |
| RZ-115F-11X | | | | | | | | | 270,00 | 30,00 | 53,00 | 1,30 | 23,45 | 14,78 | 2,000 | 44,200 | 3,00 | 0,332 | 180,20 | 127,20 | 12,4470 | ZJ |
| RZ-115F-12I | | | | 180,00 | 37,00 | 65,30 | 1,80 | | 35,70 | 14,80 | 2,000 | 44,200 | 2,90 | 0,213 | 263,20 | 197,90 | 18,6705 | ZJ | | | | |
| RZ-115F-12X | | | | 270,00 | 37,00 | 65,30 | 1,80 | | 36,05 | 14,63 | 2,000 | 44,200 | 2,90 | 0,211 | 265,25 | 199,95 | 18,8483 | ZJ | | | | |
| RZ-115F-13I | | | | 180,00 | 48,00 | 86,30 | 1,80 | | 56,70 | 14,80 | 2,000 | 44,200 | 2,80 | 0,132 | 405,40 | 319,10 | 29,3394 | ZK | | | | |
| RZ-115F-13X | | | | 270,00 | 48,00 | 86,30 | 1,80 | | 57,05 | 14,63 | 2,000 | 44,200 | 2,80 | 0,131 | 407,40 | 321,10 | 29,5172 | ZK | | | | |
| RZ-115F-14I | | | | 180,00 | 52,00 | 114,50 | 2,40 | | 84,70 | 14,90 | 2,000 | 44,200 | 2,80 | 0,088 | 595,20 | 480,70 | 43,5646 | ZK | | | | |
| RZ-115F-14X | | | | 270,00 | 52,00 | 114,50 | 2,40 | | 85,05 | 14,73 | 2,000 | 44,200 | 2,80 | 0,087 | 597,20 | 482,70 | 43,7424 | ZK | | | | |
| RZ-115GI | | | | 15,00 | 0,35 | 17,50 | 180,00 | | 20,00 | 34,90 | 0,90 | 14,70 | 10,10 | 4,351 | 55,720 | 4,64 | 1,407 | 71,42 | 36,52 | 5,8507 | ZH | |
| RZ-115GX | | | | | | | 270,00 | | 20,00 | 34,90 | 0,90 | 15,05 | 9,92 | 4,351 | 55,720 | 4,59 | 1,371 | 72,38 | 37,48 | 5,9807 | ZH | |
| RZ-115HI | 180,00 | 25,00 | 43,30 | | | | 1,30 | 23,10 | 10,10 | 4,351 | 55,720 | 3,98 | 0,862 | 102,88 | 59,58 | 8,9710 | ZJ | | | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----|
| RZ-115HX | 1,40 | 15,00 | 0,35 | 17,50 | 270,00 | 25,00 | 43,30 | 1,30 | 23,45 | 9,92 | 4,351 | 55,720 | 3,97 | 0,848 | 103,84 | 60,54 | 9,1010 | ZJ | | |
| RZ-115JI | | | | | 180,00 | 32,00 | 55,90 | 1,30 | 35,70 | 10,10 | 4,351 | 55,720 | 3,61 | 0,545 | 150,08 | 94,18 | 13,6516 | ZJ | | |
| RZ-115JX | | | | | 270,00 | 32,00 | 55,90 | 1,30 | 36,05 | 9,92 | 4,351 | 55,720 | 3,60 | 0,540 | 151,04 | 95,14 | 13,7816 | ZJ | | |
| RZ-115KI | | | | | 180,00 | 40,00 | 76,90 | 1,80 | 56,70 | 10,10 | 4,351 | 55,720 | 3,32 | 0,338 | 228,74 | 151,84 | 21,4525 | ZK | | |
| RZ-115KX | | | | | 270,00 | 40,00 | 76,90 | 1,80 | 57,05 | 9,92 | 4,351 | 55,720 | 3,32 | 0,336 | 229,70 | 152,80 | 21,5825 | ZK | | |
| RZ-115LI | | | | | 180,00 | 49,00 | 105,00 | 2,40 | 84,70 | 10,15 | 4,351 | 55,720 | 3,15 | 0,225 | 333,72 | 228,72 | 31,8537 | ZK | | |
| RZ-115LX | | | | | 270,00 | 49,00 | 105,00 | 2,40 | 85,05 | 9,97 | 4,351 | 55,720 | 3,15 | 0,224 | 334,68 | 229,68 | 31,9837 | ZK | | |
| RZ-115MI | 10,00 | 0,25 | 12,40 | 180,00 | 17,00 | 26,90 | 0,80 | 14,70 | 6,10 | 7,911 | 81,510 | 8,72 | 5,563 | 40,13 | 13,23 | 3,6997 | ZH | | | |
| RZ-115MX | | | | 270,00 | 17,00 | 26,90 | 0,80 | 15,05 | 5,92 | 7,911 | 81,510 | 8,62 | 5,420 | 40,48 | 13,58 | 3,7819 | ZH | | | |
| RZ-115NI | | | | 180,00 | 22,00 | 35,30 | 0,80 | 23,10 | 6,10 | 7,911 | 81,510 | 7,43 | 3,410 | 56,89 | 21,59 | 5,6729 | ZJ | | | |
| RZ-115NX | | | | 270,00 | 22,00 | 35,30 | 0,80 | 23,45 | 5,92 | 7,911 | 81,510 | 7,40 | 3,355 | 57,24 | 21,94 | 5,7551 | ZJ | | | |
| RZ-115OI | | | | 180,00 | 27,00 | 47,90 | 1,10 | 35,70 | 6,10 | 7,911 | 81,510 | 6,69 | 2,157 | 82,03 | 34,13 | 8,6326 | ZJ | | | |
| RZ-115OX | | | | 270,00 | 27,00 | 47,90 | 1,10 | 36,05 | 5,92 | 7,911 | 81,510 | 6,67 | 2,135 | 82,38 | 34,48 | 8,7148 | ZJ | | | |
| RZ-115PI | | | | 180,00 | 35,00 | 68,90 | 1,50 | 56,70 | 6,10 | 7,911 | 81,510 | 6,12 | 1,338 | 123,93 | 55,03 | 13,5655 | ZJ | | | |
| RZ-115PX | | | | 270,00 | 35,00 | 68,90 | 1,50 | 57,05 | 5,92 | 7,911 | 81,510 | 6,11 | 1,329 | 124,27 | 55,37 | 13,6477 | ZJ | | | |
| RZ-115QI | | | | 180,00 | 42,00 | 96,90 | 1,50 | 84,70 | 6,10 | 7,911 | 81,510 | 5,80 | 0,888 | 179,79 | 82,89 | 20,1428 | ZK | | | |
| RZ-115QX | | | | 270,00 | 43,00 | 96,90 | 1,50 | 85,05 | 5,92 | 7,911 | 81,510 | 5,79 | 0,884 | 180,14 | 83,24 | 20,2250 | ZK | | | |
| RZ-115RI | | | | 7,00 | 0,30 | 9,40 | 180,00 | 16,00 | 22,10 | 0,60 | 14,70 | 3,70 | 14,200 | 111,300 | 20,36 | 20,148 | 26,93 | 4,83 | 2,4091 | ZH |
| RZ-115RX | | | | | | | 270,00 | 16,00 | 22,10 | 0,60 | 15,05 | 3,52 | 14,200 | 111,300 | 20,11 | 19,631 | 27,05 | 4,95 | 2,4626 | ZH |
| RZ-115SI | | | | | | | 180,00 | 20,00 | 30,50 | 0,80 | 23,10 | 3,70 | 14,200 | 111,300 | 17,13 | 12,349 | 38,38 | 7,88 | 3,6940 | ZH |
| RZ-115SX | | | | | | | 270,00 | 21,00 | 30,50 | 0,80 | 23,45 | 3,52 | 14,200 | 111,300 | 17,06 | 12,153 | 38,50 | 8,00 | 3,7475 | ZH |
| RZ-115TI | 180,00 | 26,00 | 43,10 | | | | 1,10 | 35,70 | 3,70 | 14,200 | 111,300 | 15,29 | 7,813 | 55,55 | 12,45 | 5,6212 | ZJ | | | |
| RZ-115TX | 270,00 | 26,00 | 43,10 | | | | 1,10 | 36,05 | 3,52 | 14,200 | 111,300 | 15,25 | 7,734 | 55,68 | 12,58 | 5,6748 | ZJ | | | |
| RZ-115UI | 180,00 | 33,00 | 64,10 | | | | 1,50 | 56,70 | 3,70 | 14,200 | 111,300 | 13,88 | 4,846 | 84,17 | 20,07 | 8,8334 | ZJ | | | |
| RZ-115UX | 270,00 | 33,00 | 64,10 | | | | 1,50 | 57,05 | 3,52 | 14,200 | 111,300 | 13,86 | 4,815 | 84,30 | 20,20 | 8,8869 | ZJ | | | |
| RZ-115VI | 180,00 | 40,00 | 92,10 | | | | 1,50 | 84,70 | 3,70 | 14,200 | 111,300 | 13,06 | 3,217 | 122,33 | 30,23 | 13,1162 | ZK | | | |
| RZ-115VX | 270,00 | 40,00 | 92,10 | | | | 1,50 | 85,05 | 3,52 | 14,200 | 111,300 | 13,06 | 3,203 | 122,46 | 30,36 | 13,1697 | ZK | | | |
| RZ-115V-10I | 1,50 | 20,00 | 0,45 | 22,70 | 180,00 | 27,00 | 48,90 | 1,30 | 21,75 | 13,57 | 3,211 | 51,220 | 4,00 | 0,518 | 141,55 | 92,65 | 12,3846 | ZJ | | |
| RZ-115V-10X | | | | | 270,00 | 27,00 | 48,90 | 1,30 | 22,13 | 13,38 | 3,211 | 51,220 | 3,97 | 0,509 | 143,27 | 94,37 | 12,5903 | ZJ | | |
| RZ-115V-11I | | | | | 180,00 | 39,00 | 70,00 | 1,80 | 42,75 | 13,62 | 3,211 | 51,220 | 3,41 | 0,254 | 258,73 | 188,73 | 23,7541 | ZK | | |
| RZ-115V-11X | | | | | 270,00 | 39,00 | 70,00 | 1,80 | 43,13 | 13,43 | 3,211 | 51,220 | 3,40 | 0,252 | 260,45 | 190,45 | 23,9598 | ZK | | |
| RZ-115V-12I | | | | | 180,00 | 43,00 | 79,00 | 1,80 | 51,75 | 13,62 | 3,211 | 51,220 | 3,29 | 0,209 | 308,91 | 229,91 | 28,6267 | ZK | | |
| RZ-115V-12X | | | | | 270,00 | 43,00 | 79,00 | 1,80 | 52,13 | 13,43 | 3,211 | 51,220 | 3,29 | 0,207 | 310,63 | 231,63 | 28,8325 | ZK | | |

Extension springs

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|---------|
| Z-115HX | 1,40 | 15,00 | 0,35 | 17,50 | 270,00 | 25,00 | 43,30 | 1,30 | 23,45 | 9,92 | 5,441 | 66,080 | 4,12 | 0,988 | 104,69 | 61,39 | 9,1750 | ZF | | |
| Z-115JI | | | | | 180,00 | 32,00 | 55,90 | 1,30 | 35,70 | 10,10 | 5,441 | 66,080 | 3,76 | 0,635 | 151,39 | 95,49 | 13,6900 | ZF | | |
| Z-115JX | | | | | 270,00 | 32,00 | 55,90 | 1,30 | 36,05 | 9,92 | 5,441 | 66,080 | 3,76 | 0,624 | 152,37 | 96,47 | 13,8200 | ZF | | |
| Z-115KI | | | | | 180,00 | 40,00 | 76,90 | 1,80 | 56,70 | 10,10 | 5,441 | 66,080 | 3,48 | 0,394 | 230,86 | 153,96 | 21,4500 | ZG | | |
| Z-115KX | | | | | 270,00 | 40,00 | 76,90 | 1,80 | 57,05 | 9,92 | 5,441 | 66,080 | 3,47 | 0,391 | 231,83 | 154,93 | 21,5800 | ZG | | |
| Z-115LI | | | | | 180,00 | 49,00 | 105,00 | 2,40 | 84,70 | 10,15 | 5,441 | 66,080 | 3,31 | 0,261 | 336,91 | 231,91 | 31,7900 | ZG | | |
| Z-115LX | | | | | 270,00 | 49,00 | 105,00 | 2,40 | 85,05 | 9,97 | 5,441 | 66,080 | 3,31 | 0,260 | 337,89 | 232,89 | 31,9200 | ZG | | |
| Z-115MI | 10,00 | 0,25 | 12,40 | 180,00 | 17,00 | 26,90 | 0,80 | 14,70 | 6,10 | 9,881 | 96,670 | 8,95 | 6,477 | 40,30 | 13,40 | 3,7650 | ZE | | | |
| Z-115MX | | | | 270,00 | 17,00 | 26,90 | 0,80 | 15,05 | 5,92 | 9,881 | 96,670 | 8,85 | 6,311 | 40,66 | 13,76 | 3,8460 | ZE | | | |
| Z-115NI | | | | 180,00 | 22,00 | 35,30 | 0,80 | 23,10 | 6,10 | 9,881 | 96,670 | 7,65 | 3,970 | 57,17 | 21,87 | 5,7300 | ZF | | | |
| Z-115NX | | | | 270,00 | 22,00 | 35,30 | 0,80 | 23,45 | 5,92 | 9,881 | 96,670 | 7,63 | 3,907 | 57,51 | 22,21 | 5,8120 | ZF | | | |
| Z-115OI | | | | 180,00 | 27,00 | 47,90 | 1,10 | 35,70 | 6,10 | 9,881 | 96,670 | 6,91 | 2,511 | 82,47 | 34,57 | 8,6780 | ZF | | | |
| Z-115OX | | | | 270,00 | 27,00 | 47,90 | 1,10 | 36,05 | 5,92 | 9,881 | 96,670 | 6,90 | 2,486 | 82,82 | 34,92 | 8,7590 | ZF | | | |
| Z-115PI | | | | 180,00 | 35,00 | 68,90 | 1,50 | 56,70 | 6,10 | 9,881 | 96,670 | 6,35 | 1,558 | 124,63 | 55,73 | 13,5900 | ZF | | | |
| Z-115PX | | | | 270,00 | 35,00 | 68,90 | 1,50 | 57,05 | 5,92 | 9,881 | 96,670 | 6,34 | 1,548 | 124,96 | 56,06 | 13,6700 | ZF | | | |
| Z-115QI | | | | 180,00 | 42,00 | 96,90 | 1,50 | 84,70 | 6,10 | 9,881 | 96,670 | 6,02 | 1,034 | 180,83 | 83,93 | 20,1400 | ZG | | | |
| Z-115QX | | | | 270,00 | 43,00 | 96,90 | 1,50 | 85,05 | 5,92 | 9,881 | 96,670 | 6,02 | 1,030 | 181,16 | 84,26 | 20,2200 | ZG | | | |
| Z-115RI | | | | 7,00 | 0,30 | 9,40 | 180,00 | 16,00 | 22,10 | 0,60 | 14,70 | 3,70 | 17,770 | 132,100 | 20,67 | 23,458 | 26,98 | 4,88 | 2,4600 | ZE |
| Z-115RX | | | | | | | 270,00 | 16,00 | 22,10 | 0,60 | 15,05 | 3,52 | 17,770 | 132,100 | 20,43 | 22,857 | 27,11 | 5,01 | 2,5140 | ZE |
| Z-115SI | | | | | | | 180,00 | 20,00 | 30,50 | 0,80 | 23,10 | 3,70 | 17,770 | 132,100 | 17,44 | 14,378 | 38,46 | 7,96 | 3,7460 | ZE |
| Z-115SX | | | | | | | 270,00 | 21,00 | 30,50 | 0,80 | 23,45 | 3,52 | 17,770 | 132,100 | 13,37 | 14,149 | 38,58 | 8,08 | 3,7990 | ZE |
| Z-115TI | 180,00 | 26,00 | 43,10 | | | | 1,10 | 35,70 | 3,70 | 17,770 | 132,100 | 15,60 | 9,096 | 55,66 | 12,56 | 5,6740 | ZF | | | |
| Z-115TX | 270,00 | 26,00 | 43,10 | | | | 1,10 | 36,05 | 3,52 | 17,770 | 132,100 | 15,56 | 9,004 | 55,79 | 12,69 | 5,7270 | ZF | | | |
| Z-115UI | 180,00 | 33,00 | 64,10 | | | | 1,50 | 56,70 | 3,70 | 17,770 | 132,100 | 14,19 | 5,642 | 84,38 | 20,28 | 8,8870 | ZF | | | |
| Z-115UX | 270,00 | 33,00 | 64,10 | | | | 1,50 | 57,05 | 3,52 | 17,770 | 132,100 | 14,17 | 5,606 | 84,49 | 20,39 | 8,9410 | ZF | | | |
| Z-115VI | 180,00 | 40,00 | 92,10 | | | | 1,50 | 84,70 | 3,70 | 17,770 | 132,100 | 13,38 | 3,745 | 122,65 | 30,55 | 13,1700 | ZG | | | |
| Z-115VX | 270,00 | 40,00 | 92,10 | | | | 1,50 | 85,05 | 3,52 | 17,770 | 132,100 | 13,37 | 3,730 | 122,75 | 30,65 | 13,2200 | ZG | | | |
| Z-115V-10I | 1,50 | 20,00 | 0,45 | | | | 22,70 | 180,00 | 27,00 | 48,90 | 1,30 | 21,75 | 13,57 | 3,991 | 60,540 | 4,14 | 0,603 | 142,62 | 93,72 | 12,5000 |
| Z-115V-10X | | | | 270,00 | 27,00 | 48,90 | | 1,30 | 22,13 | 13,38 | 3,991 | 60,540 | 4,11 | 0,592 | 144,36 | 95,46 | 12,7000 | ZF | | |
| Z-115V-11I | | | | 180,00 | 39,00 | 70,00 | | 1,80 | 42,75 | 13,62 | 3,991 | 60,540 | 3,55 | 0,296 | 260,91 | 190,91 | 23,8000 | ZG | | |
| Z-115V-11X | | | | 270,00 | 39,00 | 70,00 | | 1,80 | 43,13 | 13,43 | 3,991 | 60,540 | 3,54 | 0,294 | 262,67 | 192,67 | 24,0000 | ZG | | |
| Z-115V-12I | | | | 180,00 | 43,00 | 79,00 | | 1,80 | 51,75 | 13,62 | 3,991 | 60,540 | 3,43 | 0,243 | 311,57 | 232,57 | 28,6400 | ZG | | |
| Z-115V-12X | | | | 270,00 | 43,00 | 79,00 | | 1,80 | 52,13 | 13,43 | 3,991 | 60,540 | 3,43 | 0,241 | 313,30 | 234,30 | 28,8400 | ZG | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-115V-13I | 1,50 | 20,00 | 0,45 | 22,70 | 180,00 | 47,00 | 90,00 | 1,80 | 62,25 | 13,87 | 3,991 | 60,540 | 3,34 | 0,201 | 371,17 | 281,17 | 34,2900 | ZH |
| Z-115V-13X | | | | | 270,00 | 47,00 | 90,00 | 1,80 | 62,63 | 13,68 | 3,991 | 60,540 | 3,33 | 0,200 | 372,90 | 282,90 | 34,4900 | ZH |
| Z-115V-14I | | | | | 180,00 | 51,00 | 99,00 | 1,80 | 71,25 | 13,87 | 3,991 | 60,540 | 3,27 | 0,175 | 421,82 | 322,82 | 39,1300 | ZJ |
| Z-115V-14X | | | | | 270,00 | 51,00 | 99,00 | 1,80 | 71,63 | 13,68 | 3,991 | 60,540 | 3,26 | 0,174 | 423,55 | 324,55 | 39,3300 | ZJ |
| Z-115V-15I | | | | | 180,00 | 54,00 | 109,00 | 2,40 | 81,75 | 13,62 | 3,991 | 60,540 | 3,21 | 0,152 | 480,42 | 371,42 | 44,7800 | ZJ |
| Z-115V-15X | | | | | 270,00 | 54,00 | 109,00 | 2,40 | 82,13 | 13,43 | 3,991 | 60,540 | 3,21 | 0,152 | 482,15 | 373,15 | 44,9800 | ZJ |
| Z-115V-16I | | | | | 180,00 | 58,00 | 121,00 | 2,40 | 93,75 | 13,62 | 3,991 | 60,540 | 3,18 | 0,132 | 547,95 | 426,95 | 51,2300 | ZK |
| Z-115V-16X | | | | | 270,00 | 58,00 | 121,00 | 2,40 | 94,13 | 13,43 | 3,991 | 60,540 | 3,18 | 0,132 | 549,69 | 428,69 | 51,4300 | ZK |
| Z-115V-17I | | | | | 180,00 | 62,00 | 133,00 | 2,40 | 105,75 | 13,62 | 3,991 | 60,540 | 3,15 | 0,117 | 615,49 | 482,49 | 57,6900 | ZL |
| Z-115V-17X | | | | | 270,00 | 62,00 | 133,00 | 2,40 | 106,13 | 13,43 | 3,991 | 60,540 | 3,15 | 0,117 | 617,23 | 484,23 | 57,8900 | ZL |
| Z-115V-20I | 15,00 | 0,35 | 17,60 | 180,00 | 22,00 | 41,50 | 1,30 | 21,75 | 9,87 | 6,441 | 79,840 | 5,18 | 1,553 | 88,77 | 47,27 | 9,1320 | ZE | |
| Z-115V-20X | | | | 270,00 | 23,00 | 41,50 | 1,30 | 22,13 | 9,68 | 6,441 | 79,830 | 5,15 | 1,525 | 89,64 | 48,14 | 9,2790 | ZE | |
| Z-115V-21I | | | | 180,00 | 32,00 | 62,50 | 1,30 | 42,75 | 9,87 | 6,441 | 79,830 | 4,45 | 0,762 | 158,78 | 96,28 | 17,3800 | ZF | |
| Z-115V-21X | | | | 270,00 | 32,00 | 62,50 | 1,30 | 43,13 | 9,68 | 6,441 | 79,830 | 4,44 | 0,755 | 159,66 | 97,16 | 17,5200 | ZF | |
| Z-115V-22I | | | | 180,00 | 35,00 | 71,50 | 1,80 | 51,75 | 9,87 | 6,441 | 79,830 | 4,30 | 0,629 | 188,79 | 117,29 | 20,9500 | ZG | |
| Z-115V-22X | | | | 270,00 | 36,00 | 71,50 | 1,80 | 52,13 | 9,68 | 6,441 | 79,830 | 4,30 | 0,621 | 189,66 | 118,16 | 21,0600 | ZG | |
| Z-115V-23I | | | | 180,00 | 39,00 | 82,00 | 1,80 | 62,25 | 9,87 | 6,441 | 79,830 | 4,19 | 0,518 | 223,80 | 141,80 | 25,0400 | ZH | |
| Z-115V-23X | | | | 270,00 | 39,00 | 82,00 | 1,80 | 62,63 | 9,68 | 6,441 | 79,830 | 4,19 | 0,514 | 224,67 | 142,67 | 25,1800 | ZH | |
| Z-115V-24I | | | | 180,00 | 42,00 | 91,00 | 1,80 | 71,25 | 9,87 | 6,441 | 79,830 | 4,10 | 0,451 | 253,80 | 162,80 | 28,5700 | ZH | |
| Z-115V-24X | | | | 270,00 | 42,00 | 91,00 | 1,80 | 71,63 | 9,68 | 6,441 | 79,830 | 4,10 | 0,448 | 254,68 | 163,68 | 28,7200 | ZH | |
| Z-115V-25I | 180,00 | 45,00 | 101,50 | 2,40 | 81,75 | 9,87 | 6,441 | 79,830 | 4,04 | 0,392 | 288,81 | 187,31 | 32,7000 | ZJ | | | | |
| Z-115V-25X | 270,00 | 45,00 | 101,50 | 2,40 | 82,13 | 9,68 | 6,441 | 79,830 | 4,04 | 0,390 | 289,69 | 188,19 | 32,8400 | ZJ | | | | |
| Z-115V-26I | 180,00 | 48,00 | 113,50 | 2,40 | 93,75 | 9,87 | 6,441 | 79,830 | 4,00 | 0,341 | 328,82 | 215,32 | 37,4100 | ZJ | | | | |
| Z-115V-26X | 270,00 | 48,00 | 113,50 | 2,40 | 94,13 | 9,68 | 6,441 | 79,830 | 3,99 | 0,339 | 329,70 | 216,20 | 37,5600 | ZJ | | | | |
| Z-115V-27I | 180,00 | 51,00 | 125,50 | 2,40 | 105,75 | 9,87 | 6,441 | 79,830 | 3,96 | 0,302 | 368,83 | 243,33 | 42,1200 | ZK | | | | |
| Z-115V-27X | 270,00 | 51,00 | 125,50 | 2,40 | 106,13 | 9,68 | 6,441 | 79,830 | 3,96 | 0,301 | 369,71 | 244,21 | 42,2700 | ZK | | | | |
| Z-115V-29I | 12,00 | 0,30 | 14,60 | 180,00 | 17,00 | 29,00 | 0,80 | 14,25 | 7,38 | 7,221 | 98,500 | 6,47 | 5,241 | 46,42 | 17,42 | 4,7240 | ZE | |
| Z-115V-29X | | | | 270,00 | 17,00 | 29,00 | 0,80 | 14,63 | 7,19 | 7,221 | 98,500 | 6,47 | 5,092 | 46,93 | 17,93 | 4,8410 | ZE | |
| Z-115V-30I | | | | 180,00 | 21,00 | 36,50 | 0,80 | 21,75 | 7,37 | 7,221 | 98,500 | 7,19 | 3,300 | 64,16 | 27,66 | 7,1080 | ZE | |
| Z-115V-30X | | | | 270,00 | 21,00 | 36,50 | 0,80 | 22,13 | 7,18 | 7,221 | 98,500 | 7,14 | 3,240 | 64,67 | 28,17 | 7,2230 | ZE | |
| Z-115V-31I | | | | 180,00 | 29,00 | 57,50 | 1,10 | 42,75 | 7,37 | 7,221 | 98,500 | 6,15 | 1,620 | 113,84 | 56,34 | 13,5300 | ZF | |
| Z-115V-31X | | | | 270,00 | 30,00 | 57,50 | 1,10 | 43,13 | 7,18 | 7,221 | 98,500 | 6,13 | 1,605 | 114,37 | 56,87 | 13,6400 | ZF | |
| Z-115V-32I | | | | 180,00 | 33,00 | 66,50 | 1,50 | 51,75 | 7,37 | 7,221 | 98,500 | 5,94 | 1,330 | 135,13 | 68,63 | 16,2800 | ZF | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| RZ-115V-13I | 1,50 | 20,00 | 0,45 | 22,70 | 180,00 | 47,00 | 90,00 | 1,80 | 62,25 | 13,87 | 3,211 | 51,220 | 3,20 | 0,173 | 367,95 | 277,95 | 34,3115 | ZL |
| RZ-115V-13X | | | | | 270,00 | 47,00 | 90,00 | 1,80 | 62,63 | 13,68 | 3,211 | 51,220 | 3,19 | 0,172 | 369,67 | 279,67 | 34,5172 | ZL |
| RZ-115V-14I | | | | | 180,00 | 51,00 | 99,00 | 1,80 | 71,25 | 13,87 | 3,211 | 51,220 | 3,13 | 0,150 | 418,10 | 319,10 | 39,1841 | ZM |
| RZ-115V-14X | | | | | 270,00 | 51,00 | 99,00 | 1,80 | 71,63 | 13,68 | 3,211 | 51,220 | 3,12 | 0,150 | 419,85 | 320,85 | 39,3898 | ZM |
| RZ-115V-15I | | | | | 180,00 | 54,00 | 109,00 | 2,40 | 81,75 | 13,62 | 3,211 | 51,220 | 3,07 | 0,131 | 476,18 | 367,18 | 44,8688 | ZM |
| RZ-115V-15X | | | | | 270,00 | 54,00 | 109,00 | 2,40 | 82,13 | 13,43 | 3,211 | 51,220 | 3,07 | 0,130 | 477,89 | 368,89 | 45,0746 | ZM |
| RZ-115V-16I | | | | | 180,00 | 58,00 | 121,00 | 2,40 | 93,75 | 13,62 | 3,211 | 51,220 | 3,04 | 0,114 | 543,08 | 422,08 | 51,3657 | ZN |
| RZ-115V-16X | | | | | 270,00 | 58,00 | 121,00 | 2,40 | 94,13 | 13,43 | 3,211 | 51,220 | 3,04 | 0,113 | 544,80 | 423,80 | 51,5714 | ZN |
| RZ-115V-17I | | | | | 180,00 | 62,00 | 133,00 | 2,40 | 105,75 | 13,62 | 3,211 | 51,220 | 3,01 | 0,101 | 609,98 | 476,98 | 57,8625 | ZO |
| RZ-115V-17X | | | | | 270,00 | 62,00 | 133,00 | 2,40 | 106,13 | 13,43 | 3,211 | 51,220 | 3,01 | 0,100 | 611,70 | 478,70 | 58,0683 | ZO |
| RZ-115V-20I | 15,00 | 0,35 | 17,60 | 180,00 | 22,00 | 41,50 | 1,30 | 21,75 | 9,87 | 5,151 | 67,550 | 5,00 | 1,334 | 88,29 | 46,79 | 9,0374 | ZH | |
| RZ-115V-20X | | | | 270,00 | 23,00 | 41,50 | 1,30 | 22,13 | 9,68 | 5,151 | 67,550 | 4,96 | 1,309 | 89,16 | 47,66 | 9,1875 | ZH | |
| RZ-115V-21I | | | | 180,00 | 32,00 | 62,50 | 1,30 | 42,75 | 9,87 | 5,151 | 67,550 | 4,27 | 0,655 | 157,81 | 95,31 | 17,3341 | ZJ | |
| RZ-115V-21X | | | | 270,00 | 32,00 | 62,50 | 1,30 | 43,13 | 9,68 | 5,151 | 67,550 | 4,26 | 0,649 | 158,68 | 96,18 | 17,4842 | ZJ | |
| RZ-115V-22I | | | | 180,00 | 35,00 | 71,50 | 1,80 | 51,75 | 9,87 | 5,151 | 67,550 | 4,12 | 0,537 | 187,61 | 116,11 | 20,8898 | ZK | |
| RZ-115V-22X | | | | 270,00 | 36,00 | 71,50 | 1,80 | 52,13 | 9,68 | 5,151 | 67,550 | 4,12 | 0,533 | 188,47 | 116,97 | 21,0399 | ZK | |
| RZ-115V-23I | | | | 180,00 | 39,00 | 82,00 | 1,80 | 62,25 | 9,87 | 5,151 | 67,550 | 4,01 | 0,445 | 222,37 | 140,37 | 25,0381 | ZL | |
| RZ-115V-23X | | | | 270,00 | 39,00 | 82,00 | 1,80 | 62,63 | 9,68 | 5,151 | 67,550 | 4,00 | 0,442 | 223,23 | 141,23 | 25,1882 | ZL | |
| RZ-115V-24I | | | | 180,00 | 42,00 | 91,00 | 1,80 | 71,25 | 9,87 | 5,151 | 67,550 | 3,92 | 0,387 | 252,16 | 161,16 | 28,5938 | ZL | |
| RZ-115V-24X | | | | 270,00 | 42,00 | 91,00 | 1,80 | 71,63 | 9,68 | 5,151 | 67,550 | 3,92 | 0,385 | 253,00 | 162,00 | 28,7439 | ZL | |
| RZ-115V-25I | | | | 180,00 | 45,00 | 101,50 | 2,40 | 81,75 | 9,87 | 5,151 | 67,550 | 3,85 | 0,337 | 286,92 | 185,42 | 32,7421 | ZM | |
| RZ-115V-25X | | | | 270,00 | 45,00 | 101,50 | 2,40 | 82,13 | 9,68 | 5,151 | 67,550 | 3,85 | 0,335 | 287,79 | 186,29 | 32,8923 | ZM | |
| RZ-115V-26I | | | | 180,00 | 48,00 | 113,50 | 2,40 | 93,75 | 9,87 | 5,151 | 67,550 | 3,81 | 0,293 | 326,65 | 213,15 | 37,4831 | ZM | |
| RZ-115V-26X | | | | 270,00 | 48,00 | 113,50 | 2,40 | 94,13 | 9,68 | 5,151 | 67,550 | 3,81 | 0,292 | 327,52 | 214,02 | 37,6332 | ZM | |
| RZ-115V-27I | | | | 180,00 | 51,00 | 125,50 | 2,40 | 105,75 | 9,87 | 5,151 | 67,550 | 3,77 | 0,259 | 366,38 | 240,88 | 42,2240 | ZN | |
| RZ-115V-27X | | | | 270,00 | 51,00 | 125,50 | 2,40 | 106,13 | 9,68 | 5,151 | 67,550 | 3,77 | 0,258 | 367,24 | 241,74 | 42,3741 | ZN | |
| RZ-115V-29I | 12,00 | 0,30 | 14,60 | 180,00 | 17,00 | 29,00 | 0,80 | 14,25 | 7,38 | 5,771 | 83,350 | 7,03 | 4,502 | 46,23 | 17,23 | 4,7245 | ZG | |
| RZ-115V-29X | | | | 270,00 | 17,00 | 29,00 | 0,80 | 14,63 | 7,19 | 5,771 | 83,350 | 7,00 | 4,372 | 46,80 | 17,80 | 4,8412 | ZG | |
| RZ-115V-30I | | | | 180,00 | 21,00 | 36,50 | 0,80 | 21,75 | 7,37 | 5,771 | 83,350 | 6,96 | 2,834 | 63,87 | 27,37 | 7,0291 | ZH | |
| RZ-115V-30X | | | | 270,00 | 21,00 | 36,50 | 0,80 | 22,13 | 7,18 | 5,771 | 83,350 | 6,92 | 2,782 | 64,38 | 27,88 | 7,1459 | ZH | |
| RZ-115V-31I | | | | 180,00 | 29,00 | 57,50 | 1,10 | 42,75 | 7,37 | 5,771 | 83,350 | 5,92 | 1,391 | 113,26 | 55,76 | 13,4821 | ZJ | |
| RZ-115V-31X | | | | 270,00 | 30,00 | 57,50 | 1,10 | 43,13 | 7,18 | 5,771 | 83,350 | 5,91 | 1,379 | 113,76 | 56,26 | 13,5988 | ZJ | |
| RZ-115V-32I | | | | 180,00 | 33,00 | 66,50 | 1,50 | 51,75 | 7,37 | 5,771 | 83,350 | 5,71 | 1,142 | 134,42 | 67,92 | 16,2476 | ZJ | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| RZ-115V-32X | 1,50 | 12,00 | 0,30 | 14,60 | 270,00 | 33,00 | 66,50 | 1,50 | 52,13 | 7,18 | 5,771 | 83,350 | 5,70 | 1,134 | 134,93 | 68,43 | 16,3644 | ZJ |
| RZ-115V-33I | | | | | 180,00 | 36,00 | 77,00 | 1,50 | 62,25 | 7,37 | 5,771 | 83,350 | 5,54 | 0,945 | 159,11 | 82,11 | 19,4741 | ZK |
| RZ-115V-33X | | | | | 270,00 | 36,00 | 77,00 | 1,50 | 62,63 | 7,18 | 5,771 | 83,350 | 5,54 | 0,939 | 159,62 | 82,62 | 19,5908 | ZK |
| RZ-115V-34I | | | | | 180,00 | 38,00 | 86,00 | 1,50 | 71,25 | 7,37 | 5,771 | 83,350 | 5,42 | 0,823 | 180,28 | 94,28 | 22,2396 | ZK |
| RZ-115V-34X | | | | | 270,00 | 38,00 | 86,00 | 1,50 | 71,63 | 7,18 | 5,771 | 83,350 | 5,41 | 0,818 | 180,79 | 94,79 | 22,3564 | ZK |
| RZ-115V-35I | | | | | 180,00 | 41,00 | 96,50 | 1,50 | 81,75 | 7,37 | 5,771 | 83,350 | 5,32 | 0,715 | 204,97 | 108,47 | 25,4661 | ZK |
| RZ-115V-35X | | | | | 270,00 | 41,00 | 96,50 | 1,50 | 82,13 | 7,18 | 5,771 | 83,350 | 5,32 | 0,712 | 205,48 | 108,98 | 25,5829 | ZK |
| RZ-115V-36I | | | | | 180,00 | 44,00 | 108,50 | 2,00 | 93,75 | 7,37 | 5,771 | 83,350 | 5,26 | 0,622 | 233,19 | 124,69 | 29,1535 | ZK |
| RZ-115V-36X | | | | | 270,00 | 44,00 | 108,50 | 2,00 | 94,13 | 7,18 | 5,771 | 83,350 | 5,26 | 0,620 | 233,70 | 125,20 | 29,2703 | ZK |
| RZ-115V-37I | | | | | 180,00 | 47,00 | 120,50 | 2,00 | 105,75 | 7,37 | 5,771 | 83,350 | 5,21 | 0,551 | 261,41 | 140,91 | 32,8409 | ZL |
| RZ-115V-37X | | | | | 270,00 | 47,00 | 120,50 | 2,00 | 106,13 | 7,18 | 5,771 | 83,350 | 5,21 | 0,549 | 261,92 | 141,42 | 32,9577 | ZL |
| RZ-115WI | 10,00 | 0,25 | 12,50 | 180,00 | 63,00 | 218,00 | 2,50 | 206,25 | 5,87 | 8,441 | 98,530 | 7,12 | 0,528 | 388,49 | 170,49 | 51,5852 | ZK | |
| RZ-115WX | | | | 270,00 | 64,00 | 218,00 | 2,50 | 206,63 | 5,68 | 8,441 | 98,530 | 7,12 | 0,527 | 388,80 | 170,80 | 51,6797 | ZK | |
| RZ-115W-19I | 8,00 | 0,25 | 10,50 | 180,00 | 15,00 | 23,00 | 0,60 | 14,25 | 4,38 | 11,600 | 119,800 | 15,10 | 18,976 | 28,75 | 5,75 | 2,9247 | ZG | |
| RZ-115W-19X | | | | 270,00 | 15,00 | 23,00 | 0,60 | 14,63 | 4,19 | 11,600 | 119,800 | 15,10 | 18,427 | 28,92 | 5,92 | 2,9970 | ZG | |
| RZ-115W-20I | | | | 180,00 | 19,00 | 30,50 | 0,80 | 21,75 | 4,37 | 11,600 | 119,800 | 14,70 | 11,948 | 39,56 | 9,06 | 4,3514 | ZH | |
| RZ-115W-20X | | | | 270,00 | 19,00 | 30,50 | 0,80 | 22,13 | 4,18 | 11,600 | 119,800 | 14,70 | 11,728 | 39,73 | 9,23 | 4,4236 | ZH | |
| RZ-115W-21I | | | | 180,00 | 28,00 | 51,50 | 1,10 | 42,75 | 4,37 | 11,600 | 119,800 | 14,27 | 5,865 | 69,96 | 18,46 | 8,3460 | ZH | |
| RZ-115W-21X | | | | 270,00 | 28,00 | 51,50 | 1,10 | 43,13 | 4,18 | 11,600 | 119,800 | 14,24 | 5,812 | 70,12 | 18,62 | 8,4183 | ZH | |
| RZ-115W-22I | | | | 180,00 | 30,00 | 60,50 | 1,10 | 51,75 | 4,37 | 11,600 | 119,800 | 13,72 | 4,815 | 82,98 | 22,48 | 10,0580 | ZJ | |
| RZ-115W-22X | | | | 270,00 | 30,00 | 60,50 | 1,10 | 52,18 | 4,18 | 11,600 | 119,800 | 13,70 | 4,774 | 83,15 | 22,65 | 10,1398 | ZJ | |
| RZ-115W-23I | | | | 180,00 | 33,00 | 71,00 | 1,50 | 62,25 | 4,37 | 11,600 | 119,800 | 13,26 | 3,983 | 98,18 | 27,18 | 12,0554 | ZK | |
| RZ-115W-23X | | | | 270,00 | 34,00 | 71,00 | 1,50 | 62,63 | 4,18 | 11,600 | 119,800 | 13,25 | 3,958 | 98,35 | 27,35 | 12,1277 | ZK | |
| RZ-115W-24I | | | | 180,00 | 36,00 | 80,00 | 1,50 | 71,25 | 4,37 | 11,600 | 119,800 | 14,94 | 3,469 | 111,21 | 31,21 | 13,7674 | ZK | |
| RZ-115W-24X | | | | 270,00 | 36,00 | 80,00 | 1,50 | 71,63 | 4,18 | 11,600 | 119,800 | 12,92 | 3,450 | 111,38 | 31,38 | 13,8397 | ZK | |
| RZ-115W-25X | | | | 270,00 | 38,00 | 90,50 | 1,50 | 82,13 | 4,18 | 11,600 | 119,800 | 12,65 | 3,001 | 126,57 | 36,07 | 15,8370 | ZK | |
| RZ-115W-25I | 180,00 | 38,00 | 90,50 | 1,50 | 81,75 | 4,37 | 11,600 | 119,800 | 12,68 | 3,015 | 126,41 | 35,91 | 15,7647 | ZK | | | | |
| RZ-115W-26I | 180,00 | 41,00 | 102,00 | 2,00 | 93,75 | 4,37 | 11,600 | 119,800 | 12,52 | 2,623 | 143,28 | 41,28 | 18,0474 | ZL | | | | |
| RZ-115W-26X | 270,00 | 41,00 | 102,00 | 2,00 | 94,13 | 4,18 | 11,600 | 119,800 | 12,51 | 2,612 | 143,44 | 41,44 | 18,1197 | ZL | | | | |
| RZ-115W-27I | 180,00 | 44,00 | 114,00 | 2,00 | 105,75 | 4,37 | 11,600 | 119,800 | 12,38 | 2,321 | 160,65 | 46,65 | 20,3301 | ZL | | | | |
| RZ-115W-27X | 270,00 | 44,00 | 114,00 | 2,00 | 106,13 | 4,18 | 11,600 | 119,800 | 12,37 | 2,312 | 160,81 | 46,81 | 20,4024 | ZL | | | | |
| RZ-116I | 1,60 | 21,60 | 0,45 | 24,50 | 180,00 | 25,00 | 50,20 | 1,30 | 20,00 | 15,10 | 3,211 | 56,930 | 4,69 | 0,623 | 136,39 | 86,19 | 13,2356 | ZJ |
| RZ-116X | | | | | 270,00 | 26,00 | 50,20 | 1,30 | 20,40 | 14,90 | 3,211 | 56,930 | 4,65 | 0,610 | 138,26 | 88,06 | 13,4853 | ZJ |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|
| Z-115V-32X | 1,50 | 12,00 | 0,30 | 14,60 | 270,00 | 33,00 | 66,50 | 1,50 | 52,13 | 7,18 | 7,221 | 98,500 | 5,93 | 1,320 | 135,65 | 69,15 | 16,3900 | ZF |
| Z-115V-33I | | | | | 180,00 | 36,00 | 77,00 | 1,50 | 62,25 | 7,37 | 7,221 | 98,500 | 5,77 | 1,100 | 159,98 | 82,98 | 19,4900 | ZG |
| Z-115V-33X | | | | | 270,00 | 36,00 | 77,00 | 1,50 | 62,63 | 7,18 | 7,221 | 98,500 | 5,76 | 1,093 | 160,51 | 83,51 | 19,6000 | ZG |
| Z-115V-34I | | | | | 180,00 | 38,00 | 86,00 | 1,50 | 71,25 | 7,37 | 7,221 | 98,500 | 5,65 | 0,958 | 181,28 | 95,28 | 22,2400 | ZG |
| Z-115V-34X | | | | | 270,00 | 38,00 | 86,00 | 1,50 | 71,63 | 7,18 | 7,221 | 98,500 | 5,64 | 0,953 | 181,78 | 95,78 | 22,3600 | ZG |
| Z-115V-35I | | | | | 180,00 | 41,00 | 96,50 | 1,50 | 81,75 | 7,37 | 7,221 | 98,500 | 5,55 | 0,833 | 206,07 | 109,57 | 25,4500 | ZG |
| Z-115V-35X | | | | | 270,00 | 41,00 | 96,50 | 1,50 | 82,13 | 7,18 | 7,221 | 98,500 | 5,55 | 0,829 | 206,60 | 110,10 | 25,5700 | ZG |
| Z-115V-36I | | | | | 180,00 | 44,00 | 108,50 | 2,00 | 93,75 | 7,37 | 7,221 | 98,500 | 5,49 | 0,724 | 234,57 | 126,07 | 29,1200 | ZG |
| Z-115V-36X | | | | | 270,00 | 44,00 | 108,50 | 2,00 | 94,13 | 7,18 | 7,221 | 98,500 | 5,49 | 0,721 | 235,10 | 126,60 | 29,2400 | ZG |
| Z-115V-37I | | | | | 180,00 | 47,00 | 120,50 | 2,00 | 105,75 | 7,37 | 7,221 | 98,500 | 5,44 | 0,641 | 262,90 | 142,40 | 32,7900 | ZH |
| Z-115V-37X | | | | | 270,00 | 47,00 | 120,50 | 2,00 | 106,13 | 7,18 | 7,221 | 98,500 | 5,43 | 0,639 | 263,34 | 142,84 | 32,9100 | ZH |
| Z-115WI | | | | | 10,00 | 0,25 | 12,50 | 180,00 | 63,00 | 218,00 | 2,50 | 206,25 | 5,87 | 10,550 | 116,400 | 7,39 | 0,615 | 390,12 |
| Z-115WX | 270,00 | 64,00 | 218,00 | 2,50 | | | | 206,63 | 5,68 | 10,550 | 116,400 | 7,39 | 0,614 | 390,44 | 172,44 | 51,5900 | ZG | |
| Z-115W-19I | 8,00 | 0,25 | 10,50 | 180,00 | 15,00 | 23,00 | 0,60 | 14,25 | 4,38 | 14,550 | 141,700 | 15,40 | 22,094 | 28,75 | 5,75 | 2,9240 | ZE | |
| Z-115W-19X | | | | 270,00 | 15,00 | 23,00 | 0,60 | 14,63 | 4,19 | 14,550 | 141,700 | 15,40 | 21,461 | 28,92 | 5,92 | 2,9970 | ZE | |
| Z-115W-20I | | | | 180,00 | 19,00 | 30,50 | 0,80 | 21,75 | 4,37 | 14,550 | 141,700 | 17,38 | 13,911 | 39,64 | 9,14 | 4,4150 | ZE | |
| Z-115W-20X | | | | 270,00 | 19,00 | 30,50 | 0,80 | 22,13 | 4,18 | 14,550 | 141,700 | 17,27 | 13,658 | 39,81 | 9,31 | 4,4870 | ZE | |
| Z-115W-21I | | | | 180,00 | 28,00 | 51,50 | 1,10 | 42,75 | 4,37 | 14,550 | 141,700 | 14,60 | 6,829 | 70,11 | 18,61 | 8,4070 | ZE | |
| Z-115W-21X | | | | 270,00 | 28,00 | 51,50 | 1,10 | 43,13 | 4,18 | 14,550 | 141,700 | 14,57 | 6,768 | 70,28 | 18,78 | 8,4790 | ZE | |
| Z-115W-22I | | | | 180,00 | 30,00 | 60,50 | 1,10 | 51,75 | 4,37 | 14,550 | 141,700 | 14,04 | 5,606 | 83,18 | 22,68 | 10,1100 | ZF | |
| Z-115W-22X | | | | 270,00 | 30,00 | 60,50 | 1,10 | 52,18 | 4,18 | 14,550 | 141,700 | 14,03 | 5,564 | 83,35 | 22,85 | 10,1900 | ZF | |
| Z-115W-23I | | | | 180,00 | 33,00 | 71,00 | 1,50 | 62,25 | 4,37 | 14,550 | 141,700 | 13,59 | 4,637 | 98,42 | 27,42 | 12,1100 | ZG | |
| Z-115W-23X | | | | 270,00 | 34,00 | 71,00 | 1,50 | 62,63 | 4,18 | 14,550 | 141,700 | 13,58 | 4,609 | 98,50 | 27,50 | 12,1800 | ZG | |
| Z-115W-24I | | | | 180,00 | 36,00 | 80,00 | 1,50 | 71,25 | 4,37 | 14,550 | 141,700 | 13,26 | 4,039 | 111,48 | 31,48 | 13,8200 | ZG | |
| Z-115W-24X | | | | 270,00 | 36,00 | 80,00 | 1,50 | 71,63 | 4,18 | 14,550 | 141,700 | 13,25 | 4,017 | 111,65 | 31,65 | 13,8390 | ZG | |
| Z-115W-25X | 270,00 | 38,00 | 90,50 | 1,50 | 82,13 | 4,18 | 14,550 | 141,700 | 13,00 | 3,494 | 126,89 | 36,39 | 15,8900 | ZG | | | | |
| Z-115W-25I | 180,00 | 38,00 | 90,50 | 1,50 | 81,75 | 4,37 | 14,550 | 141,700 | 13,01 | 3,510 | 126,72 | 36,22 | 15,8200 | ZG | | | | |
| Z-115W-26I | 180,00 | 41,00 | 102,00 | 2,00 | 93,75 | 4,37 | 14,550 | 141,700 | 12,85 | 3,054 | 143,63 | 41,63 | 18,1000 | ZH | | | | |
| Z-115W-26X | 270,00 | 41,00 | 102,00 | 2,00 | 94,13 | 4,18 | 14,550 | 141,700 | 12,84 | 3,041 | 143,81 | 41,81 | 18,1700 | ZH | | | | |
| Z-115W-27I | 180,00 | 44,00 | 114,00 | 2,00 | 105,75 | 4,37 | 14,550 | 141,700 | 12,70 | 2,702 | 161,05 | 47,05 | 20,3800 | ZH | | | | |
| Z-115W-27X | 270,00 | 44,00 | 114,00 | 2,00 | 106,13 | 4,18 | 14,550 | 141,700 | 12,70 | 2,692 | 161,23 | 47,23 | 20,4500 | ZH | | | | |
| Z-116I | 1,60 | 21,60 | 0,45 | 24,50 | 180,00 | 25,00 | 50,20 | 1,30 | 20,00 | 15,10 | 3,991 | 67,400 | 4,84 | 0,726 | 137,58 | 87,38 | 13,3900 | ZF |
| Z-116X | | | | | 270,00 | 26,00 | 50,20 | 1,30 | 20,40 | 14,90 | 3,991 | 67,400 | 4,81 | 0,710 | 139,48 | 89,28 | 13,6400 | ZF |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| Z-117I | 1,60 | 21,60 | 0,45 | 24,50 | 180,00 | 37,00 | 71,00 | 1,80 | 40,80 | 15,10 | 3,991 | 67,400 | 4,04 | 0,341 | 257,15 | 186,15 | 26,2900 | ZG | | |
| Z-117X | | | | | 270,00 | 37,00 | 71,00 | 1,80 | 41,20 | 14,90 | 3,991 | 67,400 | 4,03 | 0,337 | 259,05 | 188,05 | 26,5400 | ZG | | |
| Z-117AI | | | | | 180,00 | 43,00 | 85,00 | 1,80 | 55,20 | 14,90 | 3,991 | 67,400 | 3,82 | 0,249 | 339,54 | 254,54 | 35,2300 | ZH | | |
| Z-117AX | | | | | 270,00 | 43,00 | 85,00 | 1,80 | 55,60 | 14,70 | 3,991 | 67,400 | 3,81 | 0,247 | 341,44 | 256,44 | 35,4700 | ZH | | |
| Z-118I | | | | | 180,00 | 47,00 | 95,00 | 1,80 | 64,80 | 15,10 | 3,991 | 67,400 | 3,72 | 0,211 | 395,13 | 300,13 | 41,1800 | ZJ | | |
| Z-118X | | | | | 270,00 | 47,00 | 95,00 | 1,80 | 65,20 | 14,90 | 3,991 | 67,400 | 3,72 | 0,210 | 397,02 | 302,02 | 41,4300 | ZJ | | |
| Z-118AI | | | | | 180,00 | 55,00 | 117,00 | 2,40 | 87,20 | 14,90 | 3,991 | 67,400 | 3,57 | 0,156 | 523,50 | 406,50 | 55,0800 | ZK | | |
| Z-118AX | | | | | 270,00 | 55,00 | 117,00 | 2,40 | 87,60 | 14,70 | 3,991 | 67,400 | 3,57 | 0,155 | 525,40 | 408,40 | 55,3300 | ZK | | |
| Z-118DX | | | | | 270,00 | 70,00 | 172,00 | 3,00 | 142,00 | 15,00 | 3,991 | 67,400 | 3,44 | 0,095 | 838,73 | 666,73 | 89,4000 | ZL | | |
| Z-118DI | | | | | 180,00 | 70,00 | 172,00 | 3,00 | 141,60 | 15,20 | 3,991 | 67,400 | 3,44 | 0,095 | 836,83 | 664,83 | 89,1500 | ZL | | |
| Z-119I | 17,60 | 0,35 | 20,40 | 180,00 | 22,00 | 43,80 | 1,30 | 20,00 | 11,90 | 6,221 | 82,120 | 5,53 | 1,417 | 97,35 | 53,55 | 10,7200 | ZE | | | |
| Z-119X | | | | 270,00 | 22,00 | 43,80 | 1,30 | 20,40 | 11,70 | 6,221 | 82,120 | 5,50 | 1,387 | 98,52 | 54,72 | 10,9200 | ZE | | | |
| Z-120I | | | | 180,00 | 32,00 | 64,60 | 1,80 | 40,80 | 11,90 | 6,221 | 82,120 | 4,63 | 0,665 | 178,69 | 114,09 | 21,0400 | ZG | | | |
| Z-120X | | | | 270,00 | 32,00 | 64,60 | 1,80 | 41,20 | 11,70 | 6,221 | 82,120 | 4,62 | 0,659 | 179,85 | 115,25 | 21,2400 | ZG | | | |
| Z-121I | | | | 180,00 | 41,00 | 88,60 | 1,80 | 64,80 | 11,90 | 6,221 | 82,120 | 4,28 | 0,413 | 272,37 | 183,77 | 32,9600 | ZH | | | |
| Z-121X | | | | 270,00 | 41,00 | 88,60 | 1,80 | 65,20 | 11,70 | 6,221 | 82,120 | 4,27 | 0,410 | 273,72 | 185,12 | 33,1600 | ZH | | | |
| Z-121AI | | | | 180,00 | 44,00 | 99,80 | 1,80 | 76,00 | 11,90 | 6,221 | 82,120 | 4,17 | 0,351 | 316,30 | 216,50 | 38,5200 | ZH | | | |
| Z-121AX | | | | 270,00 | 44,00 | 99,80 | 1,80 | 76,40 | 11,70 | 6,221 | 82,120 | 4,17 | 0,349 | 317,27 | 217,47 | 38,7200 | ZH | | | |
| Z-121BI | | | | 180,00 | 47,00 | 111,00 | 2,40 | 87,20 | 11,90 | 6,221 | 82,120 | 4,11 | 0,305 | 359,80 | 248,80 | 44,0800 | ZJ | | | |
| Z-121BX | | | | 270,00 | 47,00 | 111,00 | 2,40 | 87,60 | 11,70 | 6,221 | 82,120 | 4,11 | 0,303 | 361,49 | 250,49 | 44,2800 | ZJ | | | |
| Z-121CI | | | | 180,00 | 50,00 | 123,00 | 2,40 | 98,40 | 12,30 | 6,221 | 82,120 | 4,07 | 0,269 | 404,70 | 281,70 | 49,6400 | ZK | | | |
| Z-121CX | | | | 270,00 | 50,00 | 123,00 | 2,40 | 98,80 | 12,10 | 6,221 | 82,120 | 4,07 | 0,268 | 405,90 | 282,90 | 49,8400 | ZK | | | |
| Z-121DI | | | | 180,00 | 54,00 | 136,00 | 2,40 | 112,80 | 11,60 | 6,221 | 82,120 | 4,03 | 0,235 | 459,60 | 323,60 | 56,7900 | ZK | | | |
| Z-121DX | | | | 270,00 | 54,00 | 136,00 | 2,40 | 113,20 | 11,40 | 6,221 | 82,120 | 4,02 | 0,234 | 460,35 | 324,35 | 56,9900 | ZK | | | |
| Z-121EI | | | | 180,00 | 57,00 | 149,00 | 2,40 | 125,60 | 11,70 | 6,221 | 82,120 | 3,99 | 0,210 | 509,87 | 360,87 | 63,1400 | ZL | | | |
| Z-121EX | | | | 270,00 | 57,00 | 149,00 | 2,40 | 126,00 | 11,50 | 6,221 | 82,120 | 3,99 | 0,210 | 510,42 | 361,42 | 63,3400 | ZL | | | |
| Z-121FI | | | | 15,50 | 0,35 | 18,30 | 180,00 | 22,00 | 43,50 | 1,30 | 23,20 | 10,15 | 7,331 | 92,710 | 6,02 | 1,841 | 89,87 | 46,37 | 10,6900 | ZE |
| Z-121FX | | | | | | | 270,00 | 22,00 | 43,50 | 1,30 | 23,60 | 9,95 | 7,331 | 92,710 | 5,98 | 1,808 | 90,73 | 47,23 | 10,8700 | ZE |
| Z-121GI | | | | | | | 180,00 | 31,00 | 66,00 | 1,80 | 45,60 | 10,20 | 7,331 | 92,710 | 5,17 | 0,904 | 160,45 | 94,45 | 20,3600 | ZG |
| Z-121GX | | | | | | | 270,00 | 32,00 | 66,00 | 1,80 | 46,00 | 10,00 | 7,331 | 92,710 | 5,16 | 0,896 | 161,31 | 95,31 | 20,5300 | ZG |
| Z-121HI | 180,00 | 35,00 | 75,50 | | | | 1,80 | 55,20 | 10,15 | 7,331 | 92,710 | 5,00 | 0,742 | 190,56 | 115,06 | 24,5000 | ZH | | | |
| Z-121HX | 270,00 | 35,00 | 75,50 | | | | 1,80 | 55,60 | 9,95 | 7,331 | 92,710 | 5,00 | 0,737 | 191,34 | 115,84 | 24,6700 | ZH | | | |
| Z-121JI | 180,00 | 38,00 | 86,50 | | | | 1,80 | 66,40 | 10,05 | 7,331 | 92,710 | 4,87 | 0,614 | 225,55 | 139,05 | 29,3300 | ZH | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| RZ-117I | 1,60 | 21,60 | 0,45 | 24,50 | 180,00 | 37,00 | 71,00 | 1,80 | 40,80 | 15,10 | 3,211 | 56,930 | 3,88 | 0,293 | 254,62 | 183,62 | 26,2215 | ZK | | |
| RZ-117X | | | | | 270,00 | 37,00 | 71,00 | 1,80 | 41,20 | 14,90 | 3,211 | 56,930 | 3,87 | 0,290 | 256,49 | 185,49 | 26,4712 | ZK | | |
| RZ-117AI | | | | | 180,00 | 43,00 | 85,00 | 1,80 | 55,20 | 14,90 | 3,211 | 56,930 | 3,66 | 0,214 | 336,07 | 251,07 | 35,2117 | ZL | | |
| RZ-117AX | | | | | 270,00 | 43,00 | 85,00 | 1,80 | 55,60 | 14,70 | 3,211 | 56,930 | 3,65 | 0,212 | 337,94 | 252,94 | 35,4615 | ZL | | |
| RZ-118I | | | | | 180,00 | 47,00 | 95,00 | 1,80 | 64,80 | 15,10 | 3,211 | 56,930 | 3,57 | 0,181 | 391,03 | 296,03 | 41,2052 | ZM | | |
| RZ-118X | | | | | 270,00 | 47,00 | 95,00 | 1,80 | 65,20 | 14,90 | 3,211 | 56,930 | 3,56 | 0,180 | 392,91 | 297,91 | 41,4549 | ZM | | |
| RZ-118AI | | | | | 180,00 | 55,00 | 117,00 | 2,40 | 87,20 | 14,90 | 3,211 | 56,930 | 3,41 | 0,134 | 517,96 | 400,96 | 55,1900 | ZN | | |
| RZ-118AX | | | | | 270,00 | 55,00 | 117,00 | 2,40 | 87,60 | 14,70 | 3,211 | 56,930 | 3,41 | 0,133 | 519,83 | 402,83 | 55,4397 | ZN | | |
| RZ-118DX | | | | | 270,00 | 70,00 | 172,00 | 3,00 | 142,00 | 15,00 | 3,211 | 56,930 | 3,28 | 0,082 | 829,64 | 657,64 | 89,4028 | ZO | | |
| RZ-118DI | | | | | 180,00 | 70,00 | 172,00 | 3,00 | 141,60 | 15,20 | 3,211 | 56,930 | 3,29 | 0,082 | 827,80 | 655,80 | 89,1531 | ZO | | |
| RZ-119I | 17,60 | 0,35 | 20,40 | 180,00 | 22,00 | 43,80 | 1,30 | 20,00 | 11,90 | 4,991 | 69,370 | 5,34 | 1,217 | 96,60 | 52,80 | 10,5885 | ZH | | | |
| RZ-119X | | | | 270,00 | 22,00 | 43,80 | 1,30 | 20,40 | 11,70 | 4,991 | 69,370 | 5,31 | 1,191 | 97,83 | 54,03 | 10,7883 | ZH | | | |
| RZ-120I | | | | 180,00 | 32,00 | 64,60 | 1,80 | 40,80 | 11,90 | 4,991 | 69,370 | 4,44 | 0,571 | 177,26 | 112,66 | 20,9772 | ZK | | | |
| RZ-120X | | | | 270,00 | 32,00 | 64,60 | 1,80 | 41,20 | 11,70 | 4,991 | 69,370 | 4,43 | 0,566 | 178,41 | 113,81 | 21,1770 | ZK | | | |
| RZ-121I | | | | 180,00 | 41,00 | 88,60 | 1,80 | 64,80 | 11,90 | 4,991 | 69,370 | 4,08 | 0,354 | 270,24 | 181,64 | 32,9642 | ZL | | | |
| RZ-121X | | | | 270,00 | 41,00 | 88,60 | 1,80 | 65,20 | 11,70 | 4,991 | 69,370 | 4,08 | 0,352 | 271,39 | 182,79 | 33,1640 | ZL | | | |
| RZ-121AI | | | | 180,00 | 44,00 | 99,80 | 1,80 | 76,00 | 11,90 | 4,991 | 69,370 | 3,98 | 0,301 | 313,63 | 213,83 | 38,5581 | ZL | | | |
| RZ-121AX | | | | 270,00 | 44,00 | 99,80 | 1,80 | 76,40 | 11,70 | 4,991 | 69,370 | 3,98 | 0,299 | 314,80 | 215,00 | 38,7579 | ZL | | | |
| RZ-121BI | | | | 180,00 | 47,00 | 111,00 | 2,40 | 87,20 | 11,90 | 4,991 | 69,370 | 3,92 | 0,262 | 357,01 | 246,01 | 44,1520 | ZM | | | |
| RZ-121BX | | | | 270,00 | 47,00 | 111,00 | 2,40 | 87,60 | 11,70 | 4,991 | 69,370 | 3,91 | 0,260 | 358,16 | 247,16 | 44,3518 | ZM | | | |
| RZ-121CI | | | | 180,00 | 50,00 | 123,00 | 2,40 | 98,40 | 12,30 | 4,991 | 69,370 | 3,88 | 0,231 | 401,20 | 278,20 | 49,7459 | ZN | | | |
| RZ-121CX | | | | 270,00 | 50,00 | 123,00 | 2,40 | 98,80 | 12,10 | 4,991 | 69,370 | 3,88 | 0,230 | 402,35 | 279,35 | 49,9457 | ZN | | | |
| RZ-121DI | | | | 180,00 | 54,00 | 136,00 | 2,40 | 112,80 | 11,60 | 4,991 | 69,370 | 3,83 | 0,201 | 455,59 | 319,59 | 56,9381 | ZN | | | |
| RZ-121DX | | | | 270,00 | 54,00 | 136,00 | 2,40 | 113,20 | 11,40 | 4,991 | 69,370 | 3,83 | 0,201 | 456,74 | 320,74 | 57,1379 | ZN | | | |
| RZ-121EI | | | | 180,00 | 57,00 | 149,00 | 2,40 | 125,60 | 11,70 | 4,991 | 69,370 | 3,80 | 0,181 | 505,38 | 356,38 | 63,3312 | ZO | | | |
| RZ-121EX | | | | 270,00 | 57,00 | 149,00 | 2,40 | 126,00 | 11,50 | 4,991 | 69,370 | 3,80 | 0,180 | 506,53 | 357,53 | 63,5310 | ZO | | | |
| RZ-121FI | | | | 15,50 | 0,35 | 18,30 | 180,00 | 22,00 | 43,50 | 1,30 | 23,20 | 10,15 | 5,811 | 78,310 | 5,80 | 1,582 | 89,34 | 45,84 | 10,5872 | ZH |
| RZ-121FX | | | | | | | 270,00 | 22,00 | 43,50 | 1,30 | 23,60 | 9,95 | 5,811 | 78,310 | 5,76 | 1,553 | 90,19 | 46,69 | 10,7608 | ZH |
| RZ-121GI | | | | | | | 180,00 | 31,00 | 66,00 | 1,80 | 45,60 | 10,20 | 5,811 | 78,310 | 4,96 | 0,776 | 159,38 | 93,38 | 20,3067 | ZK |
| RZ-121GX | | | | | | | 270,00 | 32,00 | 66,00 | 1,80 | 46,00 | 10,00 | 5,811 | 78,310 | 4,95 | 0,769 | 160,23 | 94,23 | 20,4802 | ZK |
| RZ-121HI | 180,00 | 35,00 | 75,50 | | | | 1,80 | 55,20 | 10,15 | 5,811 | 78,310 | 4,79 | 0,637 | 189,25 | 113,75 | 24,4722 | ZL | | | |
| RZ-121HX | 270,00 | 35,00 | 75,50 | | | | 1,80 | 55,60 | 9,95 | 5,811 | 78,310 | 4,78 | 0,633 | 190,10 | 114,60 | 24,6457 | ZL | | | |
| RZ-121JI | 180,00 | 38,00 | 86,50 | | | | 1,80 | 66,40 | 10,05 | 5,811 | 78,310 | 4,65 | 0,527 | 224,02 | 137,52 | 29,3319 | ZL | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|--------|
| RZ-121JX | 1,60 | 15,50 | 0,35 | 18,30 | 270,00 | 38,00 | 86,50 | 1,80 | 66,80 | 9,85 | 5,811 | 78,310 | 4,65 | 0,524 | 224,87 | 138,37 | 29,5054 | ZL | | |
| RZ-121KI | | | | | 180,00 | 41,00 | 96,00 | 1,80 | 76,00 | 10,00 | 5,811 | 78,310 | 4,55 | 0,459 | 253,89 | 157,89 | 33,4973 | ZM | | |
| RZ-121KX | | | | | 270,00 | 41,00 | 96,00 | 1,80 | 76,40 | 9,80 | 5,811 | 78,310 | 4,55 | 0,457 | 254,74 | 158,74 | 33,6709 | ZM | | |
| RZ-121LI | | | | | 180,00 | 44,00 | 107,50 | 2,40 | 87,20 | 10,15 | 5,811 | 78,310 | 4,47 | 0,399 | 289,16 | 181,66 | 38,3571 | ZN | | |
| RZ-121LX | | | | | 270,00 | 44,00 | 107,50 | 2,40 | 87,60 | 9,95 | 5,811 | 78,310 | 4,47 | 0,397 | 290,01 | 182,51 | 38,5306 | ZN | | |
| RZ-121MI | | | | | 180,00 | 47,00 | 120,00 | 2,40 | 100,00 | 10,00 | 5,811 | 78,310 | 4,42 | 0,347 | 328,82 | 208,82 | 43,9110 | ZN | | |
| RZ-121MX | | | | | 270,00 | 47,00 | 120,00 | 2,40 | 100,40 | 9,80 | 5,811 | 78,310 | 4,42 | 0,346 | 329,67 | 209,67 | 44,0846 | ZN | | |
| RZ-121NI | | | | | 180,00 | 50,00 | 133,00 | 2,40 | 112,80 | 10,10 | 5,811 | 78,310 | 4,38 | 0,307 | 368,99 | 235,99 | 49,4650 | ZO | | |
| RZ-121NX | | | | | 270,00 | 50,00 | 133,00 | 2,40 | 113,20 | 9,90 | 5,811 | 78,310 | 4,38 | 0,306 | 369,84 | 236,84 | 49,6386 | ZO | | |
| RZ-122I | | | | | 14,10 | 0,30 | 16,80 | 180,00 | 19,00 | 38,20 | 0,80 | 20,00 | 9,10 | 6,311 | 85,630 | 6,98 | 2,553 | 69,27 | 31,07 | 8,2723 |
| RZ-122X | 270,00 | 20,00 | 38,20 | 0,80 | | | | 20,40 | 8,90 | 6,311 | 85,630 | 6,93 | 2,499 | 69,95 | 31,75 | 8,4283 | ZH | | | |
| RZ-123I | 180,00 | 28,00 | 59,00 | 1,10 | | | | 40,80 | 9,10 | 6,311 | 85,630 | 5,78 | 1,198 | 125,20 | 66,20 | 16,3884 | ZJ | | | |
| RZ-123X | 270,00 | 29,00 | 59,00 | 1,10 | | | | 41,20 | 8,90 | 6,311 | 85,630 | 5,77 | 1,186 | 125,88 | 66,88 | 16,5445 | ZJ | | | |
| RZ-124I | 180,00 | 36,00 | 83,00 | 1,50 | | | | 64,80 | 9,10 | 6,311 | 85,630 | 5,31 | 0,743 | 189,73 | 106,73 | 25,7533 | ZJ | | | |
| RZ-124X | 270,00 | 36,00 | 83,00 | 1,50 | | | | 65,20 | 8,90 | 6,311 | 85,630 | 5,31 | 0,739 | 190,41 | 107,41 | 25,9093 | ZJ | | | |
| RZ-124AI | 180,00 | 39,00 | 94,20 | 1,50 | | | | 76,00 | 9,10 | 6,311 | 85,630 | 5,18 | 0,631 | 219,85 | 125,65 | 30,1235 | ZL | | | |
| RZ-124AX | 270,00 | 39,00 | 94,20 | 1,50 | | | | 76,40 | 8,90 | 6,311 | 85,630 | 5,17 | 0,628 | 220,52 | 126,32 | 30,2796 | ZL | | | |
| RZ-124BI | 180,00 | 42,00 | 105,00 | 2,00 | | | | 87,20 | 8,90 | 6,311 | 85,630 | 5,09 | 0,549 | 249,56 | 144,56 | 34,4938 | ZL | | | |
| RZ-124BX | 270,00 | 42,00 | 105,00 | 2,00 | | | | 87,60 | 8,70 | 6,311 | 85,630 | 5,09 | 0,546 | 250,24 | 145,24 | 34,6498 | ZL | | | |
| RZ-124CI | 180,00 | 45,00 | 118,00 | 2,00 | | | | 100,00 | 9,00 | 6,311 | 85,630 | 5,03 | 0,477 | 284,18 | 166,18 | 39,4883 | ZM | | | |
| RZ-124CX | 270,00 | 45,00 | 118,00 | 2,00 | | | | 100,40 | 8,80 | 6,311 | 85,630 | 5,03 | 0,475 | 284,86 | 166,86 | 39,6444 | ZM | | | |
| RZ-124DI | 180,00 | 48,00 | 131,00 | 2,00 | | | | 112,80 | 9,10 | 6,311 | 85,630 | 4,98 | 0,422 | 318,80 | 187,80 | 44,4829 | ZM | | | |
| RZ-124DX | 270,00 | 48,00 | 131,00 | 2,00 | | | | 113,20 | 8,90 | 6,311 | 85,630 | 4,98 | 0,421 | 319,47 | 188,47 | 44,6390 | ZM | | | |
| RZ-124EI | 180,00 | 50,00 | 143,00 | 2,00 | | | | 124,00 | 9,50 | 6,311 | 85,630 | 4,94 | 0,384 | 349,71 | 206,71 | 48,8532 | ZN | | | |
| RZ-124EX | 270,00 | 50,00 | 143,00 | 2,00 | | | | 124,40 | 9,30 | 6,311 | 85,630 | 4,94 | 0,383 | 350,39 | 207,39 | 49,0092 | ZN | | | |
| RZ-124F-01I | 12,70 | 0,30 | 15,40 | 180,00 | | | | 17,00 | 36,00 | 0,80 | 20,00 | 8,00 | 6,661 | 94,450 | 7,07 | 3,646 | 60,10 | 24,10 | 7,3458 | ZH |
| RZ-124F-01X | | | | 270,00 | | | | 17,00 | 36,00 | 0,80 | 20,40 | 7,80 | 6,661 | 94,450 | 7,05 | 3,568 | 60,60 | 24,60 | 7,4844 | ZH |
| RZ-124F-02I | | | | 180,00 | | | | 26,00 | 52,00 | 1,10 | 36,00 | 8,00 | 6,661 | 94,450 | 6,70 | 1,950 | 97,00 | 45,00 | 12,8897 | ZJ |
| RZ-124F-02X | | | | 270,00 | | | | 26,00 | 52,00 | 1,10 | 36,40 | 7,80 | 6,661 | 94,450 | 6,70 | 1,928 | 97,50 | 45,50 | 13,0283 | ZJ |
| RZ-124FI | | | | 180,00 | 32,00 | 68,00 | 1,50 | 52,80 | 8,00 | 6,661 | 94,450 | 6,54 | 1,310 | 135,00 | 67,00 | 18,7109 | ZJ | | | |
| RZ-124FX | | | | 270,00 | 32,00 | 68,00 | 1,50 | 52,40 | 7,80 | 6,661 | 94,450 | 6,53 | 1,321 | 134,47 | 66,47 | 18,5723 | ZJ | | | |
| RZ-124GI | | | | 180,00 | 38,00 | 92,00 | 1,50 | 76,00 | 8,00 | 6,661 | 94,450 | 6,14 | 0,902 | 189,36 | 97,36 | 26,7497 | ZL | | | |
| RZ-124GX | | | | 270,00 | 38,00 | 92,00 | 1,50 | 76,40 | 7,80 | 6,661 | 94,450 | 6,14 | 0,897 | 189,88 | 97,88 | 26,8883 | ZL | | | |

Extension springs

| artel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|--------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|--------|
| Z-121JX | 1,60 | 15,50 | 0,35 | 18,30 | 270,00 | 38,00 | 86,50 | 1,80 | 66,80 | 9,85 | 7,331 | 92,710 | 4,86 | 0,610 | 226,46 | 139,96 | 29,5100 | ZH | | |
| Z-121KI | | | | | 180,00 | 41,00 | 96,00 | 1,80 | 76,00 | 10,00 | 7,331 | 92,710 | 4,77 | 0,535 | 255,58 | 159,58 | 33,4800 | ZJ | | |
| Z-121KX | | | | | 270,00 | 41,00 | 96,00 | 1,80 | 76,40 | 9,80 | 7,331 | 92,710 | 4,76 | 0,532 | 256,48 | 160,48 | 33,6500 | ZJ | | |
| Z-121LI | | | | | 180,00 | 44,00 | 107,50 | 2,40 | 87,20 | 10,15 | 7,331 | 92,710 | 4,69 | 0,465 | 291,11 | 183,61 | 38,3100 | ZK | | |
| Z-121LX | | | | | 270,00 | 44,00 | 107,50 | 2,40 | 87,60 | 9,95 | 7,331 | 92,710 | 4,69 | 0,463 | 291,90 | 184,40 | 38,4800 | ZK | | |
| Z-121MI | | | | | 180,00 | 47,00 | 120,00 | 2,40 | 100,00 | 10,00 | 7,331 | 92,710 | 4,64 | 0,404 | 331,33 | 211,33 | 43,8300 | ZK | | |
| Z-121MX | | | | | 270,00 | 47,00 | 120,00 | 2,40 | 100,40 | 9,80 | 7,331 | 92,710 | 4,64 | 0,403 | 331,85 | 211,85 | 44,0000 | ZK | | |
| Z-121NI | | | | | 180,00 | 50,00 | 133,00 | 2,40 | 112,80 | 10,10 | 7,331 | 92,710 | 4,60 | 0,358 | 371,48 | 238,48 | 49,3500 | ZL | | |
| Z-121NX | | | | | 270,00 | 50,00 | 133,00 | 2,40 | 113,20 | 9,90 | 7,331 | 92,710 | 4,60 | 0,356 | 372,82 | 239,82 | 49,5300 | ZL | | |
| Z-122I | | | | | 14,10 | 0,30 | 16,80 | 180,00 | 19,00 | 38,20 | 0,80 | 20,00 | 9,10 | 7,881 | 101,300 | 7,21 | 2,972 | 69,66 | 31,46 | 8,3820 |
| Z-122X | 270,00 | 20,00 | 38,20 | 0,80 | | | | 20,40 | 8,90 | 7,881 | 101,300 | 7,17 | 2,909 | 70,34 | 32,14 | 8,5370 | ZE | | | |
| Z-123I | 180,00 | 28,00 | 59,00 | 1,10 | | | | 40,80 | 9,10 | 7,881 | 101,300 | 6,01 | 1,395 | 126,02 | 67,02 | 16,4500 | ZF | | | |
| Z-123X | 270,00 | 29,00 | 59,00 | 1,10 | | | | 41,20 | 8,90 | 7,881 | 101,300 | 6,00 | 1,381 | 126,71 | 67,71 | 16,6100 | ZF | | | |
| Z-124I | 180,00 | 36,00 | 83,00 | 1,50 | | | | 64,80 | 9,10 | 7,881 | 101,300 | 5,55 | 0,865 | 190,99 | 107,99 | 25,7700 | ZF | | | |
| Z-124X | 270,00 | 36,00 | 83,00 | 1,50 | | | | 65,20 | 8,90 | 7,881 | 101,300 | 5,54 | 0,860 | 191,62 | 108,62 | 25,9200 | ZF | | | |
| Z-124AI | 180,00 | 39,00 | 94,20 | 1,50 | | | | 76,00 | 9,10 | 7,881 | 101,300 | 5,41 | 0,735 | 221,30 | 127,10 | 30,1100 | ZH | | | |
| Z-124AX | 270,00 | 39,00 | 94,20 | 1,50 | | | | 76,40 | 8,90 | 7,881 | 101,300 | 5,41 | 0,731 | 221,99 | 127,79 | 30,2700 | ZH | | | |
| Z-124BI | 180,00 | 42,00 | 105,00 | 2,00 | | | | 87,20 | 8,90 | 7,881 | 101,300 | 5,32 | 0,639 | 251,19 | 146,19 | 34,4600 | ZH | | | |
| Z-124BX | 270,00 | 42,00 | 105,00 | 2,00 | | | | 87,60 | 8,70 | 7,881 | 101,300 | 5,32 | 0,636 | 251,88 | 146,88 | 34,6200 | ZH | | | |
| Z-124CI | 180,00 | 45,00 | 118,00 | 2,00 | | | | 100,00 | 9,00 | 7,881 | 101,300 | 5,27 | 0,556 | 286,02 | 168,02 | 39,4300 | ZJ | | | |
| Z-124CX | 270,00 | 45,00 | 118,00 | 2,00 | | | | 100,40 | 8,80 | 7,881 | 101,300 | 5,27 | 0,554 | 286,62 | 168,62 | 39,5900 | ZJ | | | |
| Z-124DI | 180,00 | 48,00 | 131,00 | 2,00 | | | | 112,80 | 9,10 | 7,881 | 101,300 | 5,22 | 0,492 | 320,87 | 189,87 | 44,4000 | ZJ | | | |
| Z-124DX | 270,00 | 48,00 | 131,00 | 2,00 | | | | 113,20 | 8,90 | 7,881 | 101,300 | 5,22 | 0,490 | 321,65 | 190,65 | 44,5500 | ZJ | | | |
| Z-124EI | 180,00 | 50,00 | 143,00 | 2,00 | | | | 124,00 | 9,50 | 7,881 | 101,300 | 5,18 | 0,447 | 351,99 | 208,99 | 48,7500 | ZK | | | |
| Z-124EX | 270,00 | 50,00 | 143,00 | 2,00 | | | | 124,40 | 9,30 | 7,881 | 101,300 | 5,18 | 0,445 | 352,93 | 209,93 | 48,9000 | ZK | | | |
| Z-124F-01I | 12,70 | 0,30 | 15,40 | 180,00 | | | | 17,00 | 36,00 | 0,80 | 20,00 | 8,00 | 8,331 | 111,800 | 7,07 | 4,245 | 60,37 | 24,37 | 7,3450 | ZF |
| Z-124F-01X | | | | 270,00 | | | | 17,00 | 36,00 | 0,80 | 20,40 | 7,80 | 8,331 | 111,800 | 7,05 | 4,155 | 60,90 | 24,90 | 7,4844 | ZF |
| Z-124F-02I | | | | 180,00 | | | | 26,00 | 52,00 | 1,10 | 36,00 | 8,00 | 8,331 | 111,800 | 6,70 | 2,271 | 97,57 | 45,57 | 12,8890 | ZF |
| Z-124F-02X | | | | 270,00 | | | | 26,00 | 52,00 | 1,10 | 36,40 | 7,80 | 8,331 | 111,800 | 6,70 | 2,244 | 98,10 | 46,10 | 13,0280 | ZF |
| Z-124FI | | | | 180,00 | | | | 32,00 | 68,00 | 1,50 | 52,80 | 8,00 | 8,331 | 111,800 | 6,60 | 1,550 | 134,77 | 66,77 | 18,7100 | ZF |
| Z-124FX | | | | 270,00 | | | | 32,00 | 68,00 | 1,50 | 52,40 | 7,80 | 8,331 | 111,800 | 6,60 | 1,538 | 135,30 | 67,30 | 18,6200 | ZF |
| Z-124GI | | | | 180,00 | | | | 38,00 | 92,00 | 1,50 | 76,00 | 8,00 | 8,331 | 111,800 | 6,40 | 1,050 | 190,57 | 98,57 | 26,7600 | ZH |
| Z-124GX | | | | 270,00 | | | | 38,00 | 92,00 | 1,50 | 76,40 | 7,80 | 8,331 | 111,800 | 6,40 | 1,044 | 191,10 | 99,10 | 26,8900 | ZH |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| Z-124HI | 1,60 | 12,70 | 0,30 | 15,40 | 180,00 | 44,00 | 115,00 | 2,00 | 98,40 | 8,30 | 8,331 | 111,800 | 6,23 | 0,807 | 243,25 | 128,25 | 34,4800 | ZJ | | |
| Z-124HX | | | | | 270,00 | 44,00 | 115,00 | 2,00 | 98,86 | 8,10 | 8,331 | 111,800 | 6,23 | 0,804 | 243,78 | 128,78 | 34,6200 | ZJ | | |
| Z-124JI | | | | | 180,00 | 49,00 | 139,00 | 2,00 | 122,40 | 8,30 | 8,331 | 111,800 | 6,12 | 0,647 | 299,05 | 160,05 | 42,7600 | ZL | | |
| Z-124JX | | | | | 270,00 | 49,00 | 139,00 | 2,00 | 122,80 | 8,10 | 8,331 | 111,800 | 6,12 | 0,644 | 299,58 | 160,58 | 42,9000 | ZL | | |
| Z-125I | 11,60 | 0,25 | 14,30 | 180,00 | 19,00 | 34,20 | 0,80 | 20,00 | 7,10 | 9,881 | 121,500 | 10,22 | 5,806 | 53,44 | 19,24 | 6,7120 | ZE | | | |
| Z-125X | | | | 270,00 | 19,00 | 34,20 | 0,86 | 20,40 | 6,90 | 9,881 | 121,500 | 10,15 | 5,682 | 53,86 | 19,66 | 6,8350 | ZE | | | |
| Z-126I | | | | 180,00 | 27,00 | 55,00 | 1,10 | 40,80 | 7,10 | 9,881 | 121,500 | 8,45 | 2,725 | 95,99 | 40,99 | 13,1700 | ZF | | | |
| Z-126X | | | | 270,00 | 27,00 | 55,00 | 1,10 | 41,20 | 6,90 | 9,881 | 121,500 | 8,43 | 2,698 | 96,40 | 41,40 | 13,3000 | ZF | | | |
| Z-127I | | | | 180,00 | 35,00 | 79,00 | 1,50 | 64,80 | 7,10 | 9,881 | 121,500 | 7,76 | 1,690 | 145,08 | 66,08 | 20,6400 | ZF | | | |
| Z-127X | | | | 270,00 | 35,00 | 79,00 | 1,50 | 65,20 | 6,90 | 9,881 | 121,500 | 7,76 | 1,680 | 145,50 | 66,50 | 20,7600 | ZF | | | |
| Z-127AI | | | | 180,00 | 38,00 | 93,60 | 1,50 | 79,20 | 7,20 | 9,881 | 121,500 | 7,51 | 1,377 | 174,74 | 81,14 | 25,1100 | ZG | | | |
| Z-127AX | | | | 270,00 | 39,00 | 93,60 | 1,50 | 79,60 | 7,00 | 9,881 | 121,500 | 7,51 | 1,370 | 175,15 | 81,55 | 25,2400 | ZG | | | |
| Z-127BI | | | | 180,00 | 41,00 | 104,00 | 2,00 | 90,40 | 6,80 | 9,881 | 121,500 | 7,41 | 1,203 | 196,85 | 92,85 | 28,5900 | ZG | | | |
| Z-127BX | | | | 270,00 | 41,00 | 104,00 | 2,00 | 90,80 | 6,60 | 9,881 | 121,500 | 7,41 | 1,198 | 197,26 | 93,26 | 28,7200 | ZG | | | |
| Z-127CI | | | | 180,00 | 44,00 | 117,00 | 2,00 | 103,20 | 6,90 | 9,881 | 121,500 | 7,33 | 1,051 | 223,23 | 106,23 | 32,5700 | ZH | | | |
| Z-127CX | | | | 270,00 | 44,00 | 117,00 | 2,00 | 103,60 | 6,70 | 9,881 | 121,500 | 7,33 | 1,047 | 223,65 | 106,65 | 32,7000 | ZH | | | |
| Z-127DI | | | | 180,00 | 47,00 | 130,00 | 2,00 | 116,00 | 7,00 | 9,881 | 121,500 | 7,26 | 0,934 | 249,61 | 119,61 | 36,5500 | ZH | | | |
| Z-127DX | | | | 270,00 | 47,00 | 130,00 | 2,00 | 116,40 | 6,80 | 9,881 | 121,500 | 7,26 | 0,931 | 250,03 | 120,03 | 36,6800 | ZH | | | |
| Z-127EI | | | | 180,00 | 49,00 | 143,00 | 2,00 | 128,80 | 7,10 | 9,881 | 121,500 | 7,19 | 0,840 | 276,00 | 133,00 | 40,5300 | ZJ | | | |
| Z-127EX | | | | 270,00 | 49,00 | 143,00 | 2,00 | 129,20 | 6,90 | 9,881 | 121,500 | 7,19 | 0,837 | 276,41 | 133,41 | 40,6600 | ZJ | | | |
| Z-128I | | | | 9,60 | 0,25 | 12,30 | 180,00 | 18,00 | 31,00 | 0,80 | 20,00 | 5,50 | 11,880 | 144,100 | 15,49 | 11,339 | 42,66 | 11,66 | 5,3770 | ZE |
| Z-128X | | | | | | | 270,00 | 18,00 | 31,00 | 0,80 | 20,40 | 5,30 | 11,880 | 144,100 | 15,38 | 11,098 | 42,92 | 11,92 | 5,4760 | ZE |
| Z-129I | | | | | | | 180,00 | 26,00 | 51,80 | 1,10 | 40,80 | 5,50 | 11,880 | 144,100 | 12,68 | 5,322 | 76,65 | 24,85 | 10,5600 | ZE |
| Z-129X | | | | | | | 270,00 | 27,00 | 51,80 | 1,10 | 41,20 | 5,30 | 11,880 | 144,100 | 12,65 | 5,269 | 76,90 | 25,10 | 10,6600 | ZE |
| Z-129AI | 180,00 | 29,00 | 61,40 | | | | 1,10 | 50,40 | 5,50 | 11,880 | 144,100 | 12,10 | 4,275 | 92,34 | 30,94 | 12,9500 | ZF | | | |
| Z-129AX | 270,00 | 30,00 | 61,40 | | | | 1,10 | 50,80 | 5,30 | 11,880 | 144,100 | 12,08 | 4,241 | 92,59 | 31,19 | 13,0500 | ZF | | | |
| Z-130I | 180,00 | 34,00 | 75,80 | | | | 1,50 | 64,80 | 5,50 | 11,880 | 144,100 | 11,59 | 3,301 | 115,87 | 40,07 | 16,5400 | ZF | | | |
| Z-130X | 270,00 | 34,00 | 75,80 | | | | 1,50 | 65,20 | 5,30 | 11,880 | 144,100 | 11,58 | 3,281 | 116,12 | 40,32 | 16,6400 | ZF | | | |
| Z-130AI | 180,00 | 36,00 | 87,00 | | | | 1,50 | 76,00 | 5,50 | 11,880 | 144,100 | 11,27 | 2,804 | 134,17 | 47,17 | 19,3300 | ZG | | | |
| Z-130AX | 270,00 | 37,00 | 87,00 | | | | 1,50 | 76,40 | 5,30 | 11,880 | 144,100 | 11,26 | 2,789 | 134,42 | 47,42 | 19,4300 | ZG | | | |
| Z-130BI | 180,00 | 39,00 | 98,20 | | | | 1,50 | 87,20 | 5,50 | 11,880 | 144,100 | 11,07 | 2,437 | 152,47 | 54,27 | 22,1200 | ZG | | | |
| Z-130BX | 270,00 | 39,00 | 98,20 | | | | 1,50 | 87,60 | 5,30 | 11,880 | 144,100 | 11,06 | 2,426 | 152,72 | 54,52 | 22,2200 | ZG | | | |
| Z-130CI | 180,00 | 42,00 | 111,00 | | | | 2,00 | 100,00 | 5,50 | 11,880 | 144,100 | 10,93 | 2,120 | 173,38 | 62,38 | 25,3100 | ZG | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| RZ-124HI | 1,60 | 12,70 | 0,30 | 15,40 | 180,00 | 44,00 | 115,00 | 2,00 | 98,40 | 8,30 | 6,661 | 94,450 | 5,97 | 0,693 | 241,67 | 126,67 | 34,5112 | ZM | | |
| RZ-124HX | | | | | 270,00 | 44,00 | 115,00 | 2,00 | 98,86 | 8,10 | 6,661 | 94,450 | 5,97 | 0,690 | 242,19 | 127,19 | 34,6706 | ZM | | |
| RZ-124JI | | | | | 180,00 | 49,00 | 139,00 | 2,00 | 122,40 | 8,30 | 6,661 | 94,450 | 5,86 | 0,555 | 297,07 | 158,07 | 42,8272 | ZO | | |
| RZ-124JX | | | | | 270,00 | 49,00 | 139,00 | 2,00 | 122,80 | 8,10 | 6,661 | 94,450 | 5,86 | 0,554 | 297,59 | 158,59 | 42,9658 | ZO | | |
| RZ-125I | 11,60 | 0,25 | 14,30 | 180,00 | 19,00 | 34,20 | 0,80 | 20,00 | 7,10 | 7,911 | 102,600 | 9,94 | 4,986 | 53,21 | 19,01 | 6,6178 | ZH | | | |
| RZ-125X | | | | 270,00 | 19,00 | 34,20 | 0,86 | 20,40 | 6,90 | 7,911 | 102,600 | 9,87 | 4,880 | 53,62 | 19,42 | 6,7427 | ZH | | | |
| RZ-126I | | | | 180,00 | 27,00 | 55,00 | 1,10 | 40,80 | 7,10 | 7,911 | 102,600 | 8,17 | 2,341 | 95,49 | 40,49 | 13,1108 | ZJ | | | |
| RZ-126X | | | | 270,00 | 27,00 | 55,00 | 1,10 | 41,20 | 6,90 | 7,911 | 102,600 | 8,15 | 2,317 | 95,91 | 40,91 | 13,2356 | ZJ | | | |
| RZ-127I | | | | 180,00 | 35,00 | 79,00 | 1,50 | 64,80 | 7,10 | 7,911 | 102,600 | 7,48 | 1,452 | 144,28 | 65,28 | 20,6026 | ZJ | | | |
| RZ-127X | | | | 270,00 | 35,00 | 79,00 | 1,50 | 65,20 | 6,90 | 7,911 | 102,600 | 7,47 | 1,443 | 144,70 | 65,70 | 20,7275 | ZJ | | | |
| RZ-127AI | | | | 180,00 | 38,00 | 93,60 | 1,50 | 79,20 | 7,20 | 7,911 | 102,600 | 7,23 | 1,182 | 173,76 | 80,16 | 25,0977 | ZK | | | |
| RZ-127AX | | | | 270,00 | 39,00 | 93,60 | 1,50 | 79,60 | 7,00 | 7,911 | 102,600 | 7,22 | 1,176 | 174,17 | 80,57 | 25,2226 | ZK | | | |
| RZ-127BI | | | | 180,00 | 41,00 | 104,00 | 2,00 | 90,40 | 6,80 | 7,911 | 102,600 | 7,13 | 1,033 | 195,73 | 91,73 | 28,5939 | ZK | | | |
| RZ-127BX | | | | 270,00 | 41,00 | 104,00 | 2,00 | 90,80 | 6,60 | 7,911 | 102,600 | 7,13 | 1,029 | 196,14 | 92,14 | 28,7188 | ZK | | | |
| RZ-127CI | | | | 180,00 | 44,00 | 117,00 | 2,00 | 103,20 | 6,90 | 7,911 | 102,600 | 7,05 | 0,903 | 221,95 | 104,95 | 32,5896 | ZL | | | |
| RZ-127CX | | | | 270,00 | 44,00 | 117,00 | 2,00 | 103,60 | 6,70 | 7,911 | 102,600 | 7,04 | 0,900 | 222,36 | 105,36 | 32,7144 | ZL | | | |
| RZ-127DI | | | | 180,00 | 47,00 | 130,00 | 2,00 | 116,00 | 7,00 | 7,911 | 102,600 | 6,98 | 0,802 | 248,17 | 118,17 | 36,5852 | ZL | | | |
| RZ-127DX | | | | 270,00 | 47,00 | 130,00 | 2,00 | 116,40 | 6,80 | 7,911 | 102,600 | 6,97 | 0,799 | 248,59 | 118,59 | 36,7101 | ZL | | | |
| RZ-127EI | | | | 180,00 | 49,00 | 143,00 | 2,00 | 128,80 | 7,10 | 7,911 | 102,600 | 6,91 | 0,721 | 274,39 | 131,39 | 40,5809 | ZM | | | |
| RZ-127EX | | | | 270,00 | 49,00 | 143,00 | 2,00 | 129,20 | 6,90 | 7,911 | 102,600 | 6,91 | 0,719 | 274,81 | 131,81 | 40,7058 | ZM | | | |
| RZ-128I | | | | 9,60 | 0,25 | 12,30 | 180,00 | 18,00 | 31,00 | 0,80 | 20,00 | 5,50 | 9,511 | 121,700 | 15,15 | 9,739 | 42,53 | 11,53 | 5,2942 | ZH |
| RZ-128X | | | | | | | 270,00 | 18,00 | 31,00 | 0,80 | 20,40 | 5,30 | 9,511 | 121,700 | 15,04 | 9,532 | 42,78 | 11,78 | 5,3941 | ZH |
| RZ-129I | | | | | | | 180,00 | 26,00 | 51,80 | 1,10 | 40,80 | 5,50 | 9,511 | 121,700 | 12,35 | 4,571 | 76,35 | 24,55 | 10,4886 | ZH |
| RZ-129X | | | | | | | 270,00 | 27,00 | 51,80 | 1,10 | 41,20 | 5,30 | 9,511 | 121,700 | 12,32 | 4,525 | 76,60 | 24,80 | 10,5885 | ZH |
| RZ-129AI | 180,00 | 29,00 | 61,40 | | | | 1,10 | 50,40 | 5,50 | 9,511 | 121,700 | 11,76 | 3,672 | 91,97 | 30,57 | 12,8860 | ZJ | | | |
| RZ-129AX | 270,00 | 30,00 | 61,40 | | | | 1,10 | 50,80 | 5,30 | 9,511 | 121,700 | 11,74 | 3,642 | 92,22 | 30,82 | 12,9859 | ZJ | | | |
| RZ-130I | 180,00 | 34,00 | 75,80 | | | | 1,50 | 64,80 | 5,50 | 9,511 | 121,700 | 11,26 | 2,835 | 115,34 | 39,54 | 16,4821 | ZJ | | | |
| RZ-130X | 270,00 | 34,00 | 75,80 | | | | 1,50 | 65,20 | 5,30 | 9,511 | 121,700 | 11,24 | 2,818 | 115,64 | 39,84 | 16,5820 | ZJ | | | |
| RZ-130AI | 180,00 | 36,00 | 87,00 | | | | 1,50 | 76,00 | 5,50 | 9,511 | 121,700 | 10,94 | 2,409 | 133,60 | 46,60 | 19,2790 | ZK | | | |
| RZ-130AX | 270,00 | 37,00 | 87,00 | | | | 1,50 | 76,40 | 5,30 | 9,511 | 121,700 | 10,93 | 2,396 | 133,85 | 46,85 | 19,3789 | ZK | | | |
| RZ-130BI | 180,00 | 39,00 | 98,20 | | | | 1,50 | 87,20 | 5,50 | 9,511 | 121,700 | 10,73 | 2,093 | 151,82 | 53,62 | 22,0760 | ZK | | | |
| RZ-130BX | 270,00 | 39,00 | 98,20 | | | | 1,50 | 87,60 | 5,30 | 9,511 | 121,700 | 10,73 | 2,084 | 152,07 | 53,87 | 22,1759 | ZK | | | |
| RZ-130CI | 180,00 | 42,00 | 111,00 | | | | 2,00 | 100,00 | 5,50 | 9,511 | 121,700 | 10,60 | 1,821 | 172,64 | 61,64 | 25,2725 | ZK | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|---------|----|
| RZ-130CX | 1,60 | 9,60 | 0,25 | 12,30 | 270,00 | 42,00 | 111,00 | 2,00 | 100,40 | 5,30 | 9,511 | 121,700 | 10,59 | 1,814 | 172,89 | 61,89 | 25,3724 | ZK | | | |
| RZ-130DI | | | | | 180,00 | 45,00 | 123,00 | 2,00 | 112,80 | 5,10 | 9,511 | 121,700 | 10,48 | 1,612 | 192,65 | 69,65 | 28,4691 | ZL | | | |
| RZ-130DX | | | | | 270,00 | 45,00 | 123,00 | 2,00 | 113,20 | 4,90 | 9,511 | 121,700 | 10,48 | 1,606 | 192,90 | 69,90 | 28,5690 | ZL | | | |
| RZ-130EI | | | | | 180,00 | 47,00 | 136,00 | 2,00 | 125,60 | 5,20 | 9,511 | 121,700 | 10,38 | 1,445 | 213,67 | 77,67 | 31,6656 | ZL | | | |
| RZ-130EX | | | | | 270,00 | 47,00 | 136,00 | 2,00 | 126,00 | 5,00 | 9,511 | 121,700 | 10,37 | 1,441 | 213,92 | 77,92 | 31,7655 | ZL | | | |
| RZ-130E-011 | 8,00 | 0,35 | 10,80 | 180,00 | 15,00 | 23,60 | 0,60 | 15,20 | 4,20 | 14,200 | 142,200 | 26,92 | 25,735 | 28,58 | 4,98 | 3,2764 | ZH | | | | |
| RZ-130E-01X | | | | 270,00 | 15,00 | 23,60 | 0,60 | 15,60 | 4,00 | 14,200 | 142,200 | 26,57 | 25,000 | 28,72 | 5,12 | 3,3564 | ZH | | | | |
| RZ-130E-02I | | | | 180,00 | 20,00 | 33,20 | 0,80 | 24,80 | 4,20 | 14,200 | 142,200 | 21,90 | 15,086 | 41,69 | 8,49 | 5,1944 | ZH | | | | |
| RZ-130E-02X | | | | 270,00 | 20,00 | 33,20 | 0,80 | 25,20 | 4,00 | 14,200 | 142,200 | 21,81 | 14,831 | 41,84 | 8,64 | 5,2743 | ZH | | | | |
| RZ-130E-03I | | | | 180,00 | 25,00 | 46,00 | 1,10 | 37,60 | 4,20 | 14,200 | 142,200 | 19,60 | 9,722 | 59,18 | 13,18 | 7,7516 | ZH | | | | |
| RZ-130E-03X | | | | 270,00 | 25,00 | 46,00 | 1,10 | 38,00 | 4,00 | 14,200 | 142,200 | 19,55 | 9,615 | 59,32 | 13,32 | 7,8315 | ZH | | | | |
| RZ-130E-10I | | | | 1,80 | 24,00 | 0,45 | 27,00 | 180,00 | 22,00 | 53,50 | 1,30 | 18,90 | 17,30 | 3,700 | 73,500 | 5,04 | 0,884 | 132,50 | 79,00 | 15,7873 | ZJ |
| RZ-130E-10X | | | | | | | | 270,00 | 22,00 | 53,50 | 1,30 | 19,35 | 17,08 | 3,700 | 73,500 | 5,04 | 0,861 | 134,50 | 81,00 | 16,1382 | ZJ |
| RZ-130E-11I | | | | | | | | 180,00 | 30,00 | 64,20 | 1,80 | 29,70 | 17,25 | 3,700 | 73,500 | 4,70 | 0,542 | 193,10 | 128,90 | 24,2072 | ZK |
| RZ-130E-11X | | | | | | | | 270,00 | 30,00 | 64,20 | 1,80 | 30,15 | 17,03 | 3,700 | 73,500 | 4,70 | 0,533 | 195,10 | 130,90 | 24,5581 | ZK |
| RZ-130E-12X | 270,00 | 37,00 | 80,30 | | | | | 1,80 | 46,35 | 16,98 | 3,700 | 73,500 | 4,60 | 0,339 | 286,10 | 205,80 | 37,1879 | ZK | | | |
| RZ-130E-12I | 180,00 | 37,00 | 80,30 | | | | | 1,80 | 45,90 | 17,20 | 3,700 | 73,500 | 4,60 | 0,343 | 286,00 | 203,70 | 36,8371 | ZK | | | |
| RZ-130E-13I | 180,00 | 46,00 | 107,50 | | | | | 2,40 | 72,90 | 17,30 | 3,700 | 73,500 | 4,50 | 0,213 | 435,90 | 328,40 | 57,8869 | ZL | | | |
| RZ-130E-13X | 270,00 | 46,00 | 107,50 | | | | | 2,40 | 73,35 | 17,08 | 3,700 | 73,500 | 4,50 | 0,211 | 438,00 | 330,50 | 58,2377 | ZL | | | |
| RZ-130E-14I | 180,00 | 58,00 | 143,50 | | | | | 2,40 | 108,90 | 17,30 | 3,700 | 73,500 | 4,50 | 0,141 | 638,20 | 494,70 | 85,9533 | ZL | | | |
| RZ-130E-14X | 270,00 | 58,00 | 143,50 | | | | | 2,40 | 109,35 | 17,08 | 3,700 | 73,500 | 4,50 | 0,141 | 640,30 | 496,80 | 86,3041 | ZL | | | |
| RZ-130E-15I | 180,00 | 66,00 | 178,00 | | | | | 3,00 | 143,10 | 17,45 | 3,700 | 73,500 | 4,50 | 0,107 | 830,70 | 652,70 | 112,6163 | ZM | | | |
| RZ-130E-15X | 270,00 | 66,00 | 178,00 | | | | | 3,00 | 143,55 | 17,23 | 3,700 | 73,500 | 4,50 | 0,107 | 832,70 | 654,70 | 112,9672 | ZM | | | |
| RZ-130FI | 20,00 | 0,45 | 23,20 | | | | | 180,00 | 20,00 | 46,00 | 1,30 | 18,90 | 13,55 | 5,511 | 84,950 | 6,92 | 1,604 | 95,53 | 49,53 | 12,9428 | ZJ |
| RZ-130FX | | | | | | | | 270,00 | 20,00 | 46,00 | 1,30 | 19,35 | 13,32 | 5,511 | 84,950 | 6,85 | 1,563 | 96,84 | 50,84 | 13,2304 | ZJ |
| RZ-130GI | | | | | | | | 180,00 | 26,00 | 56,80 | 1,30 | 29,70 | 13,55 | 5,511 | 84,950 | 5,95 | 0,983 | 137,62 | 80,82 | 19,8456 | ZJ |
| RZ-130GX | | | | | | | | 270,00 | 26,00 | 56,80 | 1,30 | 30,15 | 13,32 | 5,511 | 84,950 | 5,92 | 0,967 | 138,92 | 82,12 | 20,1332 | ZJ |
| RZ-130HI | | | | | | | | 180,00 | 32,00 | 73,00 | 1,80 | 45,90 | 13,55 | 5,511 | 84,950 | 5,39 | 0,622 | 200,74 | 127,74 | 30,1998 | ZL |
| RZ-130HX | | | | | | | | 270,00 | 32,00 | 73,00 | 1,80 | 46,35 | 13,32 | 5,511 | 84,950 | 5,38 | 0,616 | 202,05 | 129,05 | 30,4874 | ZL |
| RZ-130JI | | | | | | | | 180,00 | 41,00 | 100,00 | 1,80 | 72,90 | 13,55 | 5,511 | 84,950 | 4,96 | 0,386 | 305,95 | 205,95 | 47,4568 | ZM |
| RZ-130JX | | | | | | | | 270,00 | 41,00 | 100,00 | 1,80 | 73,35 | 13,32 | 5,511 | 84,950 | 4,96 | 0,383 | 307,25 | 207,25 | 47,7444 | ZM |
| RZ-130KI | | | | 180,00 | 40,00 | 136,00 | 2,40 | 108,90 | 13,55 | 5,511 | 84,950 | 4,72 | 0,256 | 446,23 | 310,23 | 70,4662 | ZO | | | | |
| RZ-130KX | | | | 270,00 | 50,00 | 136,00 | 2,40 | 109,35 | 13,32 | 5,511 | 84,950 | 4,72 | 0,255 | 447,53 | 311,53 | 70,7538 | ZO | | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|---------|----|
| Z-130CX | 1,60 | 9,60 | 0,25 | 12,30 | 270,00 | 42,00 | 111,00 | 2,00 | 100,40 | 5,30 | 11,880 | 144,100 | 10,93 | 2,112 | 173,64 | 62,64 | 25,4100 | ZG | | | |
| Z-130DI | | | | | 180,00 | 45,00 | 123,00 | 2,00 | 112,80 | 5,10 | 11,880 | 144,100 | 10,82 | 1,876 | 193,50 | 70,50 | 28,5000 | ZH | | | |
| Z-130DX | | | | | 270,00 | 45,00 | 123,00 | 2,00 | 113,20 | 4,90 | 11,880 | 144,100 | 10,81 | 1,870 | 193,75 | 70,75 | 28,5900 | ZH | | | |
| Z-130EI | | | | | 180,00 | 47,00 | 136,00 | 2,00 | 125,60 | 5,20 | 11,880 | 144,100 | 10,71 | 1,683 | 214,61 | 78,61 | 31,6800 | ZH | | | |
| Z-130EX | | | | | 270,00 | 47,00 | 136,00 | 2,00 | 126,00 | 5,00 | 11,880 | 144,100 | 10,71 | 1,677 | 214,86 | 78,86 | 31,7800 | ZH | | | |
| Z-130E-01I | 8,00 | 0,35 | 10,80 | 180,00 | 15,00 | 23,60 | 0,60 | 15,20 | 4,20 | 17,770 | 168,400 | 27,31 | 29,963 | 28,63 | 5,03 | 3,3520 | ZE | | | | |
| Z-130E-01X | | | | 270,00 | 15,00 | 23,60 | 0,60 | 15,60 | 4,00 | 17,770 | 168,400 | 26,97 | 29,107 | 28,78 | 5,18 | 3,4320 | ZE | | | | |
| Z-130E-02I | | | | 180,00 | 20,00 | 33,20 | 0,80 | 24,80 | 4,20 | 17,770 | 168,400 | 22,29 | 17,569 | 41,78 | 8,58 | 5,2710 | ZE | | | | |
| Z-130E-02X | | | | 270,00 | 20,00 | 33,20 | 0,80 | 25,20 | 4,00 | 17,770 | 168,400 | 22,20 | 17,267 | 41,93 | 8,73 | 5,3520 | ZE | | | | |
| Z-130E-03I | | | | 180,00 | 25,00 | 46,00 | 1,10 | 37,60 | 4,20 | 17,770 | 168,400 | 19,99 | 11,319 | 59,31 | 13,31 | 7,8300 | ZE | | | | |
| Z-130E-03X | | | | 270,00 | 25,00 | 46,00 | 1,10 | 38,00 | 4,00 | 17,770 | 168,400 | 19,94 | 11,195 | 59,46 | 13,46 | 7,9100 | ZE | | | | |
| Z-130E-10I | | | | 1,80 | 24,00 | 0,45 | 27,00 | 180,00 | 22,00 | 53,50 | 1,30 | 18,90 | 17,30 | 3,900 | 84,200 | 5,04 | 1,029 | 131,54 | 78,04 | 15,7870 | ZE |
| Z-130E-10X | | | | | | | | 270,00 | 22,00 | 53,50 | 1,30 | 19,35 | 17,08 | 3,900 | 84,200 | 5,04 | 1,003 | 133,60 | 80,10 | 16,1380 | ZE |
| Z-130E-11I | | | | | | | | 180,00 | 30,00 | 64,20 | 1,80 | 29,70 | 17,25 | 3,900 | 84,200 | 4,70 | 0,631 | 191,54 | 127,34 | 24,2070 | ZE |
| Z-130E-11X | | | | | | | | 270,00 | 30,00 | 64,20 | 1,80 | 30,15 | 17,03 | 3,900 | 84,200 | 4,70 | 0,621 | 193,59 | 129,39 | 24,5580 | ZE |
| Z-130E-12I | 180,00 | 37,00 | 80,30 | | | | | 1,80 | 45,90 | 17,20 | 3,900 | 84,200 | 4,60 | 0,399 | 283,57 | 201,27 | 36,8370 | ZF | | | |
| Z-130E-12X | 270,00 | 37,00 | 80,30 | | | | | 1,80 | 46,35 | 16,98 | 3,900 | 84,200 | 4,60 | 0,395 | 283,63 | 203,33 | 37,1870 | ZF | | | |
| Z-130E-13I | 180,00 | 46,00 | 107,50 | | | | | 2,40 | 72,90 | 17,30 | 3,900 | 84,200 | 4,50 | 0,247 | 432,00 | 324,50 | 57,8860 | ZF | | | |
| Z-130E-13X | 270,00 | 46,00 | 107,50 | | | | | 2,40 | 73,35 | 17,08 | 3,900 | 84,200 | 4,50 | 0,246 | 434,05 | 326,55 | 58,2370 | ZF | | | |
| Z-130E-14I | 180,00 | 58,00 | 143,50 | | | | | 2,40 | 108,90 | 17,30 | 3,900 | 84,200 | 4,50 | 0,164 | 632,30 | 488,80 | 85,9530 | ZH | | | |
| Z-130E-14X | 270,00 | 58,00 | 143,50 | | | | | 2,40 | 109,35 | 17,08 | 3,900 | 84,200 | 4,50 | 0,164 | 634,36 | 490,86 | 86,3040 | ZH | | | |
| Z-130E-15I | 180,00 | 66,00 | 178,00 | | | | | 3,00 | 143,10 | 17,45 | 3,900 | 84,200 | 4,50 | 0,125 | 822,89 | 644,89 | 112,6160 | ZH | | | |
| Z-130E-15X | 270,00 | 66,00 | 178,00 | | | | | 3,00 | 143,55 | 17,23 | 3,900 | 84,200 | 4,50 | 0,124 | 824,95 | 646,95 | 112,9670 | ZH | | | |
| Z-130FI | 20,00 | 0,45 | 23,20 | | | | | 180,00 | 20,00 | 46,00 | 1,30 | 18,90 | 13,55 | 6,881 | 100,900 | 7,16 | 1,867 | 96,37 | 50,37 | 13,1400 | ZF |
| Z-130FX | | | | | | | | 270,00 | 20,00 | 46,00 | 1,30 | 19,35 | 13,32 | 6,881 | 100,900 | 7,09 | 1,819 | 97,70 | 51,70 | 13,4300 | ZF |
| Z-130GI | | | | | | | | 180,00 | 26,00 | 56,80 | 1,30 | 29,70 | 13,55 | 6,881 | 100,900 | 6,19 | 1,144 | 138,99 | 82,19 | 20,0000 | ZF |
| Z-130GX | | | | 270,00 | 26,00 | 56,80 | 1,30 | 30,15 | 13,32 | 6,881 | 100,900 | 6,16 | 1,126 | 140,31 | 83,51 | 20,2900 | ZF | | | | |
| Z-130HI | | | | 180,00 | 32,00 | 73,00 | 1,80 | 45,90 | 13,55 | 6,881 | 100,900 | 5,63 | 0,724 | 202,91 | 129,91 | 30,3000 | ZH | | | | |
| Z-130HX | | | | 270,00 | 32,00 | 73,00 | 1,80 | 46,35 | 13,32 | 6,881 | 100,900 | 5,62 | 0,717 | 204,24 | 131,24 | 30,5800 | ZH | | | | |
| Z-130JI | | | | 180,00 | 41,00 | 100,00 | 1,80 | 72,90 | 13,55 | 6,881 | 100,900 | 5,20 | 0,449 | 309,45 | 209,45 | 47,4500 | ZJ | | | | |
| Z-130JX | | | | 270,00 | 41,00 | 100,00 | 1,80 | 73,35 | 13,32 | 6,881 | 100,900 | 5,20 | 0,446 | 310,77 | 210,77 | 47,7400 | ZJ | | | | |
| Z-130KI | | | | 180,00 | 40,00 | 136,00 | 2,40 | 108,90 | 13,55 | 6,881 | 100,900 | 4,96 | 0,298 | 451,20 | 315,20 | 70,3200 | ZL | | | | |
| Z-130KX | | | | 270,00 | 50,00 | 136,00 | 2,40 | 109,35 | 13,32 | 6,881 | 100,900 | 4,96 | 0,297 | 452,82 | 316,82 | 70,6100 | ZL | | | | |

Extension springs

Music wire EN 10270-1-DH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| Z-130K-01I | 1,80 | 20,00 | 0,45 | 23,20 | 180,00 | 52,00 | 145,00 | 2,40 | 117,90 | 13,55 | 6,881 | 100,900 | 4,93 | 0,275 | 487,01 | 342,01 | 76,0400 | ZM | | |
| Z-130K-01X | | | | | 270,00 | 52,00 | 145,00 | 2,40 | 118,35 | 13,32 | 6,881 | 100,900 | 4,92 | 0,274 | 488,33 | 343,33 | 76,3200 | ZM | | |
| Z-130K-02I | | | | | 180,00 | 58,00 | 170,00 | 3,00 | 143,10 | 13,45 | 6,881 | 100,900 | 4,85 | 0,226 | 586,24 | 416,24 | 92,3250 | ZO | | |
| Z-130K-02X | | | | | 270,00 | 58,00 | 170,00 | 3,00 | 143,55 | 13,22 | 6,881 | 100,900 | 4,85 | 0,225 | 587,57 | 417,57 | 92,6120 | ZO | | |
| Z-130K-20I | 16,00 | 0,30 | 19,00 | 180,00 | 20,00 | 45,00 | 1,10 | 24,30 | 10,35 | 9,881 | 124,800 | 7,16 | 2,990 | 83,46 | 38,46 | 12,7910 | ZH | | | |
| Z-130K-20X | | | | 270,00 | 20,00 | 45,00 | 1,10 | 24,75 | 10,13 | 9,881 | 124,800 | 7,16 | 2,929 | 84,23 | 39,23 | 13,0150 | ZH | | | |
| Z-130K-21I | | | | 180,00 | 27,00 | 63,00 | 1,10 | 42,30 | 10,35 | 9,881 | 124,800 | 6,85 | 1,660 | 132,23 | 69,23 | 21,7600 | ZJ | | | |
| Z-130K-21X | | | | 270,00 | 27,00 | 63,00 | 1,10 | 42,75 | 10,13 | 9,881 | 124,800 | 6,85 | 1,642 | 133,00 | 70,00 | 21,9910 | ZJ | | | |
| Z-130K-03I | | | | 180,00 | 34,00 | 84,60 | 1,50 | 63,90 | 10,35 | 9,881 | 124,800 | 6,86 | 1,083 | 190,77 | 106,17 | 32,5380 | ZJ | | | |
| Z-130K-03X | | | | 270,00 | 34,00 | 84,60 | 1,50 | 64,35 | 10,12 | 9,881 | 124,800 | 6,85 | 1,075 | 191,54 | 106,94 | 32,8100 | ZJ | | | |
| Z-130K-04I | | | | 180,00 | 40,00 | 109,00 | 2,00 | 89,10 | 9,95 | 9,881 | 124,800 | 6,52 | 0,770 | 258,25 | 149,25 | 45,0800 | ZK | | | |
| Z-130K-04X | | | | 270,00 | 40,00 | 109,00 | 2,00 | 89,55 | 9,72 | 9,881 | 124,800 | 6,51 | 0,766 | 259,02 | 150,02 | 45,3100 | ZK | | | |
| Z-130K-05I | | | | 180,00 | 45,00 | 134,00 | 2,00 | 112,50 | 10,75 | 9,881 | 124,800 | 6,38 | 0,607 | 323,26 | 189,26 | 56,6900 | ZM | | | |
| Z-130K-05X | | | | 270,00 | 45,00 | 134,00 | 2,00 | 112,95 | 10,52 | 9,881 | 124,800 | 6,38 | 0,605 | 324,03 | 190,03 | 56,9200 | ZM | | | |
| Z-130K-06I | | | | 180,00 | 50,00 | 159,00 | 2,00 | 137,70 | 10,65 | 9,881 | 124,800 | 6,28 | 0,495 | 391,34 | 232,34 | 69,1900 | ZO | | | |
| Z-130K-06X | | | | 270,00 | 50,00 | 159,00 | 2,00 | 138,15 | 10,42 | 9,881 | 124,800 | 6,28 | 0,493 | 392,11 | 233,11 | 69,4200 | ZO | | | |
| Z-130LI | | | | 12,00 | 0,30 | 15,00 | 180,00 | 17,00 | 33,20 | 0,80 | 18,90 | 7,15 | 13,771 | 162,800 | 15,98 | 10,608 | 47,25 | 14,05 | 7,3850 | ZF |
| Z-130LX | | | | | | | 270,00 | 17,00 | 33,20 | 0,80 | 19,35 | 6,92 | 13,771 | 162,800 | 15,80 | 10,336 | 47,62 | 14,42 | 7,5440 | ZF |
| Z-130MI | | | | | | | 180,00 | 21,00 | 44,00 | 1,10 | 29,70 | 7,15 | 13,771 | 162,800 | 13,64 | 6,502 | 66,93 | 22,93 | 11,2400 | ZF |
| Z-130MX | | | | | | | 270,00 | 22,00 | 44,00 | 1,10 | 30,15 | 6,92 | 13,771 | 162,800 | 13,59 | 6,398 | 67,30 | 23,30 | 11,4000 | ZF |
| Z-130NI | 180,00 | 27,00 | 60,20 | | | | 1,10 | 45,90 | 7,15 | 13,771 | 162,800 | 12,31 | 4,113 | 96,44 | 36,24 | 17,0200 | ZG | | | |
| Z-130NX | 270,00 | 27,00 | 60,20 | | | | 1,10 | 46,35 | 6,92 | 13,771 | 162,800 | 12,28 | 4,072 | 96,81 | 36,61 | 17,1800 | ZG | | | |
| Z-130OI | 180,00 | 34,00 | 87,20 | | | | 1,50 | 72,90 | 7,15 | 13,771 | 162,800 | 11,28 | 2,551 | 145,63 | 58,43 | 26,6600 | ZH | | | |
| Z-130OX | 270,00 | 34,00 | 87,20 | | | | 1,50 | 73,35 | 6,92 | 13,771 | 162,800 | 11,27 | 2,535 | 146,00 | 58,80 | 26,8200 | ZH | | | |
| Z-130PI | 180,00 | 42,00 | 123,00 | | | | 2,00 | 108,90 | 7,05 | 13,771 | 162,800 | 10,70 | 1,694 | 211,02 | 88,02 | 39,5100 | ZK | | | |
| Z-130PX | 270,00 | 42,00 | 123,00 | | | | 2,00 | 109,35 | 6,82 | 13,771 | 162,800 | 10,69 | 1,687 | 211,39 | 88,39 | 39,6700 | ZK | | | |
| Z-130QI | 9,00 | 0,35 | 12,10 | | | | 180,00 | 16,00 | 28,40 | 0,80 | 18,90 | 4,75 | 28,440 | 209,000 | 31,79 | 30,160 | 34,39 | 5,99 | 5,2290 | ZF |
| Z-130QX | | | | | | | 270,00 | 16,00 | 28,40 | 0,80 | 19,35 | 4,52 | 28,440 | 209,000 | 31,41 | 29,387 | 34,55 | 6,15 | 5,3430 | ZF |
| Z-130RI | | | | | | | 180,00 | 20,00 | 39,20 | 0,80 | 29,70 | 4,75 | 28,440 | 209,000 | 26,83 | 18,485 | 48,97 | 9,77 | 7,9620 | ZF |
| Z-130RX | | | | | | | 270,00 | 21,00 | 39,20 | 0,80 | 30,15 | 4,52 | 28,440 | 209,000 | 26,73 | 18,192 | 49,13 | 9,93 | 8,0760 | ZF |
| Z-130SI | | | | | | | 180,00 | 26,00 | 55,40 | 1,10 | 45,90 | 4,75 | 28,440 | 209,000 | 24,01 | 11,695 | 70,83 | 15,43 | 12,0500 | ZG |
| Z-130SX | | | | | | | 270,00 | 26,00 | 55,40 | 1,10 | 46,35 | 4,52 | 28,440 | 209,000 | 23,95 | 11,577 | 70,99 | 15,59 | 12,1700 | ZG |
| Z-130TI | | | | 180,00 | 33,00 | 82,40 | 1,50 | 72,90 | 4,75 | 28,440 | 209,000 | 21,85 | 7,254 | 107,29 | 24,89 | 18,8900 | ZH | | | |
| Z-130TX | | | | 270,00 | 33,00 | 82,40 | 1,50 | 73,35 | 4,52 | 28,440 | 209,000 | 21,82 | 7,208 | 107,45 | 25,05 | 19,0000 | ZH | | | |
| Z-130UI | | | | 180,00 | 40,00 | 118,00 | 2,00 | 108,90 | 4,55 | 28,440 | 209,000 | 20,60 | 4,816 | 155,49 | 37,49 | 27,9900 | ZJ | | | |
| Z-130UX | | | | 270,00 | 40,00 | 118,00 | 2,00 | 109,35 | 4,32 | 28,440 | 209,000 | 20,59 | 4,795 | 155,65 | 37,65 | 28,1100 | ZJ | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| RZ-130K-01I | 1,80 | 20,00 | 0,45 | 23,20 | 180,00 | 52,00 | 145,00 | 2,40 | 117,90 | 13,55 | 5,511 | 84,950 | 4,69 | 0,236 | 481,30 | 336,30 | 76,2185 | ZP | | |
| RZ-130K-01X | | | | | 270,00 | 52,00 | 145,00 | 2,40 | 118,35 | 13,32 | 5,511 | 84,950 | 4,69 | 0,235 | 482,60 | 337,60 | 76,5062 | ZP | | |
| RZ-130K-02I | | | | | 180,00 | 58,00 | 170,00 | 3,00 | 143,10 | 13,45 | 5,511 | 84,950 | 4,61 | 0,194 | 579,30 | 409,30 | 92,3251 | ZR | | |
| RZ-130K-02X | | | | | 270,00 | 58,00 | 170,00 | 3,00 | 143,55 | 13,22 | 5,511 | 84,950 | 4,61 | 0,193 | 580,60 | 410,60 | 92,6127 | ZR | | |
| RZ-130K-20I | 16,00 | 0,30 | 19,00 | 180,00 | 20,00 | 45,00 | 1,10 | 24,30 | 10,35 | 7,911 | 105,000 | 7,16 | 2,566 | 82,80 | 37,80 | 12,7911 | ZL | | | |
| RZ-130K-20X | | | | 270,00 | 20,00 | 45,00 | 1,10 | 24,75 | 10,13 | 7,911 | 105,000 | 7,16 | 2,516 | 83,60 | 38,60 | 13,0155 | ZL | | | |
| RZ-130K-21I | | | | 180,00 | 27,00 | 63,00 | 1,10 | 42,30 | 10,35 | 7,911 | 105,000 | 6,85 | 1,426 | 131,10 | 68,10 | 21,7672 | ZL | | | |
| RZ-130K-21X | | | | 270,00 | 27,00 | 63,00 | 1,10 | 42,75 | 10,13 | 7,911 | 105,000 | 6,85 | 1,410 | 131,90 | 68,90 | 21,9916 | ZL | | | |
| RZ-130K-03I | | | | 180,00 | 34,00 | 84,60 | 1,50 | 63,90 | 10,35 | 7,911 | 105,000 | 6,56 | 0,930 | 189,06 | 104,46 | 32,5387 | ZM | | | |
| RZ-130K-03X | | | | 270,00 | 34,00 | 84,60 | 1,50 | 64,35 | 10,12 | 7,911 | 105,000 | 6,55 | 0,923 | 189,82 | 105,22 | 32,7631 | ZM | | | |
| RZ-130K-04I | | | | 180,00 | 40,00 | 109,00 | 2,00 | 89,10 | 9,95 | 7,911 | 105,000 | 6,22 | 0,661 | 255,85 | 146,85 | 45,1053 | ZN | | | |
| RZ-130K-04X | | | | 270,00 | 40,00 | 109,00 | 2,00 | 89,55 | 9,72 | 7,911 | 105,000 | 6,22 | 0,658 | 256,61 | 147,61 | 45,3297 | ZN | | | |
| RZ-130K-05I | | | | 180,00 | 45,00 | 134,00 | 2,00 | 112,50 | 10,75 | 7,911 | 105,000 | 6,09 | 0,522 | 320,22 | 186,22 | 56,7744 | ZP | | | |
| RZ-130K-05X | | | | 270,00 | 45,00 | 134,00 | 2,00 | 112,95 | 10,52 | 7,911 | 105,000 | 6,09 | 0,520 | 320,97 | 186,97 | 56,9988 | ZP | | | |
| RZ-130K-06I | | | | 180,00 | 50,00 | 159,00 | 2,00 | 137,70 | 10,65 | 7,911 | 105,000 | 5,99 | 0,425 | 387,61 | 228,61 | 69,3410 | ZR | | | |
| RZ-130K-06X | | | | 270,00 | 50,00 | 159,00 | 2,00 | 138,15 | 10,42 | 7,911 | 105,000 | 5,98 | 0,423 | 388,36 | 229,36 | 69,5654 | ZR | | | |
| RZ-130LI | | | | 12,00 | 0,30 | 15,00 | 180,00 | 17,00 | 33,20 | 0,80 | 18,90 | 7,15 | 11,000 | 137,000 | 15,60 | 9,111 | 47,03 | 13,83 | 7,2536 | ZJ |
| RZ-130LX | | | | | | | 270,00 | 17,00 | 33,20 | 0,80 | 19,35 | 6,92 | 11,000 | 137,000 | 15,42 | 8,878 | 47,40 | 14,20 | 7,4148 | ZJ |
| RZ-130MI | | | | | | | 180,00 | 21,00 | 44,00 | 1,10 | 29,70 | 7,15 | 11,000 | 137,000 | 13,25 | 5,584 | 66,57 | 22,57 | 11,1222 | ZJ |
| RZ-130MX | | | | | | | 270,00 | 22,00 | 44,00 | 1,10 | 30,15 | 6,92 | 11,000 | 137,000 | 13,20 | 5,496 | 66,94 | 22,94 | 11,2834 | ZJ |
| RZ-130NI | 180,00 | 27,00 | 60,20 | | | | 1,10 | 45,90 | 7,15 | 11,000 | 137,000 | 11,92 | 3,533 | 95,88 | 35,68 | 16,9252 | ZK | | | |
| RZ-130NX | 270,00 | 27,00 | 60,20 | | | | 1,10 | 46,35 | 6,92 | 11,000 | 137,000 | 11,89 | 3,497 | 96,24 | 36,04 | 17,0864 | ZK | | | |
| RZ-130OI | 180,00 | 34,00 | 87,20 | | | | 1,50 | 72,90 | 7,15 | 11,000 | 137,000 | 10,90 | 2,191 | 144,72 | 57,52 | 26,5967 | ZL | | | |
| RZ-130OX | 270,00 | 34,00 | 87,20 | | | | 1,50 | 73,35 | 6,92 | 11,000 | 137,000 | 10,89 | 2,178 | 145,09 | 57,89 | 26,7579 | ZL | | | |
| RZ-130PI | 180,00 | 42,00 | 123,00 | | | | 2,00 | 108,90 | 7,05 | 11,000 | 137,000 | 10,31 | 1,455 | 209,65 | 86,65 | 39,4920 | ZN | | | |
| RZ-130PX | 270,00 | 42,00 | 123,00 | | | | 2,00 | 109,35 | 6,82 | 11,000 | 137,000 | 10,31 | 1,449 | 210,01 | 87,01 | 39,6532 | ZN | | | |
| RZ-130QI | 9,00 | 0,35 | 12,10 | | | | 180,00 | 16,00 | 28,40 | 0,80 | 18,90 | 4,75 | 22,700 | 175,900 | 31,29 | 25,905 | 34,32 | 5,92 | 5,1202 | ZJ |
| RZ-130QX | | | | | | | 270,00 | 16,00 | 28,40 | 0,80 | 19,35 | 4,52 | 22,700 | 175,900 | 30,91 | 25,240 | 34,47 | 6,07 | 5,2340 | ZJ |
| RZ-130RI | | | | | | | 180,00 | 20,00 | 39,20 | 0,80 | 29,70 | 4,75 | 22,700 | 175,900 | 26,34 | 15,877 | 48,85 | 9,65 | 7,8510 | ZJ |
| RZ-130RX | | | | | | | 270,00 | 21,00 | 39,20 | 0,80 | 30,15 | 4,52 | 22,700 | 175,900 | 26,23 | 15,625 | 49,01 | 9,81 | 7,9648 | ZJ |
| RZ-130SI | | | | | | | 180,00 | 26,00 | 55,40 | 1,10 | 45,90 | 4,75 | 22,700 | 175,900 | 23,51 | 10,045 | 70,66 | 15,26 | 11,9472 | ZK |
| RZ-130SX | | | | | | | 270,00 | 26,00 | 55,40 | 1,10 | 46,35 | 4,52 | 22,700 | 175,900 | 23,45 | 9,943 | 70,81 | 15,41 | 12,0610 | ZK |
| RZ-130TI | | | | 180,00 | 33,00 | 82,40 | 1,50 | 72,90 | 4,75 | 22,700 | 175,900 | 21,35 | 6,230 | 107,00 | 24,60 | 18,7741 | ZL | | | |
| RZ-130TX | | | | 270,00 | 33,00 | 82,40 | 1,50 | 73,35 | 4,52 | 22,700 | 175,900 | 21,32 | 6,191 | 107,16 | 24,76 | 18,8879 | ZL | | | |
| RZ-130UI | | | | 180,00 | 40,00 | 118,00 | 2,00 | 108,90 | 4,55 | 22,700 | 175,900 | 20,10 | 4,136 | 155,06 | 37,06 | 27,8767 | ZM | | | |
| RZ-130UX | | | | 270,00 | 40,00 | 118,00 | 2,00 | 109,35 | 4,32 | 22,700 | 175,900 | 20,10 | 4,119 | 155,21 | 37,21 | 27,9905 | ZM | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| RZ-131I | 2,00 | 27,00 | 0,45 | 30,50 | 180,00 | 25,00 | 62,80 | 1,30 | 25,00 | 18,90 | 5,501 | 84,860 | 6,87 | 0,779 | 164,66 | 101,86 | 25,8508 | ZK | | |
| RZ-131X | | | | | 270,00 | 26,00 | 62,80 | 1,30 | 25,50 | 18,65 | 5,501 | 84,860 | 6,83 | 0,763 | 166,88 | 104,08 | 26,3386 | ZK | | |
| RZ-132I | | | | | 180,00 | 33,00 | 78,80 | 1,80 | 41,00 | 18,90 | 5,501 | 84,860 | 5,96 | 0,459 | 251,53 | 172,73 | 41,4588 | ZM | | |
| RZ-132X | | | | | 270,00 | 33,00 | 78,80 | 1,80 | 41,50 | 18,65 | 5,501 | 84,860 | 5,94 | 0,454 | 253,74 | 174,94 | 41,9466 | ZM | | |
| RZ-133I | | | | | 180,00 | 47,00 | 118,00 | 2,40 | 81,00 | 18,50 | 5,501 | 84,860 | 5,24 | 0,227 | 467,88 | 349,88 | 80,4789 | ZO | | |
| RZ-133X | | | | | 270,00 | 47,00 | 118,00 | 2,40 | 81,50 | 18,25 | 5,501 | 84,860 | 5,23 | 0,225 | 470,10 | 352,10 | 80,9667 | ZO | | |
| RZ-133AI | | | | | 180,00 | 55,00 | 146,00 | 2,40 | 109,00 | 18,50 | 5,501 | 84,860 | 5,02 | 0,167 | 619,89 | 473,89 | 107,7930 | ZQ | | |
| RZ-133AX | | | | | 270,00 | 55,00 | 146,00 | 2,40 | 109,50 | 18,25 | 5,501 | 84,860 | 5,01 | 0,167 | 622,11 | 476,11 | 108,2808 | ZQ | | |
| RZ-134I | 22,00 | 0,45 | 25,50 | 180,00 | 22,00 | 54,80 | 1,30 | 25,00 | 14,90 | 7,101 | 103,400 | 7,84 | 1,522 | 118,09 | 63,29 | 20,6806 | ZL | | | |
| RZ-134X | | | | 270,00 | 22,00 | 54,80 | 1,30 | 25,50 | 14,65 | 7,101 | 103,400 | 7,78 | 1,489 | 119,40 | 64,60 | 21,0709 | ZL | | | |
| RZ-135I | | | | 180,00 | 29,00 | 70,80 | 1,80 | 41,00 | 14,90 | 7,101 | 103,400 | 6,82 | 0,897 | 178,11 | 107,31 | 33,1671 | ZL | | | |
| RZ-135X | | | | 270,00 | 29,00 | 70,80 | 1,80 | 41,50 | 14,65 | 7,101 | 103,400 | 6,80 | 0,886 | 179,49 | 108,69 | 33,5573 | ZL | | | |
| RZ-135AI | | | | 180,00 | 29,00 | 72,80 | 1,80 | 43,10 | 14,90 | 7,101 | 103,400 | 6,74 | 0,852 | 185,61 | 112,81 | 34,8059 | ZN | | | |
| RZ-135AX | | | | 270,00 | 30,00 | 72,80 | 1,80 | 43,50 | 14,65 | 7,101 | 103,400 | 6,73 | 0,843 | 186,99 | 114,19 | 35,1181 | ZN | | | |
| RZ-136I | | | | 180,00 | 41,00 | 110,00 | 2,40 | 81,00 | 14,50 | 7,101 | 103,400 | 6,00 | 0,443 | 327,37 | 217,37 | 64,3832 | ZN | | | |
| RZ-136X | | | | 270,00 | 41,00 | 110,00 | 2,40 | 81,50 | 14,25 | 7,101 | 103,400 | 5,99 | 0,440 | 328,75 | 218,75 | 64,7734 | ZN | | | |
| RZ-136AI | | | | 180,00 | 44,00 | 124,00 | 2,40 | 95,00 | 14,50 | 7,101 | 103,400 | 5,85 | 0,376 | 379,89 | 255,89 | 75,3088 | ZO | | | |
| RZ-136AX | | | | 270,00 | 44,00 | 124,00 | 2,40 | 95,50 | 14,25 | 7,101 | 103,400 | 5,84 | 0,374 | 381,27 | 257,27 | 75,6990 | ZO | | | |
| RZ-136BI | | | | 180,00 | 47,00 | 138,00 | 2,40 | 109,00 | 14,50 | 7,101 | 103,400 | 5,75 | 0,327 | 432,41 | 294,41 | 86,2344 | ZO | | | |
| RZ-136BX | | | | 270,00 | 47,00 | 138,00 | 2,40 | 109,50 | 14,25 | 7,101 | 103,400 | 5,75 | 0,326 | 433,79 | 295,79 | 86,6246 | ZO | | | |
| RZ-136CI | | | | 180,00 | 51,00 | 154,00 | 2,40 | 125,00 | 14,50 | 7,101 | 103,400 | 5,69 | 0,285 | 492,44 | 338,44 | 98,7208 | ZQ | | | |
| RZ-136CX | | | | 270,00 | 51,00 | 154,00 | 2,40 | 145,50 | 14,25 | 7,101 | 103,400 | 5,69 | 0,244 | 548,80 | 394,80 | 114,7191 | ZQ | | | |
| RZ-136DI | | | | 180,00 | 54,00 | 170,00 | 3,00 | 141,00 | 14,50 | 7,101 | 103,400 | 5,63 | 0,252 | 552,46 | 382,46 | 111,2073 | ZQ | | | |
| RZ-136DX | | | | 270,00 | 54,00 | 170,00 | 3,00 | 141,50 | 14,25 | 7,101 | 103,400 | 5,63 | 0,251 | 553,84 | 383,84 | 111,5975 | ZQ | | | |
| RZ-136EI | | | | 180,00 | 57,00 | 186,00 | 3,00 | 157,00 | 14,50 | 7,101 | 103,400 | 5,58 | 0,226 | 612,49 | 426,49 | 123,6937 | ZR | | | |
| RZ-136EX | | | | 270,00 | 57,00 | 186,00 | 3,00 | 157,50 | 14,25 | 7,101 | 103,400 | 5,58 | 0,225 | 613,86 | 427,86 | 124,0839 | ZR | | | |
| RZ-136E-10I | | | | 18,60 | 0,45 | 22,10 | 180,00 | 18,00 | 49,00 | 1,30 | 25,00 | 12,00 | 8,551 | 121,300 | 8,39 | 2,661 | 91,40 | 42,40 | 17,1649 | ZK |
| RZ-136E-10X | | | | | | | 270,00 | 18,00 | 49,00 | 1,30 | 25,50 | 11,75 | 8,551 | 121,300 | 8,39 | 2,605 | 92,30 | 43,30 | 17,4888 | ZK |
| RZ-137I | | | | | | | 180,00 | 26,00 | 65,00 | 1,80 | 41,00 | 12,00 | 8,551 | 121,300 | 8,22 | 1,570 | 136,86 | 71,86 | 27,5287 | ZL |
| RZ-137X | | | | | | | 270,00 | 26,00 | 65,00 | 1,80 | 41,50 | 11,75 | 8,551 | 121,300 | 8,19 | 1,550 | 137,79 | 72,79 | 27,8525 | ZL |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| Z-131I | 2,00 | 27,00 | 0,45 | 30,50 | 180,00 | 25,00 | 62,80 | 1,30 | 25,00 | 18,90 | 6,881 | 101,200 | 7,12 | 0,907 | 166,80 | 104,00 | 25,8500 | ZG | | |
| Z-131X | | | | | 270,00 | 26,00 | 62,80 | 1,30 | 25,50 | 18,65 | 6,881 | 101,200 | 7,07 | 0,888 | 169,06 | 106,26 | 26,3380 | ZG | | |
| Z-132I | | | | | 180,00 | 33,00 | 78,80 | 1,80 | 41,00 | 18,90 | 6,881 | 101,200 | 6,21 | 0,535 | 255,15 | 176,35 | 41,4580 | ZJ | | |
| Z-132X | | | | | 270,00 | 33,00 | 78,80 | 1,80 | 41,50 | 18,65 | 6,881 | 101,200 | 6,19 | 0,528 | 257,41 | 178,61 | 41,9466 | ZJ | | |
| Z-133I | | | | | 180,00 | 47,00 | 118,00 | 2,40 | 81,00 | 18,50 | 6,881 | 101,200 | 5,48 | 0,264 | 475,23 | 357,23 | 80,4400 | ZL | | |
| Z-133X | | | | | 270,00 | 47,00 | 118,00 | 2,40 | 81,50 | 18,25 | 6,881 | 101,200 | 5,48 | 0,262 | 477,49 | 359,49 | 80,9200 | ZL | | |
| Z-133AI | | | | | 180,00 | 55,00 | 146,00 | 2,40 | 109,00 | 18,50 | 6,881 | 101,200 | 5,26 | 0,195 | 629,84 | 483,84 | 107,7930 | ZN | | |
| Z-133AX | | | | | 270,00 | 55,00 | 146,00 | 2,40 | 109,50 | 18,25 | 6,881 | 101,200 | 5,26 | 0,194 | 632,10 | 486,10 | 108,2800 | ZN | | |
| Z-134I | 22,00 | 0,45 | 25,50 | 180,00 | 22,00 | 54,80 | 1,30 | 25,00 | 14,90 | 8,881 | 123,300 | 8,14 | 1,772 | 119,40 | 64,60 | 20,6800 | ZH | | | |
| Z-134X | | | | 270,00 | 22,00 | 54,80 | 1,30 | 25,50 | 14,65 | 8,881 | 123,300 | 8,08 | 1,734 | 120,81 | 66,01 | 21,0700 | ZH | | | |
| Z-135I | | | | 180,00 | 29,00 | 70,80 | 1,80 | 41,00 | 14,90 | 8,881 | 123,300 | 7,11 | 1,045 | 180,34 | 109,54 | 33,3500 | ZH | | | |
| Z-135X | | | | 270,00 | 29,00 | 70,80 | 1,80 | 41,50 | 14,65 | 8,881 | 123,300 | 7,09 | 1,032 | 181,75 | 110,95 | 33,7300 | ZH | | | |
| Z-135AI | | | | 180,00 | 29,00 | 72,80 | 1,80 | 43,10 | 14,90 | 8,881 | 123,300 | 7,04 | 0,994 | 187,96 | 115,16 | 34,9000 | ZK | | | |
| Z-135AX | | | | 270,00 | 30,00 | 72,80 | 1,80 | 43,50 | 14,65 | 8,881 | 123,300 | 7,03 | 0,982 | 189,36 | 116,56 | 35,2900 | ZK | | | |
| Z-136I | | | | 180,00 | 41,00 | 110,00 | 2,40 | 81,00 | 14,50 | 8,881 | 123,300 | 6,30 | 0,516 | 331,89 | 221,89 | 64,3800 | ZK | | | |
| Z-136X | | | | 270,00 | 41,00 | 110,00 | 2,40 | 81,50 | 14,25 | 8,881 | 123,300 | 6,29 | 0,513 | 333,30 | 223,30 | 64,7700 | ZK | | | |
| Z-136AI | | | | 180,00 | 44,00 | 124,00 | 2,40 | 95,00 | 14,50 | 8,881 | 123,300 | 6,15 | 0,438 | 385,22 | 261,22 | 75,2400 | ZL | | | |
| Z-136AX | | | | 270,00 | 44,00 | 124,00 | 2,40 | 95,50 | 14,25 | 8,881 | 123,300 | 6,14 | 0,436 | 386,62 | 262,62 | 75,6200 | ZL | | | |
| Z-136BI | | | | 180,00 | 47,00 | 138,00 | 2,40 | 109,00 | 14,50 | 8,881 | 123,300 | 6,05 | 0,381 | 438,54 | 300,54 | 86,1000 | ZL | | | |
| Z-136BX | | | | 270,00 | 47,00 | 138,00 | 2,40 | 109,50 | 14,25 | 8,881 | 123,300 | 6,05 | 0,379 | 439,94 | 301,94 | 86,4900 | ZL | | | |
| Z-136CI | | | | 180,00 | 51,00 | 154,00 | 2,40 | 125,00 | 14,50 | 8,881 | 123,300 | 5,99 | 0,331 | 499,48 | 345,48 | 98,7200 | ZN | | | |
| Z-136CX | | | | 270,00 | 51,00 | 154,00 | 2,40 | 125,50 | 14,25 | 8,881 | 123,300 | 5,99 | 0,330 | 500,88 | 346,88 | 99,1110 | ZN | | | |
| Z-136DI | | | | 180,00 | 54,00 | 170,00 | 3,00 | 141,00 | 14,50 | 8,881 | 123,300 | 5,93 | 0,293 | 560,42 | 390,42 | 111,2070 | ZN | | | |
| Z-136DX | | | | 270,00 | 54,00 | 170,00 | 3,00 | 141,50 | 14,25 | 8,881 | 123,300 | 5,93 | 0,292 | 561,82 | 391,82 | 111,5970 | ZN | | | |
| Z-136EI | | | | 180,00 | 57,00 | 186,00 | 3,00 | 157,00 | 14,50 | 8,881 | 123,300 | 5,88 | 0,263 | 621,36 | 435,36 | 123,6930 | ZO | | | |
| Z-136EX | | | | 270,00 | 57,00 | 186,00 | 3,00 | 157,50 | 14,25 | 8,881 | 123,300 | 5,88 | 0,262 | 622,72 | 436,72 | 124,0830 | ZO | | | |
| Z-136E-10I | | | | 18,60 | 0,45 | 22,10 | 180,00 | 18,00 | 49,00 | 1,30 | 25,00 | 12,00 | 10,810 | 144,700 | 8,13 | 3,099 | 92,21 | 43,21 | 17,1649 | ZH |
| Z-136E-10X | | | | | | | 270,00 | 18,00 | 49,00 | 1,30 | 25,50 | 11,75 | 10,810 | 144,700 | 8,13 | 3,033 | 93,15 | 44,15 | 17,4888 | ZH |
| Z-137I | | | | | | | 180,00 | 26,00 | 65,00 | 1,80 | 41,00 | 12,00 | 10,810 | 144,700 | 8,57 | 1,827 | 138,29 | 73,29 | 27,6900 | ZH |
| Z-137X | | | | | | | 270,00 | 26,00 | 65,00 | 1,80 | 41,50 | 11,75 | 10,810 | 144,700 | 8,54 | 1,804 | 139,23 | 74,23 | 28,0100 | ZH |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| Z-137AI | 2,00 | 18,60 | 0,45 | 22,10 | 180,00 | 33,00 | 95,00 | 1,80 | 71,00 | 12,00 | 10,810 | 144,700 | 7,50 | 1,033 | 224,60 | 129,60 | 46,9600 | ZL | | |
| Z-137AX | | | | | 270,00 | 33,00 | 95,00 | 1,80 | 71,50 | 11,75 | 10,810 | 144,700 | 7,50 | 1,025 | 225,60 | 130,60 | 47,2800 | ZL | | |
| Z-138I | | | | | 180,00 | 46,00 | 147,00 | 2,40 | 123,00 | 12,00 | 10,810 | 144,700 | 7,21 | 0,589 | 374,38 | 227,38 | 80,5200 | ZN | | |
| Z-138X | | | | | 270,00 | 46,00 | 147,00 | 2,40 | 123,50 | 11,75 | 10,810 | 144,700 | 7,21 | 0,587 | 375,32 | 228,32 | 80,8400 | ZN | | |
| Z-138AI | | | | | 180,00 | 48,00 | 160,00 | 2,40 | 135,00 | 12,50 | 10,810 | 144,700 | 7,16 | 0,536 | 409,93 | 249,93 | 88,2500 | ZN | | |
| Z-138AX | | | | | 270,00 | 48,00 | 160,00 | 2,40 | 135,50 | 12,25 | 10,810 | 144,700 | 7,15 | 0,534 | 410,87 | 250,87 | 88,5700 | ZN | | |
| Z-139I | 18,00 | 0,30 | 21,30 | 180,00 | 20,00 | 48,40 | 1,10 | 25,00 | 11,70 | 11,810 | 149,200 | 10,28 | 3,460 | 88,13 | 39,73 | 16,5400 | ZF | | | |
| Z-139X | | | | 270,00 | 20,00 | 48,40 | 1,10 | 25,50 | 11,45 | 11,810 | 149,200 | 10,21 | 3,387 | 88,99 | 40,59 | 16,8600 | ZF | | | |
| Z-140I | | | | 180,00 | 25,00 | 64,40 | 1,50 | 41,00 | 11,70 | 11,810 | 149,200 | 8,97 | 2,041 | 131,77 | 67,37 | 26,6900 | ZG | | | |
| Z-140X | | | | 270,00 | 26,00 | 64,40 | 1,50 | 41,50 | 11,45 | 11,810 | 149,200 | 8,94 | 2,015 | 132,63 | 68,23 | 27,0000 | ZG | | | |
| Z-140AI | | | | 180,00 | 32,00 | 87,40 | 1,50 | 65,00 | 11,20 | 11,810 | 149,200 | 8,19 | 1,263 | 196,22 | 108,82 | 41,6000 | ZG | | | |
| Z-140AX | | | | 270,00 | 33,00 | 87,40 | 1,50 | 65,50 | 10,95 | 11,810 | 149,200 | 8,18 | 1,253 | 197,09 | 109,69 | 41,9100 | ZG | | | |
| Z-141I | | | | 180,00 | 36,00 | 104,00 | 2,00 | 81,00 | 11,50 | 11,810 | 149,200 | 7,93 | 1,007 | 240,46 | 136,46 | 51,5400 | ZJ | | | |
| Z-141X | | | | 270,00 | 36,00 | 104,00 | 2,00 | 81,50 | 11,25 | 11,810 | 149,200 | 7,92 | 1,001 | 241,32 | 137,32 | 51,8500 | ZJ | | | |
| Z-141AI | | | | 180,00 | 39,00 | 118,00 | 2,00 | 95,00 | 11,50 | 11,810 | 149,200 | 7,73 | 0,856 | 278,64 | 160,64 | 60,2300 | ZK | | | |
| Z-141AX | | | | 270,00 | 39,00 | 118,00 | 2,00 | 95,50 | 11,25 | 11,810 | 149,200 | 7,73 | 0,851 | 279,51 | 161,51 | 60,5400 | ZK | | | |
| Z-141BI | | | | 180,00 | 42,00 | 132,00 | 2,00 | 109,00 | 11,50 | 11,810 | 149,200 | 7,61 | 0,744 | 316,83 | 184,83 | 68,9200 | ZL | | | |
| Z-141BX | | | | 270,00 | 42,00 | 132,00 | 2,00 | 109,50 | 11,25 | 11,810 | 149,200 | 7,61 | 0,740 | 317,69 | 185,69 | 69,2300 | ZL | | | |
| Z-141CI | | | | 180,00 | 45,00 | 148,00 | 2,00 | 125,00 | 11,50 | 11,810 | 149,200 | 7,53 | 0,647 | 360,46 | 212,46 | 78,8600 | ZL | | | |
| Z-141CX | | | | 270,00 | 45,00 | 148,00 | 2,00 | 125,50 | 11,25 | 11,810 | 149,200 | 7,53 | 0,644 | 361,33 | 213,33 | 79,1200 | ZL | | | |
| Z-141DI | | | | 180,00 | 48,00 | 164,00 | 2,50 | 141,00 | 11,50 | 11,810 | 149,200 | 7,46 | 0,573 | 404,10 | 240,10 | 88,8000 | ZM | | | |
| Z-141DX | | | | 270,00 | 48,00 | 164,00 | 2,50 | 141,50 | 11,25 | 11,810 | 149,200 | 7,46 | 0,571 | 404,96 | 240,96 | 89,1100 | ZM | | | |
| Z-141EI | | | | 180,00 | 51,00 | 180,00 | 2,50 | 157,00 | 11,50 | 11,810 | 149,200 | 7,39 | 0,513 | 447,74 | 267,74 | 98,9500 | ZN | | | |
| Z-141EX | | | | 270,00 | 51,00 | 180,00 | 2,50 | 157,50 | 11,25 | 11,810 | 149,200 | 7,39 | 0,512 | 448,60 | 268,60 | 99,2600 | ZN | | | |
| Z-141E-10I | | | | 16,00 | 0,30 | 19,30 | 180,00 | 17,00 | 41,00 | 1,10 | 21,00 | 10,00 | 14,500 | 166,700 | 10,50 | 6,253 | 65,35 | 24,35 | 12,2900 | ZF |
| Z-141E-10X | | | | | | | 270,00 | 17,00 | 41,00 | 1,10 | 21,50 | 9,75 | 14,500 | 166,700 | 10,50 | 6,093 | 66,00 | 25,00 | 12,5600 | ZF |
| Z-141FI | | | | | | | 180,00 | 22,00 | 53,00 | 1,10 | 33,00 | 10,00 | 14,500 | 166,700 | 10,20 | 3,832 | 92,72 | 39,72 | 19,0200 | ZF |
| Z-141FX | | | | | | | 270,00 | 22,00 | 53,00 | 1,10 | 33,50 | 9,75 | 14,500 | 166,700 | 10,20 | 3,772 | 93,36 | 40,36 | 19,2900 | ZF |
| Z-141GI | | | | | | | 180,00 | 32,00 | 87,00 | 1,50 | 67,00 | 10,00 | 14,500 | 166,700 | 9,82 | 1,828 | 170,28 | 83,28 | 37,5100 | ZG |
| Z-141GX | | | | | | | 270,00 | 32,00 | 87,00 | 1,50 | 67,50 | 9,75 | 14,500 | 166,700 | 9,81 | 1,814 | 170,92 | 83,92 | 37,7800 | ZG |
| Z-141HI | 180,00 | 40,00 | 121,00 | | | | 2,00 | 101,00 | 10,00 | 14,500 | 166,700 | 9,21 | 1,200 | 247,84 | 126,84 | 55,9900 | ZK | | | |
| Z-141HX | 270,00 | 40,00 | 121,00 | | | | 2,00 | 101,50 | 9,75 | 14,500 | 166,700 | 9,20 | 1,194 | 248,48 | 127,48 | 56,2700 | ZK | | | |
| Z-141JI | 180,00 | 46,00 | 155,00 | | | | 2,00 | 135,00 | 10,00 | 14,500 | 166,700 | 8,99 | 0,893 | 325,39 | 170,39 | 74,4800 | ZL | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| RZ-137AI | 2,00 | 18,60 | 0,45 | 22,10 | 180,00 | 33,00 | 95,00 | 1,80 | 71,00 | 12,00 | 8,551 | 121,300 | 7,50 | 0,887 | 222,10 | 127,10 | 46,9607 | ZM | | |
| RZ-137AX | | | | | 270,00 | 33,00 | 95,00 | 1,80 | 71,50 | 11,75 | 8,551 | 121,300 | 7,50 | 0,881 | 223,00 | 128,00 | 47,2845 | ZM | | |
| RZ-138I | | | | | 180,00 | 46,00 | 147,00 | 2,40 | 123,00 | 12,00 | 8,551 | 121,300 | 6,86 | 0,506 | 369,96 | 222,96 | 80,6428 | ZQ | | |
| RZ-138X | | | | | 270,00 | 46,00 | 147,00 | 2,40 | 123,50 | 11,75 | 8,551 | 121,300 | 6,86 | 0,504 | 370,88 | 223,88 | 80,9667 | ZQ | | |
| RZ-138AI | | | | | 180,00 | 48,00 | 160,00 | 2,40 | 135,00 | 12,50 | 8,551 | 121,300 | 6,81 | 0,460 | 405,08 | 245,08 | 88,4156 | ZQ | | |
| RZ-138AX | | | | | 270,00 | 48,00 | 160,00 | 2,40 | 135,50 | 12,25 | 8,551 | 121,300 | 6,80 | 0,459 | 406,00 | 246,00 | 88,7395 | ZQ | | |
| RZ-139I | 18,00 | 0,30 | 21,30 | 180,00 | 20,00 | 48,40 | 1,10 | 25,00 | 11,70 | 9,441 | 125,100 | 9,91 | 2,972 | 87,33 | 38,93 | 16,5445 | ZJ | | | |
| RZ-139X | | | | 270,00 | 20,00 | 48,40 | 1,10 | 25,50 | 11,45 | 9,441 | 125,100 | 9,85 | 2,909 | 88,18 | 39,78 | 16,8567 | ZJ | | | |
| RZ-140I | | | | 180,00 | 25,00 | 64,40 | 1,50 | 41,00 | 11,70 | 9,441 | 125,100 | 8,61 | 1,753 | 130,42 | 66,02 | 26,5337 | ZK | | | |
| RZ-140X | | | | 270,00 | 26,00 | 64,40 | 1,50 | 41,50 | 11,45 | 9,441 | 125,100 | 8,58 | 1,731 | 131,27 | 66,87 | 26,8458 | ZK | | | |
| RZ-140AI | | | | 180,00 | 32,00 | 87,40 | 1,50 | 65,00 | 11,20 | 9,441 | 125,100 | 7,83 | 1,085 | 194,05 | 106,65 | 41,5174 | ZK | | | |
| RZ-140AX | | | | 270,00 | 33,00 | 87,40 | 1,50 | 65,50 | 10,95 | 9,441 | 125,100 | 7,82 | 1,077 | 195,19 | 107,79 | 41,8295 | ZK | | | |
| RZ-141I | | | | 180,00 | 36,00 | 104,00 | 2,00 | 81,00 | 11,50 | 9,441 | 125,100 | 7,56 | 0,865 | 237,73 | 133,73 | 51,5065 | ZM | | | |
| RZ-141X | | | | 270,00 | 36,00 | 104,00 | 2,00 | 81,50 | 11,25 | 9,441 | 125,100 | 7,56 | 0,860 | 238,58 | 134,58 | 51,8187 | ZM | | | |
| RZ-141AI | | | | 180,00 | 39,00 | 118,00 | 2,00 | 95,00 | 11,50 | 9,441 | 125,100 | 7,37 | 0,735 | 275,43 | 157,43 | 60,2470 | ZN | | | |
| RZ-141AX | | | | 270,00 | 39,00 | 118,00 | 2,00 | 95,50 | 11,25 | 9,441 | 125,100 | 7,37 | 0,731 | 276,28 | 158,28 | 60,5592 | ZN | | | |
| RZ-141BI | | | | 180,00 | 42,00 | 132,00 | 2,00 | 109,00 | 11,50 | 9,441 | 125,100 | 7,25 | 0,639 | 313,13 | 181,13 | 68,9875 | ZO | | | |
| RZ-141BX | | | | 270,00 | 42,00 | 132,00 | 2,00 | 109,50 | 11,25 | 9,441 | 125,100 | 7,24 | 0,636 | 313,90 | 181,90 | 69,2997 | ZO | | | |
| RZ-141CI | | | | 180,00 | 45,00 | 148,00 | 2,00 | 125,00 | 11,50 | 9,441 | 125,100 | 7,17 | 0,556 | 356,22 | 208,22 | 78,9767 | ZO | | | |
| RZ-141CX | | | | 270,00 | 45,00 | 148,00 | 2,00 | 125,50 | 11,25 | 9,441 | 125,100 | 7,16 | 0,554 | 357,06 | 209,06 | 79,2888 | ZO | | | |
| RZ-141DI | | | | 180,00 | 48,00 | 164,00 | 2,50 | 141,00 | 11,50 | 9,441 | 125,100 | 7,10 | 0,492 | 399,30 | 235,30 | 88,9658 | ZP | | | |
| RZ-141DX | | | | 270,00 | 48,00 | 164,00 | 2,50 | 141,50 | 11,25 | 9,441 | 125,100 | 7,09 | 0,490 | 400,15 | 236,15 | 89,2780 | ZP | | | |
| RZ-141EI | | | | 180,00 | 51,00 | 180,00 | 2,50 | 157,00 | 11,50 | 9,441 | 125,100 | 7,03 | 0,441 | 442,20 | 262,20 | 98,9550 | ZQ | | | |
| RZ-141EX | | | | 270,00 | 51,00 | 180,00 | 2,50 | 157,50 | 11,25 | 9,441 | 125,100 | 7,03 | 0,440 | 443,23 | 263,23 | 99,2671 | ZQ | | | |
| RZ-141E-10I | | | | 16,00 | 0,30 | 19,30 | 180,00 | 17,00 | 41,00 | 1,10 | 21,00 | 10,00 | 11,600 | 139,700 | 11,57 | 5,371 | 64,80 | 23,80 | 12,2913 | ZG |
| RZ-141E-10X | | | | | | | 270,00 | 17,00 | 41,00 | 1,10 | 21,50 | 9,75 | 11,600 | 139,700 | 11,50 | 5,233 | 65,50 | 24,50 | 12,5645 | ZG |
| RZ-141FI | | | | | | | 180,00 | 22,00 | 53,00 | 1,10 | 33,00 | 10,00 | 11,600 | 139,700 | 11,01 | 3,292 | 91,94 | 38,94 | 18,8467 | ZJ |
| RZ-141FX | | | | | | | 270,00 | 22,00 | 53,00 | 1,10 | 33,50 | 9,75 | 11,600 | 139,700 | 10,97 | 3,239 | 92,56 | 39,56 | 19,1198 | ZJ |
| RZ-141GI | | | | | | | 180,00 | 32,00 | 87,00 | 1,50 | 67,00 | 10,00 | 11,600 | 139,700 | 9,41 | 1,570 | 168,64 | 81,64 | 37,4203 | ZK |
| RZ-141GX | | | | | | | 270,00 | 32,00 | 87,00 | 1,50 | 67,50 | 9,75 | 11,600 | 139,700 | 9,40 | 1,558 | 169,27 | 82,27 | 37,6934 | ZK |
| RZ-141HI | 180,00 | 40,00 | 121,00 | | | | 2,00 | 101,00 | 10,00 | 11,600 | 139,700 | 8,80 | 1,031 | 245,35 | 124,35 | 55,9938 | ZN | | | |
| RZ-141HX | 270,00 | 40,00 | 121,00 | | | | 2,00 | 101,50 | 9,75 | 11,600 | 139,700 | 8,79 | 1,026 | 245,97 | 124,97 | 56,2670 | ZN | | | |
| RZ-141JI | 180,00 | 46,00 | 155,00 | | | | 2,00 | 135,00 | 10,00 | 11,600 | 139,700 | 8,58 | 0,767 | 322,05 | 167,05 | 74,5674 | ZO | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| RZ-141JX | 2,00 | 16,00 | 0,30 | 19,30 | 270,00 | 46,00 | 155,00 | 2,00 | 135,50 | 9,75 | 11,600 | 139,700 | 8,58 | 0,764 | 322,68 | 167,68 | 74,8405 | ZO | | |
| RZ-141KI | | | | | 180,00 | 51,00 | 189,00 | 2,50 | 169,00 | 10,00 | 11,600 | 139,700 | 8,42 | 0,611 | 398,76 | 209,76 | 93,1410 | ZQ | | |
| RZ-141KX | | | | | 270,00 | 51,00 | 189,00 | 2,50 | 169,50 | 9,75 | 11,600 | 139,700 | 8,42 | 0,609 | 399,38 | 210,38 | 93,4141 | ZQ | | |
| RZ-142I | 14,50 | 0,30 | 17,80 | 180,00 | 19,00 | 42,80 | 1,10 | 25,00 | 8,90 | 13,300 | 153,000 | 14,57 | 6,233 | 65,22 | 22,42 | 12,9254 | ZH | | | |
| RZ-142X | | | | 270,00 | 19,00 | 42,80 | 1,10 | 25,50 | 8,65 | 13,300 | 153,000 | 14,46 | 6,100 | 65,71 | 22,91 | 13,1693 | ZH | | | |
| RZ-143I | | | | 180,00 | 24,00 | 58,80 | 1,10 | 41,00 | 8,90 | 13,300 | 153,000 | 12,57 | 3,676 | 96,82 | 38,02 | 20,7294 | ZK | | | |
| RZ-143X | | | | 270,00 | 25,00 | 58,80 | 1,10 | 41,50 | 8,65 | 13,300 | 153,000 | 12,53 | 3,629 | 97,31 | 38,51 | 20,9733 | ZK | | | |
| RZ-144I | | | | 180,00 | 35,00 | 98,80 | 1,50 | 81,00 | 8,90 | 13,300 | 153,000 | 10,98 | 1,815 | 175,82 | 77,02 | 40,2395 | ZL | | | |
| RZ-144X | | | | 270,00 | 35,00 | 98,80 | 1,50 | 81,50 | 8,65 | 13,300 | 153,000 | 10,97 | 1,803 | 176,37 | 77,57 | 40,4833 | ZL | | | |
| RZ-144AI | | | | 180,00 | 38,00 | 112,00 | 2,00 | 95,00 | 8,50 | 13,300 | 153,000 | 10,68 | 1,542 | 202,67 | 90,67 | 47,0680 | ZM | | | |
| RZ-144AX | | | | 270,00 | 38,00 | 112,00 | 2,00 | 95,50 | 8,25 | 13,300 | 153,000 | 10,67 | 1,533 | 203,16 | 91,16 | 47,3119 | ZM | | | |
| RZ-144BI | | | | 180,00 | 40,00 | 126,00 | 2,00 | 109,00 | 8,50 | 13,300 | 153,000 | 10,49 | 1,340 | 230,32 | 104,32 | 53,8965 | ZN | | | |
| RZ-144BX | | | | 270,00 | 40,00 | 126,00 | 2,00 | 109,50 | 8,25 | 13,300 | 153,000 | 10,49 | 1,334 | 230,81 | 104,81 | 54,1404 | ZN | | | |
| RZ-144CI | | | | 180,00 | 43,00 | 142,00 | 2,00 | 125,00 | 8,50 | 13,300 | 153,000 | 10,37 | 1,166 | 261,92 | 119,92 | 61,7005 | ZN | | | |
| RZ-144CX | | | | 270,00 | 43,00 | 142,00 | 2,00 | 125,50 | 8,25 | 13,300 | 153,000 | 10,37 | 1,161 | 262,41 | 120,41 | 61,9444 | ZN | | | |
| RZ-144DI | | | | 180,00 | 46,00 | 158,00 | 2,00 | 141,00 | 8,50 | 13,300 | 153,000 | 10,26 | 1,031 | 293,52 | 135,52 | 69,5045 | ZO | | | |
| RZ-144DX | | | | 270,00 | 46,00 | 158,00 | 2,00 | 141,50 | 8,25 | 13,300 | 153,000 | 10,26 | 1,028 | 294,01 | 136,01 | 69,7484 | ZO | | | |
| RZ-144EI | | | | 180,00 | 49,00 | 174,00 | 2,50 | 157,00 | 8,50 | 13,300 | 153,000 | 10,17 | 0,925 | 325,12 | 151,12 | 77,3086 | ZO | | | |
| RZ-144EX | | | | 270,00 | 49,00 | 174,00 | 2,50 | 157,50 | 8,25 | 13,300 | 153,000 | 10,16 | 0,922 | 325,31 | 151,31 | 77,5524 | ZO | | | |
| RZ-145I | | | | 12,00 | 0,25 | 15,30 | 180,00 | 18,00 | 38,30 | 0,80 | 25,00 | 6,65 | 15,700 | 181,500 | 22,20 | 12,174 | 51,92 | 13,62 | 10,3403 | ZH |
| RZ-145X | | | | | | | 270,00 | 18,00 | 38,30 | 0,80 | 25,50 | 6,40 | 15,700 | 181,500 | 22,03 | 11,915 | 52,22 | 13,92 | 10,5354 | ZH |
| RZ-146I | | | | | | | 180,00 | 24,00 | 54,80 | 1,10 | 41,00 | 6,90 | 15,700 | 181,500 | 19,03 | 7,179 | 77,89 | 23,09 | 16,5835 | ZJ |
| RZ-146X | | | | | | | 270,00 | 24,00 | 54,80 | 1,10 | 41,50 | 6,65 | 15,700 | 181,500 | 18,97 | 7,089 | 78,19 | 23,39 | 16,7786 | ZJ |
| RZ-146AI | 180,00 | 27,00 | 66,80 | | | | 1,50 | 53,00 | 6,90 | 15,700 | 181,500 | 17,94 | 5,490 | 97,00 | 30,20 | 21,2660 | ZK | | | |
| RZ-146AX | 270,00 | 27,00 | 66,80 | | | | 1,50 | 53,50 | 6,65 | 15,700 | 181,500 | 17,90 | 5,437 | 97,30 | 30,50 | 21,4611 | ZK | | | |
| RZ-147I | 180,00 | 34,00 | 94,80 | | | | 1,50 | 81,00 | 6,90 | 15,700 | 181,500 | 16,50 | 3,544 | 141,58 | 46,78 | 32,1916 | ZK | | | |
| RZ-147X | 270,00 | 34,00 | 94,80 | | | | 1,50 | 81,50 | 6,65 | 15,700 | 181,500 | 16,48 | 3,522 | 141,87 | 47,07 | 32,3867 | ZK | | | |
| RZ-147AAI | 180,00 | 34,00 | 96,80 | | | | 1,50 | 83,00 | 6,90 | 15,700 | 181,500 | 16,43 | 3,457 | 144,76 | 47,96 | 32,9720 | ZL | | | |
| RZ-147AAX | 270,00 | 34,00 | 96,80 | | | | 1,50 | 83,50 | 6,65 | 15,700 | 181,500 | 16,41 | 3,436 | 145,06 | 48,26 | 33,1671 | ZL | | | |
| RZ-147AI | 180,00 | 36,00 | 108,00 | | | | 2,00 | 95,00 | 6,50 | 15,700 | 181,500 | 16,04 | 3,011 | 163,07 | 55,07 | 37,6544 | ZL | | | |
| RZ-147AX | 270,00 | 37,00 | 108,00 | | | | 2,00 | 95,50 | 6,25 | 15,700 | 181,500 | 16,02 | 2,995 | 163,36 | 55,36 | 37,8495 | ZL | | | |
| RZ-147BI | 180,00 | 39,00 | 122,00 | | | | 2,00 | 109,00 | 6,50 | 15,700 | 181,500 | 15,74 | 2,617 | 185,36 | 63,36 | 43,1172 | ZL | | | |
| RZ-147BX | 270,00 | 39,00 | 122,00 | | | | 2,00 | 109,50 | 6,25 | 15,700 | 181,500 | 15,73 | 2,605 | 185,65 | 63,65 | 43,3123 | ZL | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| Z-141JX | 2,00 | 16,00 | 0,30 | 19,30 | 270,00 | 46,00 | 155,00 | 2,00 | 135,50 | 9,75 | 14,500 | 166,700 | 8,99 | 0,890 | 326,04 | 171,04 | 74,7500 | ZL | | |
| Z-141KI | | | | | 180,00 | 51,00 | 189,00 | 2,50 | 169,00 | 10,00 | 14,500 | 166,700 | 8,83 | 0,711 | 402,95 | 213,95 | 92,9700 | ZN | | |
| Z-141KX | | | | | 270,00 | 51,00 | 189,00 | 2,50 | 169,50 | 9,75 | 14,500 | 166,700 | 8,82 | 0,709 | 403,59 | 214,59 | 93,2400 | ZN | | |
| Z-142I | 14,50 | 0,30 | 17,80 | 180,00 | 19,00 | 42,80 | 1,10 | 25,00 | 8,90 | 16,700 | 182,500 | 15,01 | 7,257 | 65,66 | 22,86 | 13,1100 | ZE | | | |
| Z-142X | | | | 270,00 | 19,00 | 42,80 | 1,10 | 25,50 | 8,65 | 16,700 | 182,500 | 14,90 | 7,103 | 66,15 | 23,35 | 13,3500 | ZE | | | |
| Z-143I | | | | 180,00 | 24,00 | 58,80 | 1,10 | 41,00 | 8,90 | 16,700 | 182,500 | 13,01 | 4,280 | 97,56 | 38,76 | 20,8800 | ZG | | | |
| Z-143X | | | | 270,00 | 25,00 | 58,80 | 1,10 | 41,50 | 8,65 | 16,700 | 182,500 | 12,97 | 4,226 | 98,03 | 39,23 | 21,1200 | ZG | | | |
| Z-144I | | | | 180,00 | 35,00 | 98,80 | 1,50 | 81,00 | 8,90 | 16,700 | 182,500 | 11,42 | 2,113 | 177,31 | 78,51 | 40,3100 | ZH | | | |
| Z-144X | | | | 270,00 | 35,00 | 98,80 | 1,50 | 81,50 | 8,65 | 16,700 | 182,500 | 11,41 | 2,100 | 177,81 | 79,01 | 40,5500 | ZH | | | |
| Z-144AI | | | | 180,00 | 38,00 | 112,00 | 2,00 | 95,00 | 8,50 | 16,700 | 182,500 | 11,13 | 1,795 | 204,42 | 92,42 | 47,1100 | ZJ | | | |
| Z-144AX | | | | 270,00 | 38,00 | 112,00 | 2,00 | 95,50 | 8,25 | 16,700 | 182,500 | 11,12 | 1,785 | 204,92 | 92,92 | 47,3500 | ZJ | | | |
| Z-144BI | | | | 180,00 | 40,00 | 126,00 | 2,00 | 109,00 | 8,50 | 16,700 | 182,500 | 10,94 | 1,560 | 232,34 | 106,34 | 53,9100 | ZK | | | |
| Z-144BX | | | | 270,00 | 40,00 | 126,00 | 2,00 | 109,50 | 8,25 | 16,700 | 182,500 | 10,93 | 1,553 | 232,84 | 106,84 | 54,1500 | ZK | | | |
| Z-144CI | | | | 180,00 | 43,00 | 142,00 | 2,00 | 125,00 | 8,50 | 16,700 | 182,500 | 10,81 | 1,357 | 264,24 | 122,24 | 61,6800 | ZK | | | |
| Z-144CX | | | | 270,00 | 43,00 | 142,00 | 2,00 | 125,50 | 8,25 | 16,700 | 182,500 | 10,81 | 1,352 | 264,74 | 122,74 | 61,9300 | ZK | | | |
| Z-144DI | | | | 180,00 | 46,00 | 158,00 | 2,00 | 141,00 | 8,50 | 16,700 | 182,500 | 10,71 | 1,201 | 296,14 | 138,14 | 69,4500 | ZL | | | |
| Z-144DX | | | | 270,00 | 46,00 | 158,00 | 2,00 | 141,50 | 8,25 | 16,700 | 182,500 | 10,70 | 1,197 | 296,64 | 138,64 | 69,7000 | ZL | | | |
| Z-144EI | | | | 180,00 | 49,00 | 174,00 | 2,50 | 157,00 | 8,50 | 16,700 | 182,500 | 10,61 | 1,077 | 328,04 | 154,04 | 77,2300 | ZL | | | |
| Z-144EX | | | | 270,00 | 49,00 | 174,00 | 2,50 | 157,50 | 8,25 | 16,700 | 182,500 | 10,61 | 1,073 | 328,54 | 154,54 | 77,4700 | ZL | | | |
| Z-145I | | | | 12,00 | 0,25 | 15,30 | 180,00 | 18,00 | 38,30 | 0,80 | 25,00 | 6,65 | 19,710 | 216,400 | 22,72 | 14,174 | 52,18 | 13,88 | 10,5000 | ZE |
| Z-145X | | | | | | | 270,00 | 18,00 | 38,30 | 0,80 | 25,50 | 6,40 | 19,710 | 216,400 | 22,56 | 13,872 | 52,48 | 14,18 | 10,6900 | ZE |
| Z-146I | | | | | | | 180,00 | 24,00 | 54,80 | 1,10 | 41,00 | 6,90 | 19,710 | 216,400 | 19,56 | 8,359 | 78,34 | 23,54 | 16,7300 | ZF |
| Z-146X | | | | | | | 270,00 | 24,00 | 54,80 | 1,10 | 41,50 | 6,65 | 19,710 | 216,400 | 19,49 | 8,253 | 78,34 | 23,54 | 16,9200 | ZF |
| Z-146AI | 180,00 | 27,00 | 66,80 | | | | 1,50 | 53,00 | 6,90 | 19,710 | 216,400 | 18,46 | 6,392 | 97,58 | 30,78 | 21,4000 | ZG | | | |
| Z-146AX | 270,00 | 27,00 | 66,80 | | | | 1,50 | 53,50 | 6,65 | 19,710 | 216,400 | 18,42 | 6,330 | 97,89 | 31,09 | 21,5900 | ZG | | | |
| Z-147I | 180,00 | 34,00 | 94,80 | | | | 1,50 | 81,00 | 6,90 | 19,710 | 216,400 | 17,03 | 4,127 | 142,45 | 47,65 | 32,3000 | ZG | | | |
| Z-147X | 270,00 | 34,00 | 94,80 | | | | 1,50 | 81,50 | 6,65 | 19,710 | 216,400 | 17,01 | 4,101 | 142,76 | 47,96 | 32,4900 | ZG | | | |
| Z-147AAI | 180,00 | 34,00 | 96,80 | | | | 1,50 | 83,00 | 6,90 | 19,710 | 216,400 | 16,96 | 4,025 | 145,69 | 48,89 | 33,0800 | ZH | | | |
| Z-147AAX | 270,00 | 34,00 | 96,80 | | | | 1,50 | 83,50 | 6,65 | 19,710 | 216,400 | 16,94 | 4,000 | 145,99 | 49,19 | 33,2700 | ZH | | | |
| Z-147AI | 180,00 | 36,00 | 108,00 | | | | 2,00 | 95,00 | 6,50 | 19,710 | 216,400 | 16,56 | 3,505 | 164,14 | 56,14 | 37,7500 | ZH | | | |
| Z-147AX | 270,00 | 37,00 | 108,00 | | | | 2,00 | 95,50 | 6,25 | 19,710 | 216,400 | 16,55 | 3,487 | 164,44 | 56,44 | 37,9500 | ZH | | | |
| Z-147BI | 180,00 | 39,00 | 122,00 | | | | 2,00 | 109,00 | 6,50 | 19,710 | 216,400 | 16,26 | 3,047 | 186,59 | 64,59 | 43,2000 | ZH | | | |
| Z-147BX | 270,00 | 39,00 | 122,00 | | | | 2,00 | 109,50 | 6,25 | 19,710 | 216,400 | 16,25 | 3,033 | 186,89 | 64,89 | 43,4000 | ZH | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| Z-147B-011 | 2,00 | 12,00 | 0,25 | 15,30 | 180,00 | 40,00 | 126,00 | 2,00 | 113,00 | 6,50 | 19,710 | 216,400 | 16,21 | 2,937 | 193,00 | 67,00 | 44,7600 | ZH |
| Z-147B-01X | | | | | 270,00 | 40,00 | 126,00 | 2,00 | 113,50 | 6,25 | 19,710 | 216,400 | 16,20 | 2,924 | 193,30 | 67,30 | 44,9500 | ZH |
| Z-147CI | | | | | 180,00 | 42,00 | 138,00 | 2,00 | 125,00 | 6,50 | 19,710 | 216,400 | 16,06 | 2,650 | 212,24 | 74,24 | 49,4300 | ZH |
| Z-147CX | | | | | 270,00 | 42,00 | 138,00 | 2,00 | 125,50 | 6,25 | 19,710 | 216,400 | 16,06 | 2,640 | 212,55 | 74,55 | 49,6200 | ZH |
| Z-147DI | | | | | 180,00 | 45,00 | 154,80 | 2,00 | 141,00 | 6,50 | 19,710 | 216,400 | 15,89 | 2,345 | 238,70 | 83,90 | 55,6600 | ZK |
| Z-147DX | | | | | 270,00 | 45,00 | 154,80 | 2,00 | 141,50 | 6,25 | 19,710 | 216,400 | 15,89 | 2,337 | 239,00 | 84,20 | 55,8500 | ZK |
| Z-147EI | | | | | 180,00 | 47,00 | 170,00 | 2,50 | 157,00 | 6,50 | 19,710 | 216,400 | 15,74 | 2,103 | 263,56 | 93,56 | 61,8900 | ZK |
| Z-147EX | | | | | 270,00 | 47,00 | 170,00 | 2,50 | 157,50 | 6,25 | 19,710 | 216,400 | 15,74 | 2,096 | 263,86 | 93,86 | 62,0800 | ZK |
| Z-147E-011 | 10,00 | 0,35 | 13,40 | 180,00 | 15,00 | 29,60 | 0,80 | 19,00 | 5,30 | 29,510 | 252,900 | 40,02 | 37,454 | 35,57 | 5,97 | 6,5500 | ZE | |
| Z-147E-01X | | | | 270,00 | 15,00 | 29,60 | 0,80 | 19,50 | 5,05 | 29,510 | 252,900 | 39,51 | 36,384 | 35,74 | 6,14 | 6,7050 | ZE | |
| Z-147E-02I | | | | 180,00 | 20,00 | 41,60 | 1,10 | 31,00 | 5,30 | 29,510 | 252,900 | 32,68 | 21,956 | 51,77 | 10,17 | 10,2800 | ZF | |
| Z-147E-02X | | | | 270,00 | 20,00 | 41,60 | 1,10 | 31,50 | 5,05 | 29,510 | 252,900 | 32,54 | 21,584 | 51,95 | 10,35 | 10,4500 | ZF | |
| Z-147E-03I | | | | 180,00 | 25,00 | 57,60 | 1,10 | 47,00 | 5,30 | 29,510 | 252,900 | 29,31 | 14,149 | 73,38 | 15,78 | 15,2900 | ZF | |
| Z-147E-03X | | | | 270,00 | 25,00 | 57,60 | 1,10 | 47,50 | 5,05 | 29,510 | 252,900 | 29,24 | 13,994 | 73,56 | 15,96 | 15,4500 | ZF | |
| Z-147E-10I | | | | 180,00 | 30,00 | 85,50 | 1,50 | 75,00 | 5,25 | 29,510 | 252,900 | 26,00 | 8,722 | 111,10 | 25,60 | 23,8800 | ZF | |
| Z-147E-10X | | | | 270,00 | 30,00 | 85,50 | 1,50 | 75,00 | 5,25 | 29,510 | 252,900 | 26,00 | 8,663 | 111,30 | 25,80 | 23,8800 | ZF | |
| Z-147E-20I | 2,20 | 30,00 | 0,50 | 13,40 | 180,00 | 23,00 | 67,00 | 1,80 | 23,10 | 21,95 | 5,100 | 118,000 | 7,00 | 1,169 | 163,60 | 96,60 | 29,5300 | ZJ |
| Z-147E-20X | | | | | 270,00 | 23,00 | 67,00 | 1,80 | 23,65 | 21,68 | 5,100 | 118,000 | 7,00 | 1,139 | 166,10 | 99,10 | 30,1900 | ZJ |
| Z-147E-21I | | | | | 180,00 | 30,00 | 82,30 | 1,80 | 36,30 | 23,00 | 5,100 | 118,000 | 6,70 | 0,717 | 239,80 | 157,50 | 45,2800 | ZJ |
| Z-147E-21X | | | | | 270,00 | 30,00 | 82,30 | 1,80 | 36,85 | 22,73 | 5,100 | 118,000 | 6,70 | 0,705 | 242,30 | 160,00 | 45,9400 | ZJ |
| Z-147E-22I | | | | | 180,00 | 36,00 | 102,00 | 2,40 | 56,10 | 22,95 | 5,100 | 118,000 | 6,50 | 0,453 | 351,00 | 249,00 | 68,9100 | ZK |
| Z-147E-22X | | | | | 270,00 | 36,00 | 102,00 | 2,40 | 56,65 | 22,68 | 5,100 | 118,000 | 6,50 | 0,449 | 353,60 | 251,60 | 69,5700 | ZK |
| Z-147E-23I | | | | | 180,00 | 47,00 | 133,00 | 2,40 | 89,10 | 21,95 | 5,100 | 118,000 | 6,40 | 0,281 | 534,50 | 401,50 | 108,2900 | ZM |
| Z-147E-23X | | | | | 270,00 | 47,00 | 133,00 | 2,40 | 89,65 | 21,68 | 5,100 | 118,000 | 6,40 | 0,279 | 537,10 | 404,10 | 108,9400 | ZM |
| Z-147E-24I | 24,00 | 0,45 | 27,80 | 180,00 | 20,00 | 55,60 | 1,30 | 23,10 | 16,25 | 9,811 | 148,000 | 10,29 | 2,425 | 112,62 | 57,02 | 23,1600 | ZH | |
| Z-147FX | | | | 270,00 | 20,00 | 55,60 | 1,30 | 23,65 | 15,97 | 9,811 | 148,000 | 10,18 | 2,363 | 114,12 | 58,52 | 23,6700 | ZH | |
| Z-147GI | | | | 180,00 | 25,00 | 68,80 | 1,80 | 36,30 | 16,25 | 9,811 | 148,000 | 8,89 | 1,486 | 161,83 | 93,03 | 35,5100 | ZJ | |
| Z-147GX | | | | 270,00 | 26,00 | 68,80 | 1,80 | 36,85 | 15,97 | 9,811 | 148,000 | 8,86 | 1,463 | 163,33 | 94,53 | 36,0200 | ZJ | |
| Z-147HI | | | | 180,00 | 32,00 | 88,60 | 1,80 | 56,10 | 16,25 | 9,811 | 148,000 | 8,10 | 0,940 | 235,65 | 147,05 | 54,2200 | ZJ | |
| Z-147HX | | | | 270,00 | 32,00 | 88,60 | 1,80 | 56,65 | 15,97 | 9,811 | 148,000 | 8,08 | 0,931 | 237,15 | 148,55 | 54,7300 | ZJ | |
| Z-147JI | | | | 180,00 | 40,00 | 122,00 | 2,40 | 89,10 | 16,45 | 9,811 | 148,000 | 7,49 | 0,583 | 359,08 | 237,08 | 84,9100 | ZK | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| RZ-147B-01I | 2,00 | 12,00 | 0,25 | 15,30 | 180,00 | 40,00 | 126,00 | 2,00 | 113,00 | 6,50 | 15,700 | 181,500 | 15,68 | 2,523 | 191,73 | 65,73 | 44,6780 | ZL |
| RZ-147B-01X | | | | | 270,00 | 40,00 | 126,00 | 2,00 | 113,50 | 6,25 | 15,700 | 181,500 | 15,68 | 2,511 | 192,02 | 66,02 | 44,8731 | ZL |
| RZ-147CI | | | | | 180,00 | 42,00 | 138,00 | 2,00 | 125,00 | 6,50 | 15,700 | 181,500 | 15,54 | 2,276 | 210,83 | 72,83 | 49,3604 | ZL |
| RZ-147CX | | | | | 270,00 | 42,00 | 138,00 | 2,00 | 125,50 | 6,25 | 15,700 | 181,500 | 15,53 | 2,267 | 211,13 | 73,13 | 49,5555 | ZL |
| RZ-147DI | | | | | 180,00 | 45,00 | 154,80 | 2,00 | 141,00 | 6,50 | 15,700 | 181,500 | 15,37 | 2,014 | 237,11 | 82,31 | 55,6036 | ZN |
| RZ-147DX | | | | | 270,00 | 45,00 | 154,80 | 2,00 | 141,50 | 6,25 | 15,700 | 181,500 | 15,36 | 2,007 | 237,40 | 82,60 | 55,7987 | ZN |
| RZ-147EI | | | | | 180,00 | 47,00 | 170,00 | 2,50 | 157,00 | 6,50 | 15,700 | 181,500 | 15,22 | 1,806 | 261,78 | 91,78 | 61,8468 | ZN |
| RZ-147EX | | | | | 270,00 | 47,00 | 170,00 | 2,50 | 157,50 | 6,25 | 15,700 | 181,500 | 15,21 | 1,801 | 262,08 | 92,08 | 62,0419 | ZN |
| RZ-147E-01I | 10,00 | 0,35 | 13,40 | 180,00 | 15,00 | 29,60 | 0,80 | 19,00 | 5,30 | 23,600 | 212,000 | 39,40 | 32,169 | 35,46 | 5,86 | 6,3993 | ZH | |
| RZ-147E-01X | | | | 270,00 | 15,00 | 29,60 | 0,80 | 19,50 | 5,05 | 23,600 | 212,000 | 38,89 | 31,250 | 35,63 | 6,03 | 6,5554 | ZH | |
| RZ-147E-02I | | | | 180,00 | 20,00 | 41,60 | 1,10 | 31,00 | 5,30 | 23,600 | 212,000 | 32,07 | 18,858 | 51,60 | 10,00 | 10,1452 | ZJ | |
| RZ-147E-02X | | | | 270,00 | 20,00 | 41,60 | 1,10 | 31,50 | 5,05 | 23,600 | 212,000 | 31,93 | 18,538 | 51,77 | 10,17 | 10,3013 | ZJ | |
| RZ-147E-03I | | | | 180,00 | 25,00 | 57,60 | 1,10 | 47,00 | 5,30 | 23,600 | 212,000 | 28,70 | 12,153 | 73,11 | 15,51 | 15,1398 | ZJ | |
| RZ-147E-03X | | | | 270,00 | 25,00 | 57,60 | 1,10 | 47,50 | 5,05 | 23,600 | 212,000 | 28,63 | 12,019 | 73,29 | 15,69 | 15,2959 | ZJ | |
| RZ-147E-10I | | | | 180,00 | 30,00 | 85,50 | 1,50 | 75,00 | 5,25 | 23,600 | 212,000 | 26,00 | 7,491 | 110,65 | 25,15 | 23,8803 | ZL | |
| RZ-147E-10X | | | | 270,00 | 30,00 | 85,50 | 1,50 | 75,00 | 5,25 | 23,600 | 212,000 | 26,00 | 7,491 | 110,65 | 25,15 | 23,8803 | ZL | |
| RZ-147E-20I | 2,20 | 30,00 | 0,50 | 13,40 | 180,00 | 23,00 | 67,00 | 1,80 | 23,10 | 21,95 | 3,500 | 104,300 | 7,00 | 1,004 | 167,40 | 100,40 | 29,5326 | ZM |
| RZ-147E-20X | | | | | 270,00 | 23,00 | 67,00 | 1,80 | 23,65 | 21,68 | 3,500 | 104,300 | 7,00 | 0,978 | 170,00 | 103,00 | 30,1888 | ZM |
| RZ-147E-21I | | | | | 180,00 | 30,00 | 82,30 | 1,80 | 36,30 | 23,00 | 3,500 | 104,300 | 6,70 | 0,616 | 246,10 | 163,80 | 45,2832 | ZN |
| RZ-147E-21X | | | | | 270,00 | 30,00 | 82,30 | 1,80 | 36,85 | 22,73 | 3,500 | 104,300 | 6,70 | 0,606 | 248,70 | 166,40 | 45,9395 | ZN |
| RZ-147E-22I | | | | | 180,00 | 36,00 | 102,00 | 2,40 | 56,10 | 22,95 | 3,500 | 104,300 | 6,50 | 0,389 | 360,90 | 258,90 | 68,9093 | ZN |
| RZ-147E-22X | | | | | 270,00 | 36,00 | 102,00 | 2,40 | 56,65 | 22,68 | 3,500 | 104,300 | 6,50 | 0,385 | 363,50 | 261,50 | 69,5656 | ZN |
| RZ-147E-23I | | | | | 180,00 | 47,00 | 133,00 | 2,40 | 89,10 | 21,95 | 3,500 | 104,300 | 6,40 | 0,242 | 550,30 | 417,30 | 108,2860 | ZP |
| RZ-147E-23X | | | | | 270,00 | 47,00 | 133,00 | 2,40 | 89,65 | 21,68 | 3,500 | 104,300 | 6,40 | 0,240 | 553,00 | 420,00 | 108,9423 | ZP |
| RZ-147E-24I | 180,00 | 58,00 | 177,00 | 3,00 | 133,10 | 21,95 | 3,500 | 104,300 | 6,30 | 0,160 | 805,70 | 628,70 | 160,7883 | ZQ | | | | |
| RZ-147E-24X | 270,00 | 58,00 | 177,00 | 3,00 | 133,65 | 21,68 | 3,500 | 104,300 | 6,30 | 0,160 | 808,30 | 631,30 | 161,4446 | ZQ | | | | |
| RZ-147FI | 24,00 | 0,45 | 27,80 | 180,00 | 20,00 | 55,60 | 1,30 | 23,10 | 16,25 | 7,851 | 123,700 | 9,93 | 2,083 | 111,25 | 55,65 | 23,1586 | ZL | |
| RZ-147FX | | | | 270,00 | 20,00 | 55,60 | 1,30 | 23,65 | 15,97 | 7,851 | 123,700 | 9,82 | 2,029 | 112,72 | 57,12 | 23,6733 | ZL | |
| RZ-147GI | | | | 180,00 | 25,00 | 68,80 | 1,80 | 36,30 | 16,25 | 7,851 | 123,700 | 8,53 | 1,276 | 159,60 | 90,80 | 35,5099 | ZM | |
| RZ-147GX | | | | 270,00 | 26,00 | 68,80 | 1,80 | 36,85 | 15,97 | 7,851 | 123,700 | 8,50 | 1,256 | 161,07 | 92,27 | 36,0245 | ZM | |
| RZ-147HI | | | | 180,00 | 32,00 | 88,60 | 1,80 | 56,10 | 16,25 | 7,851 | 123,700 | 7,73 | 0,808 | 232,13 | 143,53 | 54,0368 | ZM | |
| RZ-147HX | | | | 270,00 | 32,00 | 88,60 | 1,80 | 56,65 | 15,97 | 7,851 | 123,700 | 7,72 | 0,799 | 233,49 | 144,89 | 54,5514 | ZM | |
| RZ-147JI | | | | 180,00 | 40,00 | 122,00 | 2,40 | 89,10 | 16,45 | 7,851 | 123,700 | 7,12 | 0,501 | 353,40 | 231,40 | 84,9149 | ZN | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| RZ-147JX | 2,20 | 24,00 | 0,45 | 27,80 | 270,00 | 41,00 | 122,00 | 2,40 | 89,65 | 16,17 | 7,851 | 123,700 | 7,12 | 0,498 | 354,87 | 232,87 | 85,4296 | ZN | | |
| RZ-147KI | | | | | 180,00 | 50,00 | 166,00 | 3,00 | 133,10 | 16,45 | 7,851 | 123,700 | 6,77 | 0,333 | 514,40 | 348,40 | 126,0858 | ZP | | |
| RZ-147KX | | | | | 270,00 | 50,00 | 166,00 | 3,00 | 133,65 | 16,17 | 7,851 | 123,700 | 6,77 | 0,331 | 516,03 | 350,03 | 126,6005 | ZP | | |
| RZ-147K-20I | 20,00 | 0,45 | 23,80 | 180,00 | 17,00 | 51,50 | 1,30 | 25,30 | 13,10 | 11,700 | 147,200 | 9,80 | 3,461 | 90,70 | 39,20 | 20,5902 | ZL | | | |
| RZ-147K-20X | | | | 270,00 | 17,00 | 51,50 | 1,30 | 25,85 | 12,83 | 11,700 | 147,200 | 9,80 | 3,381 | 91,60 | 40,10 | 21,0104 | ZL | | | |
| RZ-147K-21I | | | | 180,00 | 25,00 | 75,50 | 1,80 | 49,50 | 13,00 | 11,700 | 147,200 | 9,40 | 1,690 | 155,70 | 80,20 | 39,0793 | ZM | | | |
| RZ-147K-21X | | | | 270,00 | 25,00 | 75,50 | 1,80 | 50,05 | 12,73 | 11,700 | 147,200 | 9,40 | 1,671 | 156,60 | 81,10 | 39,4995 | ZM | | | |
| RZ-147K-01I | | | | 180,00 | 31,00 | 90,90 | 1,80 | 64,90 | 13,00 | 11,700 | 147,200 | 9,26 | 1,275 | 197,16 | 106,26 | 50,8451 | ZM | | | |
| RZ-147K-01X | | | | 270,00 | 31,00 | 90,90 | 1,80 | 65,45 | 12,72 | 11,700 | 147,200 | 9,24 | 1,264 | 198,09 | 107,19 | 51,2653 | ZM | | | |
| RZ-147K-02I | | | | 180,00 | 36,00 | 112,00 | 2,40 | 87,45 | 12,55 | 11,700 | 147,200 | 8,82 | 0,938 | 256,50 | 144,50 | 68,0736 | ZN | | | |
| RZ-147K-02X | | | | 270,00 | 36,00 | 112,00 | 2,40 | 87,45 | 12,27 | 11,700 | 147,200 | 8,82 | 0,938 | 256,47 | 144,47 | 68,0736 | ZN | | | |
| RZ-147K-03I | | | | 180,00 | 40,00 | 134,00 | 2,40 | 108,90 | 12,55 | 11,700 | 147,200 | 8,51 | 0,749 | 314,82 | 180,82 | 84,4617 | ZO | | | |
| RZ-147K-03X | | | | 270,00 | 41,00 | 134,00 | 2,40 | 109,45 | 12,27 | 11,700 | 147,200 | 8,50 | 0,746 | 315,76 | 181,76 | 84,8819 | ZO | | | |
| RZ-147K-04I | | | | 180,00 | 44,00 | 156,00 | 2,40 | 130,90 | 12,55 | 11,700 | 147,200 | 8,36 | 0,621 | 374,11 | 218,11 | 101,2700 | ZQ | | | |
| RZ-147K-04X | | | | 270,00 | 44,00 | 156,00 | 2,40 | 131,45 | 12,27 | 11,700 | 147,200 | 8,36 | 0,619 | 375,04 | 219,04 | 101,6902 | ZQ | | | |
| RZ-147LI | | | | 15,00 | 0,30 | 18,60 | 180,00 | 17,00 | 41,20 | 1,10 | 23,10 | 9,05 | 16,600 | 192,200 | 20,92 | 10,288 | 58,27 | 17,07 | 13,5977 | ZJ |
| RZ-147LX | | | | | | | 270,00 | 17,00 | 41,20 | 1,10 | 23,65 | 8,77 | 16,600 | 192,200 | 20,68 | 10,025 | 58,72 | 17,52 | 13,8999 | ZJ |
| RZ-147MI | | | | | | | 180,00 | 21,00 | 54,40 | 1,10 | 36,30 | 9,05 | 16,600 | 192,200 | 17,80 | 6,306 | 82,25 | 27,85 | 20,8498 | ZK |
| RZ-147MX | 270,00 | 22,00 | 54,40 | | | | 1,10 | 36,85 | 8,77 | 16,600 | 192,200 | 17,74 | 6,206 | 82,70 | 28,30 | 21,1520 | ZK | | | |
| RZ-147NI | 180,00 | 27,00 | 74,20 | | | | 1,50 | 56,10 | 9,05 | 16,600 | 192,200 | 16,02 | 3,989 | 118,22 | 44,02 | 31,7280 | ZK | | | |
| RZ-147NX | 270,00 | 27,00 | 74,20 | | | | 1,50 | 56,65 | 8,77 | 16,600 | 192,200 | 15,99 | 3,949 | 118,67 | 44,47 | 32,0302 | ZK | | | |
| RZ-147OI | 180,00 | 34,00 | 107,00 | | | | 2,00 | 89,10 | 8,95 | 16,600 | 192,200 | 14,66 | 2,474 | 177,97 | 70,97 | 49,8583 | ZM | | | |
| RZ-147OX | 270,00 | 34,00 | 107,00 | | | | 2,00 | 89,65 | 8,67 | 16,600 | 192,200 | 14,65 | 2,459 | 178,42 | 71,42 | 50,1605 | ZM | | | |
| RZ-147PI | 180,00 | 42,00 | 151,00 | | | | 2,00 | 133,10 | 8,95 | 16,600 | 192,200 | 13,88 | 1,643 | 257,91 | 106,91 | 74,0320 | ZN | | | |
| RZ-147PX | 270,00 | 42,00 | 151,00 | | | | 2,00 | 133,65 | 8,67 | 16,600 | 192,200 | 13,87 | 1,636 | 258,36 | 107,36 | 74,3342 | ZN | | | |
| RZ-147QI | 11,00 | 0,35 | 14,70 | | | | 180,00 | 16,00 | 34,80 | 0,80 | 23,10 | 5,85 | 25,000 | 251,800 | 44,08 | 31,661 | 41,97 | 7,17 | 9,3484 | ZJ |
| RZ-147QX | | | | | | | 270,00 | 16,00 | 34,80 | 0,80 | 23,65 | 5,57 | 25,000 | 251,800 | 43,54 | 30,849 | 42,15 | 7,35 | 9,5562 | ZJ |
| RZ-147RI | | | | | | | 180,00 | 20,00 | 48,00 | 1,10 | 36,30 | 5,85 | 25,000 | 251,800 | 37,11 | 19,405 | 59,69 | 11,69 | 14,3343 | ZJ |
| RZ-147RX | | | | | | | 270,00 | 21,00 | 48,00 | 1,10 | 36,85 | 5,57 | 25,000 | 251,800 | 36,96 | 19,097 | 59,88 | 11,88 | 14,5420 | ZJ |
| RZ-147SI | | | | | | | 180,00 | 26,00 | 67,80 | 1,50 | 56,10 | 5,85 | 25,000 | 251,800 | 33,13 | 12,277 | 86,28 | 18,48 | 21,8130 | ZK |
| RZ-147SX | | | | 270,00 | 26,00 | 67,80 | 1,50 | 56,65 | 5,57 | 25,000 | 251,800 | 33,06 | 12,153 | 86,47 | 18,67 | 22,0208 | ZK | | | |
| RZ-147TI | | | | 180,00 | 33,00 | 101,00 | 2,00 | 89,10 | 5,95 | 25,000 | 251,800 | 30,09 | 7,615 | 130,79 | 29,79 | 34,2776 | ZM | | | |
| RZ-147TX | | | | 270,00 | 33,00 | 101,00 | 2,00 | 89,65 | 5,67 | 25,000 | 251,800 | 30,06 | 7,567 | 130,98 | 29,98 | 34,4853 | ZM | | | |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| Z-147JX | 2,20 | 24,00 | 0,45 | 27,80 | 270,00 | 41,00 | 122,00 | 2,40 | 89,65 | 16,17 | 9,811 | 148,000 | 7,48 | 0,579 | 360,58 | 238,58 | 85,4200 | ZK | | |
| Z-147KI | | | | | 180,00 | 50,00 | 166,00 | 3,00 | 133,10 | 16,45 | 9,811 | 148,000 | 7,14 | 0,387 | 523,12 | 357,12 | 126,0800 | ZM | | |
| Z-147KX | | | | | 270,00 | 50,00 | 166,00 | 3,00 | 133,65 | 16,17 | 9,811 | 148,000 | 7,14 | 0,386 | 524,62 | 358,62 | 126,6000 | ZM | | |
| Z-147K-20I | 20,00 | 0,45 | 23,80 | 180,00 | 17,00 | 51,50 | 1,30 | 25,30 | 13,10 | 14,710 | 176,100 | 10,00 | 4,030 | 91,50 | 40,00 | 20,5900 | ZJ | | | |
| Z-147K-20X | | | | 270,00 | 17,00 | 51,50 | 1,30 | 25,85 | 12,83 | 14,710 | 176,100 | 10,00 | 3,936 | 92,50 | 41,00 | 21,0100 | ZJ | | | |
| Z-147K-21I | | | | 180,00 | 25,00 | 75,50 | 1,80 | 49,50 | 13,00 | 14,710 | 176,100 | 9,40 | 1,968 | 157,50 | 82,00 | 39,0800 | ZJ | | | |
| Z-147K-21X | | | | 270,00 | 25,00 | 75,50 | 1,80 | 50,05 | 12,73 | 14,710 | 176,100 | 9,40 | 1,964 | 158,50 | 83,00 | 39,5000 | ZJ | | | |
| Z-147K-01I | | | | 180,00 | 31,00 | 90,90 | 1,80 | 64,90 | 13,00 | 14,710 | 176,100 | 9,20 | 1,485 | 199,61 | 108,71 | 50,9800 | ZJ | | | |
| Z-147K-01X | | | | 270,00 | 31,00 | 90,90 | 1,80 | 65,45 | 12,72 | 14,710 | 176,100 | 9,20 | 1,472 | 200,57 | 109,67 | 51,4000 | ZJ | | | |
| Z-147K-02I | | | | 180,00 | 36,00 | 112,00 | 2,40 | 86,90 | 12,55 | 14,710 | 176,100 | 9,20 | 1,099 | 258,86 | 146,86 | 67,7000 | ZK | | | |
| Z-147K-02X | | | | 270,00 | 36,00 | 112,00 | 2,40 | 87,45 | 12,27 | 14,710 | 176,100 | 9,20 | 1,092 | 259,81 | 147,81 | 68,1200 | ZK | | | |
| Z-147K-03I | | | | 180,00 | 40,00 | 134,00 | 2,40 | 108,90 | 12,55 | 14,710 | 176,100 | 9,10 | 0,872 | 319,00 | 185,00 | 84,4200 | ZL | | | |
| Z-147K-03X | | | | 270,00 | 41,00 | 134,00 | 2,40 | 109,45 | 12,27 | 14,710 | 176,100 | 9,10 | 0,868 | 319,96 | 185,96 | 84,8400 | ZL | | | |
| Z-147K-04I | | | | 180,00 | 44,00 | 156,00 | 2,40 | 130,90 | 12,55 | 14,710 | 176,100 | 8,80 | 0,723 | 379,15 | 223,15 | 101,1000 | ZN | | | |
| Z-147K-04X | | | | 270,00 | 44,00 | 156,00 | 2,40 | 131,45 | 12,27 | 14,710 | 176,100 | 8,79 | 0,720 | 380,10 | 224,10 | 101,5000 | ZN | | | |
| Z-147LI | | | | 15,00 | 0,30 | 18,60 | 180,00 | 17,00 | 41,20 | 1,10 | 23,10 | 9,05 | 20,810 | 229,900 | 21,49 | 11,979 | 58,66 | 17,46 | 13,6000 | ZF |
| Z-147LX | | | | | | | 270,00 | 17,00 | 41,20 | 1,10 | 23,65 | 8,77 | 20,810 | 229,900 | 21,25 | 11,671 | 59,12 | 17,92 | 13,9000 | ZF |
| Z-147MI | | | | | | | 180,00 | 21,00 | 54,40 | 1,10 | 36,30 | 9,05 | 20,810 | 229,900 | 18,37 | 7,342 | 82,89 | 28,49 | 20,8500 | ZG |
| Z-147MX | 270,00 | 22,00 | 54,40 | | | | 1,10 | 36,85 | 8,77 | 20,810 | 229,900 | 18,30 | 7,225 | 83,35 | 28,95 | 21,1500 | ZG | | | |
| Z-147NI | 180,00 | 27,00 | 74,20 | | | | 1,50 | 56,10 | 9,05 | 20,810 | 229,900 | 16,59 | 4,645 | 119,23 | 45,03 | 31,9000 | ZG | | | |
| Z-147NX | 270,00 | 27,00 | 74,20 | | | | 1,50 | 56,65 | 8,77 | 20,810 | 229,900 | 16,56 | 4,598 | 119,69 | 45,49 | 32,2000 | ZG | | | |
| Z-147OI | 180,00 | 34,00 | 107,00 | | | | 2,00 | 89,10 | 8,95 | 20,810 | 229,900 | 15,23 | 2,881 | 179,60 | 72,60 | 49,9700 | ZJ | | | |
| Z-147OX | 270,00 | 34,00 | 107,00 | | | | 2,00 | 89,65 | 8,67 | 20,810 | 229,900 | 15,21 | 2,863 | 180,06 | 73,06 | 50,2700 | ZJ | | | |
| Z-147PI | 180,00 | 42,00 | 151,00 | | | | 2,00 | 133,10 | 8,95 | 20,810 | 229,900 | 14,45 | 1,913 | 260,36 | 109,36 | 74,0600 | ZK | | | |
| Z-147PX | 270,00 | 42,00 | 151,00 | | | | 2,00 | 133,65 | 8,67 | 20,810 | 229,900 | 14,44 | 1,905 | 260,82 | 109,82 | 74,3600 | ZK | | | |
| Z-147QI | 11,00 | 0,35 | 14,70 | | | | 180,00 | 16,00 | 34,80 | 0,80 | 23,10 | 5,85 | 31,410 | 301,200 | 44,82 | 36,863 | 42,12 | 7,32 | 9,3500 | ZF |
| Z-147QX | | | | | | | 270,00 | 16,00 | 34,80 | 0,80 | 23,65 | 5,57 | 31,410 | 301,200 | 44,29 | 35,917 | 42,32 | 7,52 | 9,7540 | ZF |
| Z-147RI | | | | | | | 180,00 | 20,00 | 48,00 | 1,10 | 36,30 | 5,85 | 31,410 | 301,200 | 37,85 | 22,593 | 59,95 | 11,95 | 14,5300 | ZF |
| Z-147RX | | | | | | | 270,00 | 21,00 | 48,00 | 1,10 | 36,85 | 5,57 | 31,410 | 301,200 | 37,70 | 22,235 | 60,14 | 12,14 | 14,7400 | ZF |
| Z-147SI | | | | | | | 180,00 | 26,00 | 67,80 | 1,50 | 56,10 | 5,85 | 31,410 | 301,200 | 33,88 | 14,294 | 86,67 | 18,87 | 22,0100 | ZG |
| Z-147SX | | | | 270,00 | 26,00 | 67,80 | 1,50 | 56,65 | 5,57 | 31,410 | 301,200 | 33,80 | 14,149 | 86,86 | 19,06 | 22,2200 | ZG | | | |
| Z-147TI | | | | 180,00 | 33,00 | 101,00 | 2,00 | 89,10 | 5,95 | 31,410 | 301,200 | 30,84 | 8,866 | 131,43 | 30,43 | 34,2800 | ZJ | | | |
| Z-147TX | | | | 270,00 | 33,00 | 101,00 | 2,00 | 89,65 | 5,67 | 31,410 | 301,200 | 30,80 | 8,810 | 131,62 | 30,62 | 34,4900 | ZJ | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|---------|----|
| Z-147UI | 2,20 | 11,00 | 0,35 | 14,70 | 180,00 | 40,00 | 145,00 | 2,00 | 133,10 | 5,95 | 31,410 | 301,200 | 29,09 | 5,886 | 190,83 | 45,83 | 50,9000 | ZK | | | |
| Z-147UX | | | | | 270,00 | 40,00 | 145,00 | 2,00 | 133,65 | 5,67 | 31,410 | 301,200 | 29,08 | 5,861 | 191,03 | 46,03 | 51,1000 | ZK | | | |
| Z-148I | 2,50 | 34,50 | 0,60 | 38,90 | 180,00 | 26,00 | 79,70 | 1,80 | 31,25 | 24,22 | 9,881 | 148,500 | 10,36 | 1,056 | 211,03 | 131,33 | 51,7000 | ZJ | | | |
| Z-148X | | | | | 270,00 | 26,00 | 79,70 | 1,80 | 31,88 | 23,91 | 9,881 | 148,500 | 10,29 | 1,034 | 213,89 | 134,19 | 52,6800 | ZJ | | | |
| Z-149I | | | | | 180,00 | 38,00 | 112,00 | 2,40 | 63,75 | 24,12 | 9,881 | 148,500 | 8,64 | 0,496 | 391,79 | 279,79 | 102,4200 | ZM | | | |
| Z-149X | | | | | 270,00 | 38,00 | 112,00 | 2,40 | 64,38 | 23,81 | 9,881 | 148,500 | 8,63 | 0,491 | 394,65 | 282,65 | 103,6000 | ZM | | | |
| Z-150I | | | | | 180,00 | 48,00 | 149,00 | 2,40 | 101,25 | 23,87 | 9,881 | 148,500 | 7,98 | 0,307 | 600,09 | 451,09 | 160,8000 | ZP | | | |
| Z-150X | | | | | 270,00 | 48,00 | 149,00 | 2,40 | 101,88 | 23,56 | 9,881 | 148,500 | 7,97 | 0,306 | 602,95 | 453,95 | 161,8000 | ZP | | | |
| Z-150AI | | | | | 180,00 | 56,00 | 184,00 | 3,00 | 136,25 | 23,87 | 9,881 | 148,500 | 7,66 | 0,227 | 794,97 | 610,97 | 215,5600 | ZP | | | |
| Z-150AX | | | | | 270,00 | 56,00 | 184,00 | 3,00 | 136,88 | 23,56 | 9,881 | 148,500 | 7,66 | 0,226 | 797,83 | 613,83 | 216,5700 | ZP | | | |
| Z-151I | | | | | 27,50 | 0,45 | 31,70 | 180,00 | 22,00 | 68,50 | 1,80 | 31,25 | 18,62 | 13,710 | 184,900 | 11,96 | 2,215 | 145,81 | 77,31 | 40,3900 | ZH |
| Z-151X | | | | | | | | 270,00 | 22,00 | 68,50 | 1,80 | 31,88 | 18,31 | 13,710 | 184,900 | 11,88 | 2,168 | 147,49 | 78,99 | 41,1600 | ZH |
| Z-151AI | 180,00 | 23,00 | 71,00 | 1,80 | | | | 33,75 | 18,62 | 13,710 | 184,900 | 11,66 | 2,037 | 155,03 | 84,03 | 43,4400 | ZK | | | | |
| Z-151AX | 270,00 | 23,00 | 71,00 | 1,80 | | | | 34,38 | 18,31 | 13,710 | 184,900 | 11,59 | 1,990 | 156,71 | 85,71 | 44,2100 | ZK | | | | |
| Z-152I | 180,00 | 32,00 | 101,00 | 2,40 | | | | 63,75 | 18,62 | 13,710 | 184,900 | 10,03 | 1,040 | 265,71 | 164,71 | 80,0200 | ZL | | | | |
| Z-152X | 270,00 | 32,00 | 101,00 | 2,40 | | | | 64,38 | 18,31 | 13,710 | 184,900 | 10,01 | 1,029 | 267,39 | 166,39 | 80,7900 | ZL | | | | |
| Z-153I | 180,00 | 41,00 | 138,00 | 2,40 | | | | 101,25 | 18,37 | 13,710 | 184,900 | 9,27 | 0,645 | 403,55 | 265,55 | 125,7000 | ZN | | | | |
| Z-153X | 270,00 | 41,00 | 138,00 | 2,40 | | | | 101,88 | 18,06 | 13,710 | 184,900 | 9,27 | 0,641 | 405,23 | 267,23 | 126,5000 | ZN | | | | |
| Z-153AI | 180,00 | 44,00 | 156,00 | 2,40 | | | | 118,75 | 18,62 | 13,710 | 184,900 | 9,05 | 0,548 | 468,61 | 312,61 | 146,9000 | ZN | | | | |
| Z-153AX | 270,00 | 44,00 | 156,00 | 2,40 | | | | 119,38 | 18,31 | 13,710 | 184,900 | 9,05 | 0,545 | 470,29 | 314,29 | 147,7000 | ZN | | | | |
| Z-153BI | 180,00 | 47,00 | 173,00 | 3,00 | | | | 136,25 | 18,37 | 13,710 | 184,900 | 8,91 | 0,476 | 532,67 | 359,67 | 168,4300 | ZO | | | | |
| Z-153BX | 270,00 | 47,00 | 173,00 | 3,00 | | | | 136,88 | 18,06 | 13,710 | 184,900 | 8,91 | 0,474 | 534,35 | 361,35 | 169,1900 | ZO | | | | |
| Z-153CI | 180,00 | 51,00 | 193,00 | 3,00 | | | | 156,25 | 18,37 | 13,710 | 184,900 | 8,82 | 0,414 | 606,45 | 413,45 | 192,8100 | ZP | | | | |
| Z-153CX | 270,00 | 51,00 | 193,00 | 3,00 | | | | 156,88 | 18,06 | 13,710 | 184,900 | 8,82 | 0,412 | 608,13 | 415,13 | 193,5800 | ZP | | | | |
| Z-153DI | 180,00 | 54,00 | 213,00 | 3,00 | | | | 176,25 | 18,37 | 13,710 | 184,900 | 8,74 | 0,366 | 680,23 | 467,23 | 217,2000 | ZQ | | | | |
| Z-153DX | 270,00 | 54,00 | 213,00 | 3,00 | | | | 176,88 | 18,06 | 13,710 | 184,900 | 8,74 | 0,365 | 681,91 | 468,91 | 217,9700 | ZQ | | | | |
| Z-153EI | 180,00 | 57,00 | 234,00 | 3,00 | | | | 196,25 | 18,87 | 13,710 | 184,900 | 8,67 | 0,329 | 755,01 | 521,01 | 241,5900 | ZS | | | | |
| Z-153EX | 270,00 | 57,00 | 234,00 | 3,00 | | | | 196,88 | 18,56 | 13,710 | 184,900 | 8,67 | 0,328 | 756,69 | 522,69 | 242,3500 | ZS | | | | |
| Z-154I | 22,50 | 0,35 | 26,60 | 180,00 | 20,00 | 60,50 | 1,10 | 31,25 | 14,62 | 17,710 | 223,800 | 15,10 | 4,326 | 108,15 | 47,65 | 32,3100 | ZH | | | | |
| Z-154X | | | | 270,00 | 20,00 | 60,50 | 1,10 | 31,88 | 14,31 | 17,710 | 223,800 | 15,00 | 4,234 | 109,19 | 48,69 | 32,9300 | ZH | | | | |
| Z-155I | | | | 180,00 | 29,00 | 93,00 | 1,50 | 63,75 | 14,62 | 17,710 | 223,800 | 12,63 | 2,030 | 194,52 | 101,52 | 64,0200 | ZK | | | | |
| Z-155X | | | | 270,00 | 29,00 | 93,00 | 1,50 | 64,38 | 14,31 | 17,710 | 223,800 | 12,60 | 2,010 | 195,56 | 102,56 | 64,6300 | ZK | | | | |
| Z-156I | | | | 180,00 | 36,00 | 130,00 | 2,00 | 101,25 | 14,37 | 17,710 | 223,800 | 11,67 | 1,259 | 293,68 | 163,68 | 100,6000 | ZM | | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|---------|----|
| RZ-147UI | 2,20 | 11,00 | 0,35 | 14,70 | 180,00 | 40,00 | 145,00 | 2,00 | 133,10 | 5,95 | 25,000 | 251,800 | 28,34 | 5,055 | 189,88 | 44,88 | 50,8970 | ZN | | | |
| RZ-147UX | | | | | 270,00 | 40,00 | 145,00 | 2,00 | 133,65 | 5,67 | 25,000 | 251,800 | 28,33 | 5,034 | 190,07 | 45,07 | 51,1048 | ZN | | | |
| RZ-148I | 2,50 | 34,50 | 0,60 | 38,90 | 180,00 | 26,00 | 79,70 | 1,80 | 31,25 | 24,22 | 7,900 | 123,500 | 9,98 | 0,907 | 207,20 | 127,50 | 51,7016 | ZM | | | |
| RZ-148X | | | | | 270,00 | 26,00 | 79,70 | 1,80 | 31,88 | 23,91 | 7,900 | 123,500 | 9,91 | 0,888 | 209,97 | 130,27 | 52,6849 | ZM | | | |
| RZ-149I | | | | | 180,00 | 38,00 | 112,00 | 2,40 | 63,75 | 24,12 | 7,900 | 123,500 | 8,27 | 0,426 | 383,64 | 271,64 | 102,4277 | ZP | | | |
| RZ-149X | | | | | 270,00 | 38,00 | 112,00 | 2,40 | 64,38 | 23,81 | 7,900 | 123,500 | 8,25 | 0,421 | 386,41 | 274,41 | 103,4111 | ZP | | | |
| RZ-150I | | | | | 180,00 | 48,00 | 149,00 | 2,40 | 101,25 | 23,87 | 7,900 | 123,500 | 7,60 | 0,264 | 586,95 | 437,95 | 160,9579 | ZS | | | |
| RZ-150X | | | | | 270,00 | 48,00 | 149,00 | 2,40 | 101,88 | 23,56 | 7,900 | 123,500 | 7,60 | 0,262 | 589,72 | 440,72 | 161,9412 | ZS | | | |
| RZ-150AI | | | | | 180,00 | 56,00 | 184,00 | 3,00 | 136,25 | 23,87 | 7,900 | 123,500 | 7,28 | 0,195 | 777,17 | 593,17 | 215,5860 | ZS | | | |
| RZ-150AX | | | | | 270,00 | 56,00 | 184,00 | 3,00 | 136,88 | 23,56 | 7,900 | 123,500 | 7,28 | 0,194 | 779,94 | 595,94 | 216,5693 | ZS | | | |
| RZ-151I | | | | | 27,50 | 0,45 | 31,70 | 180,00 | 22,00 | 68,50 | 1,80 | 31,25 | 18,62 | 11,000 | 153,700 | 11,49 | 1,902 | 143,56 | 75,06 | 40,3919 | ZL |
| RZ-151X | | | | | | | | 270,00 | 22,00 | 68,50 | 1,80 | 31,88 | 18,31 | 11,000 | 153,700 | 11,42 | 1,861 | 145,20 | 76,70 | 41,1601 | ZL |
| RZ-151AI | | | | | | | | 180,00 | 23,00 | 71,00 | 1,80 | 33,75 | 18,62 | 11,000 | 153,700 | 11,19 | 1,750 | 152,59 | 81,59 | 43,4403 | ZN |
| RZ-151AX | 270,00 | 23,00 | 71,00 | 1,80 | | | | 34,38 | 18,31 | 11,000 | 153,700 | 11,12 | 1,715 | 154,22 | 83,22 | 44,2085 | ZN | | | | |
| RZ-152I | 180,00 | 32,00 | 101,00 | 2,40 | | | | 63,75 | 18,62 | 11,000 | 153,700 | 9,56 | 0,893 | 260,92 | 159,92 | 80,0217 | ZO | | | | |
| RZ-152X | 270,00 | 32,00 | 101,00 | 2,40 | | | | 64,38 | 18,31 | 11,000 | 153,700 | 9,54 | 0,884 | 262,55 | 161,55 | 80,7899 | ZO | | | | |
| RZ-153I | 180,00 | 41,00 | 138,00 | 2,40 | | | | 101,25 | 18,37 | 11,000 | 153,700 | 8,81 | 0,554 | 395,83 | 257,83 | 125,7483 | ZQ | | | | |
| RZ-153X | 270,00 | 41,00 | 138,00 | 2,40 | | | | 101,88 | 18,06 | 11,000 | 153,700 | 8,80 | 0,550 | 397,46 | 259,46 | 126,5166 | ZQ | | | | |
| RZ-153AI | 180,00 | 44,00 | 156,00 | 2,40 | | | | 118,75 | 18,62 | 11,000 | 153,700 | 8,59 | 0,470 | 459,52 | 303,52 | 147,0875 | ZQ | | | | |
| RZ-153AX | 270,00 | 44,00 | 156,00 | 2,40 | | | | 119,38 | 18,31 | 11,000 | 153,700 | 8,58 | 0,468 | 461,15 | 305,15 | 147,8557 | ZQ | | | | |
| RZ-153BI | 180,00 | 47,00 | 173,00 | 3,00 | | | | 136,25 | 18,37 | 11,000 | 153,700 | 8,45 | 0,409 | 522,21 | 349,21 | 168,4266 | ZR | | | | |
| RZ-153BX | 270,00 | 47,00 | 173,00 | 3,00 | | | | 136,88 | 18,06 | 11,000 | 153,700 | 8,44 | 0,407 | 523,84 | 350,84 | 169,1948 | ZR | | | | |
| RZ-153CI | 180,00 | 51,00 | 193,00 | 3,00 | | | | 156,25 | 18,37 | 11,000 | 153,700 | 8,35 | 0,356 | 594,43 | 401,43 | 192,8141 | ZS | | | | |
| RZ-153CX | 270,00 | 51,00 | 193,00 | 3,00 | | | | 156,88 | 18,06 | 11,000 | 153,700 | 8,35 | 0,354 | 596,06 | 403,06 | 193,5823 | ZS | | | | |
| RZ-153DI | 180,00 | 54,00 | 213,00 | 3,00 | | | | 176,25 | 18,37 | 11,000 | 153,700 | 8,27 | 0,315 | 666,64 | 453,64 | 217,2017 | ZT | | | | |
| RZ-153DX | 270,00 | 54,00 | 213,00 | 3,00 | | | | 176,88 | 18,06 | 11,000 | 153,700 | 8,27 | 0,314 | 668,28 | 455,28 | 217,9699 | ZT | | | | |
| RZ-153EI | 180,00 | 57,00 | 234,00 | 3,00 | | | | 196,25 | 18,87 | 11,000 | 153,700 | 8,20 | 0,282 | 739,86 | 505,86 | 241,5893 | ZW | | | | |
| RZ-153EX | 270,00 | 57,00 | 234,00 | 3,00 | | | | 196,88 | 18,56 | 11,000 | 153,700 | 8,20 | 0,281 | 741,49 | 507,49 | 242,3575 | ZW | | | | |
| RZ-154I | 22,50 | 0,35 | 26,60 | 180,00 | | | | 20,00 | 60,50 | 1,10 | 31,25 | 14,62 | 14,000 | 186,100 | 14,54 | 3,715 | 106,83 | 46,33 | 32,3135 | ZL | |
| RZ-154X | | | | 270,00 | 20,00 | 60,50 | 1,10 | 31,88 | 14,31 | 14,000 | 186,100 | 14,44 | 3,636 | 107,84 | 47,34 | 32,9281 | ZL | | | | |
| RZ-155I | | | | 180,00 | 29,00 | 93,00 | 1,50 | 63,75 | 14,62 | 14,000 | 186,100 | 12,06 | 1,744 | 191,71 | 98,71 | 64,0173 | ZN | | | | |
| RZ-155X | | | | 270,00 | 29,00 | 93,00 | 1,50 | 64,38 | 14,31 | 14,000 | 186,100 | 12,04 | 1,726 | 192,72 | 99,72 | 64,6319 | ZN | | | | |
| RZ-156I | | | | 180,00 | 36,00 | 130,00 | 2,00 | 101,25 | 14,37 | 14,000 | 186,100 | 11,10 | 1,082 | 289,15 | 159,15 | 100,5987 | ZP | | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| RZ-156X | 2,50 | 22,50 | 0,35 | 26,60 | 270,00 | 36,00 | 130,00 | 2,00 | 101,88 | 14,06 | 14,000 | 186,100 | 11,09 | 1,075 | 290,15 | 160,15 | 101,2132 | ZP | | |
| RZ-156AI | | | | | 180,00 | 39,00 | 148,00 | 2,00 | 118,75 | 14,62 | 14,000 | 186,100 | 10,82 | 0,919 | 335,35 | 187,35 | 117,6700 | ZP | | |
| RZ-156AX | | | | | 270,00 | 39,00 | 148,00 | 2,00 | 119,38 | 14,31 | 14,000 | 186,100 | 10,81 | 0,914 | 336,36 | 188,36 | 118,2845 | ZP | | |
| RZ-156BI | | | | | 180,00 | 42,00 | 165,00 | 2,50 | 136,25 | 14,37 | 14,000 | 186,100 | 10,84 | 0,799 | 380,55 | 215,55 | 134,7413 | ZQ | | |
| RZ-156BX | | | | | 270,00 | 42,00 | 165,00 | 2,50 | 136,88 | 14,06 | 14,000 | 186,100 | 10,64 | 0,795 | 381,56 | 216,56 | 135,3558 | ZQ | | |
| RZ-156CI | | | | | 180,00 | 45,00 | 185,00 | 2,50 | 156,25 | 14,37 | 14,000 | 186,100 | 10,52 | 0,695 | 432,79 | 247,79 | 154,2513 | ZQ | | |
| RZ-156CX | | | | | 270,00 | 45,00 | 185,00 | 2,50 | 156,88 | 14,06 | 14,000 | 186,100 | 10,52 | 0,692 | 433,79 | 248,79 | 154,8659 | ZQ | | |
| RZ-156DI | | | | | 180,00 | 48,00 | 205,00 | 2,50 | 176,25 | 14,37 | 14,000 | 186,100 | 10,42 | 0,615 | 485,02 | 280,02 | 173,7614 | ZR | | |
| RZ-156DX | | | | | 270,00 | 48,00 | 205,00 | 2,50 | 176,88 | 14,06 | 14,000 | 186,100 | 10,42 | 0,613 | 486,03 | 281,03 | 174,3759 | ZR | | |
| RZ-156EI | | | | | 180,00 | 51,00 | 225,00 | 2,50 | 196,25 | 14,37 | 14,000 | 186,100 | 10,33 | 0,551 | 537,25 | 312,25 | 193,2714 | ZS | | |
| RZ-156EX | | | | | 270,00 | 51,00 | 225,00 | 2,50 | 196,88 | 14,06 | 14,000 | 186,100 | 10,32 | 0,549 | 538,26 | 313,26 | 193,8860 | ZS | | |
| RZ-156E-10I | 20,00 | 0,35 | 24,10 | 180,00 | 17,00 | 51,00 | 1,10 | 26,25 | 12,38 | 16,000 | 207,800 | 16,50 | 6,713 | 79,60 | 28,60 | 24,0065 | ZL | | | |
| RZ-156E-10X | | | | 270,00 | 17,00 | 51,00 | 1,10 | 26,88 | 12,06 | 16,000 | 207,800 | 16,50 | 6,540 | 80,30 | 29,30 | 24,5442 | ZL | | | |
| RZ-156FI | | | | 180,00 | 21,00 | 63,50 | 1,50 | 38,75 | 12,37 | 16,000 | 207,800 | 16,39 | 4,398 | 107,12 | 43,62 | 34,6761 | ZL | | | |
| RZ-156FX | | | | 270,00 | 22,00 | 63,50 | 1,50 | 39,38 | 12,06 | 16,000 | 207,800 | 16,32 | 4,323 | 107,87 | 44,37 | 35,2138 | ZL | | | |
| RZ-156GI | | | | 180,00 | 27,00 | 86,00 | 1,50 | 61,25 | 12,37 | 16,000 | 207,800 | 14,71 | 2,714 | 156,70 | 70,70 | 53,8813 | ZM | | | |
| RZ-156GX | | | | 270,00 | 27,00 | 86,00 | 1,50 | 61,88 | 12,06 | 16,000 | 207,800 | 14,68 | 2,685 | 157,45 | 71,45 | 54,4190 | ZM | | | |
| RZ-156HI | | | | 180,00 | 28,00 | 91,00 | 1,50 | 66,25 | 12,37 | 16,000 | 207,800 | 14,47 | 2,501 | 167,71 | 76,71 | 58,1491 | ZN | | | |
| RZ-156HX | | | | 270,00 | 29,00 | 91,00 | 1,50 | 66,88 | 12,06 | 16,000 | 207,800 | 14,44 | 2,477 | 168,46 | 77,46 | 58,6868 | ZN | | | |
| RZ-156JI | | | | 180,00 | 35,00 | 123,50 | 2,00 | 98,75 | 12,37 | 16,000 | 207,800 | 13,45 | 1,657 | 239,32 | 115,82 | 85,8899 | ZO | | | |
| RZ-156JX | | | | 270,00 | 35,00 | 123,50 | 2,00 | 99,38 | 12,06 | 16,000 | 207,800 | 13,44 | 1,646 | 240,07 | 116,57 | 86,4277 | ZO | | | |
| RZ-156KI | | | | 180,00 | 42,00 | 163,50 | 2,50 | 138,75 | 12,37 | 16,000 | 207,800 | 12,81 | 1,170 | 327,45 | 163,95 | 120,0325 | ZQ | | | |
| RZ-156KX | | | | 270,00 | 42,00 | 163,50 | 2,50 | 139,38 | 12,06 | 16,000 | 207,800 | 12,80 | 1,165 | 328,21 | 164,71 | 120,5703 | ZQ | | | |
| RZ-156LI | | | | 180,00 | 46,00 | 191,00 | 2,50 | 166,25 | 12,37 | 16,000 | 207,800 | 12,61 | 0,974 | 388,05 | 197,05 | 143,5055 | ZR | | | |
| RZ-156LX | | | | 270,00 | 46,00 | 191,00 | 2,50 | 166,88 | 12,06 | 16,000 | 207,800 | 12,61 | 0,970 | 388,80 | 197,80 | 144,0433 | ZR | | | |
| RZ-156MI | | | | 180,00 | 47,00 | 203,50 | 2,50 | 178,75 | 12,37 | 16,000 | 207,800 | 12,54 | 0,905 | 415,59 | 212,09 | 154,1751 | ZS | | | |
| RZ-156MX | | | | 270,00 | 47,00 | 203,50 | 2,50 | 179,38 | 12,06 | 16,000 | 207,800 | 12,53 | 0,901 | 416,34 | 212,84 | 154,7128 | ZS | | | |
| RZ-156NI | | | | 180,00 | 48,00 | 211,00 | 2,50 | 186,25 | 12,37 | 16,000 | 207,800 | 12,49 | 0,868 | 432,11 | 221,11 | 160,5768 | ZT | | | |
| RZ-156NX | | | | 270,00 | 48,00 | 211,00 | 2,50 | 186,88 | 12,06 | 16,000 | 207,800 | 12,49 | 0,865 | 432,87 | 221,87 | 161,1146 | ZT | | | |
| RZ-157I | | | | 18,50 | 0,30 | 22,60 | 180,00 | 19,00 | 54,10 | 1,10 | 31,25 | 11,42 | 18,000 | 223,400 | 20,48 | 7,256 | 82,41 | 28,31 | 25,8508 | ZK |
| RZ-157X | | | | | | | 270,00 | 19,00 | 54,10 | 1,10 | 31,88 | 11,11 | 18,000 | 223,400 | 20,33 | 7,101 | 83,02 | 28,92 | 26,3425 | ZK |
| RZ-157AI | 180,00 | 21,00 | 62,00 | | | | 1,10 | 38,75 | 11,62 | 18,000 | 223,400 | 18,99 | 5,755 | 97,69 | 35,69 | 31,7038 | ZL | | | |
| RZ-157AX | 270,00 | 21,00 | 62,00 | | | | 1,10 | 39,38 | 11,31 | 18,000 | 223,400 | 18,92 | 5,657 | 98,31 | 36,31 | 32,1955 | ZL | | | |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| Z-156X | 2,50 | 22,50 | 0,35 | 26,60 | 270,00 | 36,00 | 130,00 | 2,00 | 101,88 | 14,06 | 17,710 | 223,800 | 11,66 | 1,251 | 294,72 | 164,72 | 101,2000 | ZM |
| Z-156AI | | | | | 180,00 | 39,00 | 148,00 | 2,00 | 118,75 | 14,62 | 17,710 | 223,800 | 11,39 | 1,070 | 340,69 | 192,69 | 117,6000 | ZM |
| Z-156AX | | | | | 270,00 | 39,00 | 148,00 | 2,00 | 119,38 | 14,31 | 17,710 | 223,800 | 11,39 | 1,064 | 341,72 | 193,72 | 118,2000 | ZM |
| Z-156BI | | | | | 180,00 | 42,00 | 165,00 | 2,50 | 136,25 | 14,37 | 17,710 | 223,800 | 11,20 | 0,930 | 386,69 | 221,69 | 134,6000 | ZN |
| Z-156BX | | | | | 270,00 | 42,00 | 165,00 | 2,50 | 136,88 | 14,06 | 17,710 | 223,800 | 11,20 | 0,925 | 387,73 | 222,73 | 135,2000 | ZN |
| Z-156CI | | | | | 180,00 | 45,00 | 185,00 | 2,50 | 156,25 | 14,37 | 17,710 | 223,800 | 11,09 | 0,809 | 439,85 | 254,85 | 154,2500 | ZN |
| Z-156CX | | | | | 270,00 | 45,00 | 185,00 | 2,50 | 156,88 | 14,06 | 17,710 | 223,800 | 11,08 | 0,806 | 440,88 | 255,88 | 154,8700 | ZN |
| Z-156DI | | | | | 180,00 | 48,00 | 205,00 | 2,50 | 176,25 | 14,37 | 17,710 | 223,800 | 10,98 | 0,716 | 493,00 | 288,00 | 173,7600 | ZO |
| Z-156DX | | | | | 270,00 | 48,00 | 205,00 | 2,50 | 176,88 | 14,06 | 17,710 | 223,800 | 10,98 | 0,713 | 494,03 | 289,03 | 174,3800 | ZO |
| Z-156EI | | | | | 180,00 | 51,00 | 225,00 | 2,50 | 196,25 | 14,37 | 17,710 | 223,800 | 10,89 | 0,642 | 546,14 | 321,14 | 193,2700 | ZP |
| Z-156EX | | | | | 270,00 | 51,00 | 225,00 | 2,50 | 196,88 | 14,06 | 17,710 | 223,800 | 10,89 | 0,640 | 547,18 | 322,18 | 193,8900 | ZP |
| Z-156E-10I | 20,00 | 0,35 | 24,10 | 180,00 | 17,00 | 51,00 | 1,10 | 26,25 | 12,38 | 20,200 | 249,900 | 15,40 | 7,820 | 80,40 | 29,40 | 24,0100 | ZH | |
| Z-156E-10X | | | | 270,00 | 17,00 | 51,00 | 1,10 | 26,88 | 12,06 | 20,200 | 249,900 | 15,40 | 7,620 | 81,20 | 30,20 | 24,5400 | ZH | |
| Z-156FI | | | | 180,00 | 21,00 | 63,50 | 1,50 | 38,75 | 12,37 | 20,200 | 249,900 | 14,80 | 5,121 | 108,37 | 44,87 | 34,6800 | ZH | |
| Z-156FX | | | | 270,00 | 22,00 | 63,50 | 1,50 | 39,38 | 12,06 | 20,200 | 249,900 | 14,80 | 5,034 | 109,14 | 45,64 | 35,2100 | ZH | |
| Z-156GI | | | | 180,00 | 27,00 | 86,00 | 1,50 | 61,25 | 12,37 | 20,200 | 249,900 | 14,30 | 3,160 | 158,71 | 72,71 | 53,8800 | ZJ | |
| Z-156GX | | | | 270,00 | 27,00 | 86,00 | 1,50 | 61,88 | 12,06 | 20,200 | 249,900 | 14,30 | 3,126 | 159,49 | 73,49 | 54,4200 | ZJ | |
| Z-156HI | | | | 180,00 | 28,00 | 91,00 | 1,50 | 66,25 | 12,37 | 20,200 | 249,900 | 14,20 | 2,912 | 169,88 | 78,88 | 58,1500 | ZK | |
| Z-156HX | | | | 270,00 | 29,00 | 91,00 | 1,50 | 66,88 | 12,06 | 20,200 | 249,900 | 14,20 | 2,884 | 170,68 | 79,68 | 58,6900 | ZK | |
| Z-156JI | | | | 180,00 | 35,00 | 123,50 | 2,00 | 98,75 | 12,37 | 20,200 | 249,900 | 13,90 | 1,929 | 242,57 | 119,07 | 86,0000 | ZL | |
| Z-156JX | | | | 270,00 | 35,00 | 123,50 | 2,00 | 99,38 | 12,06 | 20,200 | 249,900 | 13,90 | 1,916 | 243,40 | 119,90 | 86,5300 | ZL | |
| Z-156KI | | | | 180,00 | 42,00 | 163,50 | 2,50 | 138,75 | 12,37 | 20,200 | 249,900 | 13,44 | 1,362 | 332,14 | 168,64 | 119,9000 | ZN | |
| Z-156KX | | | | 270,00 | 42,00 | 163,50 | 2,50 | 139,38 | 12,06 | 20,200 | 249,900 | 13,43 | 1,356 | 332,91 | 169,41 | 120,5000 | ZN | |
| Z-156LI | | | | 180,00 | 46,00 | 191,00 | 2,50 | 166,25 | 12,37 | 20,200 | 249,900 | 13,25 | 1,134 | 393,67 | 202,67 | 143,5100 | ZO | |
| Z-156LX | | | | 270,00 | 46,00 | 191,00 | 2,50 | 166,88 | 12,06 | 20,200 | 249,900 | 13,24 | 1,129 | 394,45 | 203,45 | 144,0400 | ZO | |
| Z-156MI | | | | 180,00 | 47,00 | 203,50 | 2,50 | 178,75 | 12,37 | 20,200 | 249,900 | 13,17 | 1,053 | 421,64 | 218,14 | 154,1800 | ZP | |
| Z-156MX | | | | 270,00 | 47,00 | 203,50 | 2,50 | 179,38 | 12,06 | 20,200 | 249,900 | 13,16 | 1,050 | 422,42 | 218,92 | 154,7100 | ZP | |
| Z-156NI | | | | 180,00 | 48,00 | 211,00 | 2,50 | 186,25 | 12,37 | 20,200 | 249,900 | 13,12 | 1,010 | 438,43 | 227,43 | 160,5800 | ZQ | |
| Z-156NX | | | | 270,00 | 48,00 | 211,00 | 2,50 | 186,88 | 12,06 | 20,200 | 249,900 | 13,12 | 1,007 | 439,20 | 228,20 | 161,1100 | ZQ | |
| Z-157I | 18,50 | 0,30 | 22,60 | 180,00 | 19,00 | 54,10 | 1,10 | 31,25 | 11,42 | 22,610 | 268,600 | 21,16 | 8,448 | 83,22 | 29,12 | 25,8500 | ZG | |
| Z-157X | | | | 270,00 | 19,00 | 54,10 | 1,10 | 31,88 | 11,11 | 22,610 | 268,600 | 21,01 | 8,269 | 83,86 | 29,76 | 26,3500 | ZG | |
| Z-157AI | | | | 180,00 | 21,00 | 62,00 | 1,10 | 38,75 | 11,62 | 22,610 | 268,600 | 19,67 | 6,700 | 98,72 | 36,72 | 31,7000 | ZH | |
| Z-157AX | | | | 270,00 | 21,00 | 62,00 | 1,10 | 39,38 | 11,31 | 22,610 | 268,600 | 19,60 | 6,587 | 99,35 | 37,35 | 32,2000 | ZH | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|---------|----|
| Z-158I | 2,50 | 18,50 | 0,30 | 22,60 | 180,00 | 27,00 | 86,60 | 1,50 | 63,75 | 11,42 | 22,610 | 268,600 | 17,55 | 3,966 | 148,65 | 62,05 | 51,2100 | ZJ | | | |
| Z-158X | | | | | 270,00 | 28,00 | 86,60 | 1,50 | 64,38 | 11,11 | 22,610 | 268,600 | 17,51 | 3,925 | 149,28 | 62,68 | 51,7100 | ZJ | | | |
| Z-159I | | | | | 180,00 | 35,00 | 124,00 | 2,00 | 101,25 | 11,37 | 22,610 | 268,600 | 16,15 | 2,460 | 224,03 | 100,03 | 80,6100 | ZL | | | |
| Z-159X | | | | | 270,00 | 35,00 | 124,00 | 2,00 | 101,88 | 11,06 | 22,610 | 268,600 | 16,13 | 2,444 | 224,67 | 100,67 | 81,1000 | ZL | | | |
| Z-159AI | | | | | 180,00 | 38,00 | 141,00 | 2,00 | 118,75 | 11,12 | 22,610 | 268,600 | 15,74 | 2,089 | 258,76 | 117,76 | 94,2100 | ZL | | | |
| Z-159AX | | | | | 270,00 | 38,00 | 141,00 | 2,00 | 119,38 | 10,81 | 22,610 | 268,600 | 15,73 | 2,078 | 259,39 | 118,39 | 94,7000 | ZL | | | |
| Z-159BI | | | | | 180,00 | 41,00 | 159,00 | 2,00 | 136,25 | 11,37 | 22,610 | 268,600 | 15,47 | 1,816 | 294,49 | 135,49 | 107,8000 | ZL | | | |
| Z-159BX | | | | | 270,00 | 41,00 | 159,00 | 2,00 | 136,88 | 11,06 | 22,610 | 268,600 | 15,47 | 1,808 | 295,12 | 136,12 | 108,2000 | ZL | | | |
| Z-159CI | | | | | 180,00 | 43,00 | 179,00 | 2,50 | 156,25 | 11,37 | 22,610 | 268,600 | 15,30 | 1,580 | 334,75 | 155,75 | 123,3000 | ZM | | | |
| Z-159CX | | | | | 270,00 | 44,00 | 179,00 | 2,50 | 156,88 | 11,06 | 22,610 | 268,600 | 15,30 | 1,573 | 335,40 | 156,40 | 123,8000 | ZM | | | |
| Z-159DI | | | | | 180,00 | 46,00 | 199,00 | 2,50 | 176,25 | 11,37 | 22,610 | 268,600 | 15,15 | 1,398 | 375,01 | 176,01 | 139,0100 | ZN | | | |
| Z-159DX | | | | | 270,00 | 46,00 | 199,00 | 2,50 | 176,88 | 11,06 | 22,610 | 268,600 | 15,15 | 1,393 | 375,64 | 176,64 | 139,5000 | ZN | | | |
| Z-159EI | | | | | 180,00 | 49,00 | 219,00 | 2,50 | 196,25 | 11,37 | 22,610 | 268,600 | 15,05 | 1,254 | 415,27 | 196,27 | 154,6200 | ZN | | | |
| Z-159EX | | | | | 270,00 | 49,00 | 219,00 | 2,50 | 196,88 | 11,06 | 22,610 | 268,600 | 15,01 | 1,250 | 415,90 | 196,90 | 155,1100 | ZN | | | |
| Z-160I | 15,00 | 0,30 | 19,10 | 180,00 | 18,00 | 48,50 | 1,10 | 31,25 | 8,62 | 29,410 | 324,500 | 33,33 | 17,717 | 65,16 | 16,66 | 20,2000 | ZF | | | | |
| Z-160X | | | | 270,00 | 18,00 | 48,50 | 1,10 | 31,88 | 8,31 | 21,410 | 324,500 | 33,09 | 17,340 | 65,51 | 17,01 | 20,5800 | ZF | | | | |
| Z-161I | | | | 180,00 | 26,00 | 81,00 | 1,50 | 63,75 | 8,62 | 29,410 | 324,500 | 27,33 | 8,316 | 116,49 | 35,49 | 40,0100 | ZH | | | | |
| Z-161X | | | | 270,00 | 27,00 | 81,00 | 1,50 | 64,38 | 8,31 | 29,410 | 324,500 | 27,27 | 8,232 | 116,86 | 35,86 | 40,3900 | ZH | | | | |
| Z-162I | | | | 180,00 | 34,00 | 118,00 | 2,00 | 101,25 | 8,37 | 29,410 | 324,500 | 25,01 | 5,158 | 175,21 | 57,21 | 62,8700 | ZK | | | | |
| Z-162X | | | | 270,00 | 34,00 | 118,00 | 2,00 | 101,88 | 8,06 | 29,410 | 324,500 | 24,98 | 5,126 | 175,56 | 57,56 | 63,2600 | ZK | | | | |
| Z-162AI | | | | 180,00 | 36,00 | 136,00 | 2,00 | 118,75 | 8,62 | 29,410 | 324,500 | 24,33 | 4,382 | 203,34 | 67,34 | 73,7400 | ZK | | | | |
| Z-162AX | | | | 270,00 | 37,00 | 136,00 | 2,00 | 119,38 | 8,31 | 29,410 | 324,500 | 24,30 | 4,358 | 203,71 | 67,71 | 74,1200 | ZK | | | | |
| Z-162BI | | | | 180,00 | 39,00 | 153,00 | 2,00 | 136,25 | 8,37 | 29,410 | 324,500 | 23,88 | 3,808 | 230,49 | 77,49 | 84,3800 | ZK | | | | |
| Z-162BX | | | | 270,00 | 39,00 | 153,00 | 2,00 | 136,88 | 8,06 | 29,410 | 324,500 | 23,88 | 3,791 | 230,84 | 77,84 | 84,7600 | ZK | | | | |
| Z-162CI | | | | 180,00 | 42,00 | 173,00 | 2,50 | 152,25 | 8,37 | 29,410 | 324,500 | 23,60 | 3,402 | 259,75 | 86,75 | 93,9700 | ZL | | | | |
| Z-162CX | | | | 270,00 | 42,00 | 173,00 | 2,50 | 156,88 | 8,06 | 29,410 | 324,500 | 23,59 | 3,300 | 262,42 | 89,42 | 96,9300 | ZL | | | | |
| Z-162DI | | | | 180,00 | 45,00 | 193,00 | 2,50 | 176,25 | 8,34 | 29,410 | 324,500 | 23,35 | 2,932 | 293,69 | 100,69 | 108,7000 | ZL | | | | |
| Z-162DX | | | | 270,00 | 45,00 | 193,00 | 2,50 | 176,88 | 8,06 | 29,410 | 324,500 | 23,34 | 2,912 | 294,05 | 101,05 | 109,1000 | ZL | | | | |
| Z-162EI | | | | 180,00 | 47,00 | 213,00 | 2,50 | 196,25 | 8,57 | 29,410 | 324,500 | 23,13 | 2,629 | 325,28 | 112,28 | 120,8000 | ZM | | | | |
| Z-162EX | | | | 270,00 | 47,00 | 213,00 | 2,50 | 198,88 | 8,06 | 29,410 | 324,500 | 23,12 | 2,621 | 325,64 | 112,64 | 122,3900 | ZM | | | | |
| Z-162E-10I | | | | 2,80 | 38,00 | 0,60 | 42,50 | 180,00 | 24,00 | 83,50 | 1,80 | 29,40 | 27,05 | 8,200 | 180,000 | 10,60 | 1,510 | 197,20 | 113,70 | 60,5700 | ZL |
| Z-162E-10X | | | | | | | | 270,00 | 24,00 | 83,50 | 1,80 | 30,10 | 26,70 | 8,200 | 180,000 | 10,60 | 1,470 | 200,20 | 116,70 | 61,9200 | ZL |
| Z-162E-11I | | | | | | | | 180,00 | 30,00 | 100,50 | 2,40 | 46,20 | 27,15 | 8,200 | 180,000 | 10,10 | 0,930 | 286,00 | 185,50 | 92,8800 | ZL |

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|---------|----|
| RZ-158I | 2,50 | 18,50 | 0,30 | 22,60 | 180,00 | 27,00 | 86,60 | 1,50 | 63,75 | 11,42 | 18,000 | 223,400 | 16,87 | 3,406 | 146,91 | 60,31 | 51,2139 | ZM | | | |
| RZ-158X | | | | | 270,00 | 28,00 | 86,60 | 1,50 | 64,38 | 11,11 | 18,000 | 223,400 | 16,83 | 3,371 | 147,52 | 60,92 | 51,7055 | ZM | | | |
| RZ-159I | | | | | 180,00 | 35,00 | 124,00 | 2,00 | 101,25 | 11,37 | 18,000 | 223,400 | 15,47 | 2,113 | 221,23 | 97,23 | 80,4789 | ZO | | | |
| RZ-159X | | | | | 270,00 | 35,00 | 124,00 | 2,00 | 101,88 | 11,06 | 18,000 | 223,400 | 15,45 | 2,099 | 221,85 | 97,85 | 80,9706 | ZO | | | |
| RZ-159AI | | | | | 180,00 | 38,00 | 141,00 | 2,00 | 118,75 | 11,12 | 18,000 | 223,400 | 15,06 | 1,795 | 255,46 | 114,46 | 94,1360 | ZO | | | |
| RZ-159AX | | | | | 270,00 | 38,00 | 141,00 | 2,00 | 119,38 | 10,81 | 18,000 | 223,400 | 15,05 | 1,785 | 256,08 | 115,08 | 94,6276 | ZO | | | |
| RZ-159BI | | | | | 180,00 | 41,00 | 159,00 | 2,00 | 136,25 | 11,37 | 18,000 | 223,400 | 14,79 | 1,560 | 290,69 | 131,69 | 107,7930 | ZO | | | |
| RZ-159BX | | | | | 270,00 | 41,00 | 159,00 | 2,00 | 136,88 | 11,06 | 18,000 | 223,400 | 14,79 | 1,552 | 291,31 | 132,31 | 108,2847 | ZO | | | |
| RZ-159CI | | | | | 180,00 | 43,00 | 179,00 | 2,50 | 156,25 | 11,37 | 18,000 | 223,400 | 14,62 | 1,357 | 330,38 | 151,38 | 123,4010 | ZP | | | |
| RZ-159CX | | | | | 270,00 | 44,00 | 179,00 | 2,50 | 156,88 | 11,06 | 18,000 | 223,400 | 14,62 | 1,351 | 331,00 | 152,00 | 123,8927 | ZP | | | |
| RZ-159DI | | | | | 180,00 | 46,00 | 199,00 | 2,50 | 176,25 | 11,37 | 18,000 | 223,400 | 14,47 | 1,201 | 370,08 | 171,08 | 139,0091 | ZQ | | | |
| RZ-159DX | | | | | 270,00 | 46,00 | 199,00 | 2,50 | 176,88 | 11,06 | 18,000 | 223,400 | 14,47 | 1,196 | 370,69 | 171,69 | 139,5007 | ZQ | | | |
| RZ-159EI | | | | | 180,00 | 49,00 | 219,00 | 2,50 | 196,25 | 11,37 | 18,000 | 223,400 | 14,34 | 1,077 | 409,77 | 190,77 | 154,6171 | ZQ | | | |
| RZ-159EX | | | | | 270,00 | 49,00 | 219,00 | 2,50 | 196,88 | 11,06 | 18,000 | 223,400 | 14,33 | 1,073 | 410,38 | 191,38 | 155,1088 | ZQ | | | |
| RZ-160I | 15,00 | 0,30 | 19,10 | 180,00 | 18,00 | 48,50 | 1,10 | 31,25 | 8,62 | 23,500 | 269,800 | 32,51 | 15,217 | 64,69 | 16,19 | 20,1959 | ZJ | | | | |
| RZ-160X | | | | 270,00 | 18,00 | 48,50 | 1,10 | 31,88 | 8,31 | 23,500 | 269,800 | 32,27 | 14,891 | 65,05 | 16,55 | 20,5801 | ZJ | | | | |
| RZ-161I | | | | 180,00 | 26,00 | 81,00 | 1,50 | 63,75 | 8,62 | 23,500 | 269,800 | 26,51 | 7,143 | 115,50 | 34,50 | 40,0108 | ZL | | | | |
| RZ-161X | | | | 270,00 | 27,00 | 81,00 | 1,50 | 64,38 | 8,31 | 23,500 | 269,800 | 26,45 | 7,070 | 115,85 | 34,85 | 40,3949 | ZL | | | | |
| RZ-162I | | | | 180,00 | 34,00 | 118,00 | 2,00 | 101,25 | 8,37 | 23,500 | 269,800 | 24,19 | 4,430 | 173,62 | 55,62 | 62,8742 | ZN | | | | |
| RZ-162X | | | | 270,00 | 34,00 | 118,00 | 2,00 | 101,88 | 8,06 | 23,500 | 269,800 | 24,16 | 4,402 | 173,97 | 55,97 | 63,2583 | ZN | | | | |
| RZ-162AI | | | | 180,00 | 36,00 | 136,00 | 2,00 | 118,75 | 8,62 | 23,500 | 269,800 | 23,51 | 3,763 | 201,48 | 65,48 | 73,5437 | ZN | | | | |
| RZ-162AX | | | | 270,00 | 37,00 | 136,00 | 2,00 | 119,38 | 8,31 | 23,500 | 269,800 | 23,48 | 3,743 | 201,83 | 65,83 | 73,9278 | ZN | | | | |
| RZ-162BI | | | | 180,00 | 39,00 | 153,00 | 2,00 | 136,25 | 8,37 | 23,500 | 269,800 | 23,07 | 3,271 | 228,34 | 75,34 | 84,2133 | ZN | | | | |
| RZ-162BX | | | | 270,00 | 39,00 | 153,00 | 2,00 | 136,88 | 8,06 | 23,500 | 269,800 | 23,06 | 3,256 | 228,69 | 75,69 | 84,5974 | ZN | | | | |
| RZ-162CI | | | | 180,00 | 42,00 | 173,00 | 2,50 | 152,25 | 8,37 | 23,500 | 269,800 | 22,78 | 2,922 | 257,30 | 84,30 | 93,9683 | ZO | | | | |
| RZ-162CX | | | | 270,00 | 42,00 | 173,00 | 2,50 | 156,88 | 8,06 | 23,500 | 269,800 | 22,77 | 2,834 | 259,95 | 86,95 | 96,7912 | ZO | | | | |
| RZ-162DI | | | | 180,00 | 45,00 | 193,00 | 2,50 | 176,25 | 8,34 | 23,500 | 269,800 | 22,53 | 2,518 | 290,87 | 97,87 | 108,6008 | ZO | | | | |
| RZ-162DX | | | | 270,00 | 45,00 | 193,00 | 2,50 | 176,88 | 8,06 | 23,500 | 269,800 | 22,52 | 2,509 | 291,22 | 98,22 | 108,9850 | ZO | | | | |
| RZ-162EI | | | | 180,00 | 47,00 | 213,00 | 2,50 | 196,25 | 8,57 | 23,500 | 269,800 | 22,31 | 2,258 | 322,13 | 109,13 | 120,7946 | ZP | | | | |
| RZ-162EX | | | | 270,00 | 47,00 | 213,00 | 2,50 | 198,88 | 8,06 | 23,500 | 269,800 | 22,30 | 2,228 | 323,60 | 110,60 | 122,3981 | ZP | | | | |
| RZ-162E-10I | | | | 2,80 | 38,00 | 0,60 | 42,50 | 180,00 | 24,00 | 83,50 | 1,80 | 29,40 | 27,05 | 6,800 | 158,000 | 10,60 | 1,298 | 200,00 | 116,50 | 60,5717 | ZN |
| RZ-162E-10X | | | | | | | | 270,00 | 24,00 | 83,50 | 1,80 | 30,10 | 26,70 | 6,800 | 158,000 | 10,60 | 1,265 | 203,10 | 119,60 | 61,9177 | ZN |
| RZ-162E-11I | | | | | | | | 180,00 | 30,00 | 100,50 | 2,40 | 46,20 | 27,15 | 6,800 | 158,000 | 10,10 | 0,796 | 290,50 | 190,00 | 92,8766 | ZN |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|----------|----|
| RZ-162E-11X | 2,80 | 38,00 | 0,60 | 42,50 | 270,00 | 30,00 | 100,50 | 2,40 | 46,90 | 26,80 | 6,800 | 158,000 | 10,10 | 0,783 | 293,60 | 193,10 | 94,2226 | ZN | | |
| RZ-162E-12I | | | | | 180,00 | 37,00 | 126,00 | 2,40 | 71,40 | 27,30 | 6,800 | 158,000 | 9,80 | 0,503 | 426,40 | 300,40 | 141,3339 | ZM | | |
| RZ-162E-12X | | | | | 270,00 | 37,00 | 126,00 | 2,40 | 72,10 | 26,95 | 6,800 | 158,000 | 9,80 | 0,498 | 429,50 | 303,50 | 142,6799 | ZM | | |
| RZ-162E-13I | | | | | 180,00 | 42,00 | 167,00 | 3,00 | 113,40 | 26,80 | 6,800 | 158,000 | 9,60 | 0,312 | 651,30 | 484,30 | 222,0961 | ZP | | |
| RZ-162E-13X | | | | | 270,00 | 42,00 | 167,00 | 3,00 | 114,10 | 26,45 | 6,800 | 158,000 | 9,60 | 0,310 | 654,40 | 487,40 | 223,4422 | ZP | | |
| RZ-162E-14I | | | | | 180,00 | 58,00 | 223,00 | 3,00 | 169,40 | 26,80 | 6,800 | 158,000 | 9,50 | 0,207 | 952,55 | 729,55 | 329,7791 | ZR | | |
| RZ-162E-14X | | | | | 270,00 | 58,00 | 223,00 | 3,00 | 170,10 | 26,45 | 6,800 | 158,000 | 9,50 | 0,206 | 955,60 | 732,60 | 331,1251 | ZR | | |
| RZ-162FI | 30,00 | 0,50 | 34,70 | 180,00 | 20,00 | 69,80 | 1,80 | 29,40 | 20,20 | 14,000 | 193,300 | 15,26 | 2,813 | 133,56 | 63,76 | 46,8054 | ZN | | | |
| RZ-162FX | | | | 270,00 | 20,00 | 69,80 | 1,80 | 30,10 | 19,85 | 14,000 | 193,300 | 15,10 | 2,741 | 135,24 | 65,44 | 47,8455 | ZN | | | |
| RZ-162GI | | | | 180,00 | 25,00 | 86,60 | 1,80 | 46,20 | 20,20 | 14,000 | 193,300 | 13,12 | 1,724 | 190,63 | 104,03 | 71,7683 | ZO | | | |
| RZ-162GX | | | | 270,00 | 25,00 | 86,60 | 1,80 | 46,90 | 19,85 | 14,000 | 193,300 | 13,08 | 1,697 | 192,31 | 105,71 | 72,8084 | ZO | | | |
| RZ-162HI | | | | 180,00 | 32,00 | 112,00 | 2,40 | 71,40 | 20,30 | 14,000 | 193,300 | 11,90 | 1,091 | 276,44 | 164,44 | 109,2126 | ZQ | | | |
| RZ-162HX | | | | 270,00 | 32,00 | 112,00 | 2,40 | 72,10 | 19,95 | 14,000 | 193,300 | 11,88 | 1,080 | 278,12 | 166,12 | 110,2527 | ZQ | | | |
| RZ-162JI | | | | 180,00 | 40,00 | 154,00 | 2,40 | 113,40 | 20,30 | 14,000 | 193,300 | 10,97 | 0,677 | 419,00 | 265,00 | 171,6197 | ZR | | | |
| RZ-162JX | | | | 270,00 | 40,00 | 154,00 | 2,40 | 114,10 | 19,95 | 14,000 | 193,300 | 10,96 | 0,672 | 420,80 | 266,80 | 172,6599 | ZR | | | |
| RZ-162KI | | | | 180,00 | 49,00 | 210,00 | 3,00 | 169,40 | 20,30 | 14,000 | 193,300 | 10,43 | 0,449 | 609,35 | 399,35 | 254,8293 | ZU | | | |
| RZ-162KX | | | | 270,00 | 49,00 | 210,00 | 3,00 | 170,10 | 19,95 | 14,000 | 193,300 | 10,43 | 0,447 | 611,03 | 401,03 | 255,8694 | ZU | | | |
| RZ-162K-20I | | | | 25,00 | 0,35 | 29,60 | 180,00 | 17,00 | 65,00 | 1,50 | 32,20 | 16,40 | 17,300 | 229,900 | 15,50 | 4,682 | 110,40 | 45,40 | 41,5971 | ZN |
| RZ-162K-20X | | | | | | | 270,00 | 17,00 | 65,00 | 1,50 | 32,90 | 16,05 | 17,300 | 229,900 | 15,50 | 4,573 | 111,50 | 46,50 | 42,4461 | ZN |
| RZ-162K-21I | | | | | | | 180,00 | 28,00 | 104,00 | 2,00 | 71,40 | 16,30 | 17,300 | 229,900 | 14,60 | 2,006 | 209,96 | 105,96 | 89,1367 | ZQ |
| RZ-162K-21X | | | | | | | 270,00 | 28,00 | 104,00 | 2,00 | 72,10 | 15,95 | 17,300 | 229,900 | 14,60 | 1,986 | 211,10 | 107,10 | 89,9856 | ZQ |
| RZ-162K-01I | | | | | | | 180,00 | 36,00 | 143,00 | 2,00 | 110,60 | 16,20 | 17,300 | 229,900 | 13,71 | 1,277 | 309,56 | 166,56 | 136,6763 | ZR |
| RZ-162K-01X | | | | | | | 270,00 | 36,00 | 143,00 | 2,00 | 111,30 | 15,85 | 17,300 | 229,900 | 13,70 | 1,269 | 310,64 | 167,64 | 137,5252 | ZR |
| RZ-162K-02I | 180,00 | 40,00 | 171,00 | | | | 2,50 | 138,60 | 16,20 | 17,300 | 229,900 | 13,22 | 1,014 | 380,82 | 209,82 | 170,6332 | ZS | | | |
| RZ-162K-02X | 270,00 | 40,00 | 171,00 | | | | 2,50 | 139,30 | 15,85 | 17,300 | 229,900 | 13,21 | 1,008 | 381,90 | 210,90 | 171,4821 | ZS | | | |
| RZ-162K-03I | 180,00 | 44,00 | 199,00 | | | | 2,50 | 166,60 | 16,20 | 17,300 | 229,900 | 12,99 | 0,840 | 452,08 | 253,08 | 204,5900 | ZU | | | |
| RZ-162K-03X | 270,00 | 44,00 | 199,00 | | | | 2,50 | 167,30 | 15,85 | 17,300 | 229,900 | 12,99 | 0,837 | 453,16 | 254,16 | 205,4389 | ZU | | | |
| RZ-162K-04I | 180,00 | 48,00 | 227,00 | | | | 2,50 | 194,60 | 16,20 | 17,300 | 229,900 | 12,83 | 0,718 | 523,34 | 296,34 | 238,5468 | ZW | | | |
| RZ-162K-04X | 270,00 | 48,00 | 227,00 | | | | 2,50 | 195,30 | 15,85 | 17,300 | 229,900 | 12,83 | 0,715 | 524,43 | 297,43 | 239,3958 | ZW | | | |
| RZ-162LI | 20,00 | 0,35 | 24,60 | | | | 180,00 | 17,00 | 53,80 | 1,10 | 29,40 | 12,20 | 22,000 | 282,900 | 28,62 | 11,126 | 77,26 | 23,46 | 29,5975 | ZM |
| RZ-162LX | | | | | | | 270,00 | 17,00 | 53,80 | 1,10 | 30,10 | 11,85 | 22,000 | 282,900 | 28,29 | 10,841 | 77,87 | 24,07 | 30,2552 | ZM |
| RZ-162MI | | | | | | | 180,00 | 22,00 | 70,60 | 1,50 | 46,20 | 12,20 | 22,000 | 282,900 | 24,40 | 6,819 | 108,87 | 38,27 | 45,3829 | ZO |
| RZ-162MX | | | | | | | 270,00 | 22,00 | 70,60 | 1,50 | 46,90 | 11,85 | 22,000 | 282,900 | 24,31 | 6,711 | 109,49 | 38,89 | 46,0406 | ZO |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| Z-162E-11X | 2,80 | 38,00 | 0,60 | 42,50 | 270,00 | 30,00 | 100,50 | 2,40 | 46,90 | 26,80 | 8,200 | 180,000 | 10,10 | 0,910 | 289,00 | 188,50 | 94,2200 | ZL | | |
| Z-162E-12I | | | | | 180,00 | 37,00 | 126,00 | 2,40 | 71,40 | 27,30 | 8,200 | 180,000 | 9,80 | 0,580 | 419,20 | 293,20 | 141,3300 | ZM | | |
| Z-162E-12X | | | | | 270,00 | 37,00 | 126,00 | 2,40 | 72,10 | 26,95 | 8,200 | 180,000 | 9,80 | 0,580 | 422,20 | 296,20 | 142,6800 | ZM | | |
| Z-162E-13I | | | | | 180,00 | 42,00 | 167,00 | 3,00 | 113,40 | 26,80 | 8,200 | 180,000 | 9,60 | 0,360 | 639,70 | 472,70 | 222,1000 | ZM | | |
| Z-162E-13X | | | | | 270,00 | 42,00 | 167,00 | 3,00 | 114,10 | 26,45 | 8,200 | 180,000 | 9,60 | 0,360 | 642,70 | 475,70 | 223,4400 | ZM | | |
| Z-162E-14I | | | | | 180,00 | 58,00 | 223,00 | 3,00 | 169,40 | 26,80 | 8,200 | 180,000 | 9,50 | 0,240 | 935,00 | 712,00 | 329,7800 | ZO | | |
| Z-162E-14X | | | | | 270,00 | 58,00 | 223,00 | 3,00 | 170,10 | 26,45 | 8,200 | 180,000 | 9,50 | 0,240 | 938,00 | 715,00 | 331,1300 | ZO | | |
| Z-162FI | 30,00 | 0,50 | 34,70 | 180,00 | 20,00 | 69,80 | 1,80 | 29,40 | 20,20 | 17,770 | 233,400 | 15,86 | 3,275 | 135,65 | 65,85 | 46,8100 | ZK | | | |
| Z-162FX | | | | 270,00 | 20,00 | 69,80 | 1,80 | 30,10 | 19,85 | 17,770 | 233,400 | 15,70 | 3,191 | 137,38 | 67,58 | 47,8500 | ZK | | | |
| Z-162GI | | | | 180,00 | 25,00 | 86,60 | 1,80 | 46,20 | 20,20 | 17,770 | 233,400 | 13,72 | 2,008 | 194,03 | 107,43 | 71,7700 | ZL | | | |
| Z-162GX | | | | 270,00 | 25,00 | 86,60 | 1,80 | 46,90 | 19,85 | 17,770 | 233,400 | 13,68 | 1,976 | 195,77 | 109,17 | 72,8000 | ZL | | | |
| Z-162HI | | | | 180,00 | 32,00 | 112,00 | 2,40 | 71,40 | 20,30 | 17,770 | 233,400 | 12,51 | 1,270 | 281,82 | 169,82 | 109,2100 | ZN | | | |
| Z-162HX | | | | 270,00 | 32,00 | 112,00 | 2,40 | 72,10 | 19,95 | 17,770 | 233,400 | 12,48 | 1,257 | 283,55 | 171,55 | 110,2500 | ZN | | | |
| Z-162JI | | | | 180,00 | 40,00 | 154,00 | 2,40 | 113,40 | 20,30 | 17,770 | 233,400 | 11,57 | 0,788 | 427,78 | 273,78 | 171,6200 | ZO | | | |
| Z-162JX | | | | 270,00 | 40,00 | 154,00 | 2,40 | 114,10 | 19,95 | 17,770 | 233,400 | 11,56 | 0,783 | 429,52 | 275,52 | 172,6000 | ZO | | | |
| Z-162KI | | | | 180,00 | 49,00 | 210,00 | 3,00 | 169,40 | 20,30 | 17,770 | 233,400 | 11,04 | 0,526 | 622,41 | 412,41 | 254,8300 | ZR | | | |
| Z-162KX | | | | 270,00 | 49,00 | 210,00 | 3,00 | 170,10 | 19,95 | 17,770 | 233,400 | 11,03 | 0,521 | 624,14 | 414,14 | 255,8700 | ZR | | | |
| Z-162K-20I | | | | 25,00 | 0,35 | 29,60 | 180,00 | 17,00 | 65,00 | 1,50 | 32,20 | 16,40 | 21,660 | 277,600 | 15,50 | 5,450 | 111,96 | 46,96 | 41,6000 | ZN |
| Z-162K-20X | | | | | | | 270,00 | 17,00 | 65,00 | 1,50 | 32,90 | 16,05 | 21,660 | 277,600 | 15,50 | 5,320 | 113,10 | 48,10 | 42,4500 | ZN |
| Z-162K-21I | | | | | | | 180,00 | 28,00 | 104,00 | 2,00 | 71,40 | 16,30 | 21,660 | 277,600 | 14,60 | 2,340 | 213,60 | 109,60 | 89,1400 | ZN |
| Z-162K-21X | | | | | | | 270,00 | 28,00 | 104,00 | 2,00 | 72,10 | 15,95 | 21,660 | 277,600 | 14,60 | 2,310 | 214,70 | 110,70 | 89,9900 | ZN |
| Z-162K-01I | 180,00 | 36,00 | 143,00 | | | | 2,00 | 110,60 | 16,20 | 21,660 | 277,600 | 14,20 | 1,487 | 315,17 | 172,17 | 136,7000 | ZO | | | |
| Z-162K-01X | 270,00 | 36,00 | 143,00 | | | | 2,00 | 111,30 | 15,85 | 21,660 | 277,600 | 14,20 | 1,477 | 316,29 | 173,29 | 137,6000 | ZO | | | |
| Z-162K-02I | 180,00 | 40,00 | 171,00 | | | | 2,50 | 138,60 | 16,20 | 21,660 | 277,600 | 13,94 | 1,180 | 387,90 | 216,90 | 170,5000 | ZP | | | |
| Z-162K-02X | 270,00 | 40,00 | 171,00 | | | | 2,50 | 139,30 | 15,85 | 21,660 | 277,600 | 13,93 | 1,174 | 389,01 | 218,01 | 171,4000 | ZP | | | |
| Z-162K-03I | 180,00 | 44,00 | 199,00 | | | | 2,50 | 166,60 | 16,20 | 21,660 | 277,600 | 13,71 | 0,978 | 460,62 | 261,62 | 204,5900 | ZR | | | |
| Z-162K-03X | 270,00 | 44,00 | 199,00 | | | | 2,50 | 167,30 | 15,85 | 21,660 | 277,600 | 13,70 | 0,974 | 461,73 | 262,73 | 205,4400 | ZR | | | |
| Z-162K-04I | 180,00 | 48,00 | 227,00 | | | | 2,50 | 194,60 | 16,20 | 21,660 | 277,600 | 13,55 | 0,836 | 533,34 | 306,34 | 238,5500 | ZS | | | |
| Z-162K-04X | 270,00 | 48,00 | 227,00 | | | | 2,50 | 195,30 | 15,85 | 21,660 | 277,600 | 13,54 | 0,832 | 534,45 | 307,45 | 239,4000 | ZS | | | |
| Z-162LI | 20,00 | 0,35 | 24,60 | | | | 180,00 | 17,00 | 53,80 | 1,10 | 29,40 | 12,20 | 27,550 | 341,500 | 29,49 | 12,954 | 78,04 | 24,24 | 29,6000 | ZJ |
| Z-162LX | | | | | | | 270,00 | 17,00 | 53,80 | 1,10 | 30,10 | 11,85 | 27,550 | 341,500 | 29,17 | 12,621 | 78,68 | 24,88 | 30,2600 | ZJ |
| Z-162MI | | | | 180,00 | 22,00 | 70,60 | 1,50 | 46,20 | 12,20 | 27,550 | 341,500 | 25,28 | 7,939 | 110,16 | 39,56 | 45,3800 | ZL | | | |
| Z-162MX | | | | 270,00 | 22,00 | 70,60 | 1,50 | 46,90 | 11,85 | 27,550 | 341,500 | 25,19 | 7,813 | 110,79 | 40,19 | 46,0400 | ZL | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----------|----|
| Z-162NI | 2,80 | 20,00 | 0,35 | 24,60 | 180,00 | 27,00 | 95,80 | 1,50 | 71,40 | 12,20 | 27,550 | 341,500 | 22,88 | 5,023 | 158,32 | 62,52 | 69,0600 | ZL | | | |
| Z-162NX | | | | | 270,00 | 27,00 | 95,80 | 1,50 | 72,10 | 11,85 | 27,550 | 341,500 | 22,83 | 4,972 | 158,96 | 63,16 | 69,7200 | ZL | | | |
| Z-162N-01I | | | | | 180,00 | 30,00 | 112,00 | 2,00 | 88,20 | 11,90 | 27,550 | 341,500 | 21,89 | 4,035 | 189,80 | 77,80 | 84,8500 | ZM | | | |
| Z-162N-01X | | | | | 270,00 | 31,00 | 112,00 | 2,00 | 88,90 | 11,55 | 27,550 | 341,500 | 21,86 | 4,002 | 190,44 | 78,44 | 85,5000 | ZM | | | |
| Z-1620I | | | | | 180,00 | 35,00 | 138,00 | 2,00 | 113,40 | 12,30 | 27,550 | 341,500 | 21,04 | 3,115 | 238,80 | 100,80 | 108,7000 | ZM | | | |
| Z-1620X | | | | | 270,00 | 35,00 | 138,00 | 2,00 | 114,10 | 11,95 | 27,550 | 341,500 | 21,02 | 3,096 | 239,40 | 101,40 | 109,3000 | ZM | | | |
| Z-1620-01I | | | | | 180,00 | 36,00 | 146,00 | 2,00 | 121,80 | 12,10 | 27,550 | 341,500 | 20,80 | 2,896 | 254,40 | 108,40 | 116,5000 | ZN | | | |
| Z-1620-01X | | | | | 270,00 | 36,00 | 146,00 | 2,00 | 122,50 | 11,75 | 27,550 | 341,500 | 20,78 | 2,879 | 255,10 | 109,10 | 117,2000 | ZN | | | |
| Z-1620-02I | | | | | 180,00 | 39,00 | 171,00 | 2,50 | 147,00 | 12,00 | 27,550 | 341,500 | 20,21 | 2,390 | 302,36 | 131,36 | 140,1000 | ZN | | | |
| Z-1620-02X | | | | | 270,00 | 40,00 | 171,00 | 2,50 | 147,70 | 11,65 | 27,550 | 341,500 | 20,21 | 2,378 | 303,07 | 132,07 | 140,8000 | ZN | | | |
| Z-162PI | | | | | 180,00 | 42,00 | 194,00 | 2,50 | 169,40 | 12,30 | 27,550 | 341,500 | 19,98 | 2,068 | 345,81 | 151,81 | 161,1000 | ZQ | | | |
| Z-162PX | | | | | 270,00 | 43,00 | 194,00 | 2,50 | 170,10 | 11,98 | 27,550 | 341,500 | 19,97 | 2,060 | 346,40 | 152,40 | 161,8000 | ZQ | | | |
| Z-162P-01I | | | | | 180,00 | 43,00 | 202,00 | 2,50 | 177,80 | 12,10 | 27,550 | 341,500 | 19,90 | 1,969 | 361,44 | 159,44 | 169,0000 | ZR | | | |
| Z-162P-01X | | | | | 270,00 | 44,00 | 202,00 | 2,50 | 178,50 | 11,75 | 27,550 | 341,500 | 19,89 | 1,961 | 362,09 | 160,09 | 169,6000 | ZR | | | |
| Z-162QI | | | | | 14,00 | 0,40 | 18,60 | 180,00 | 16,00 | 44,20 | 1,10 | 29,40 | 7,40 | 46,110 | 466,900 | 67,73 | 46,916 | 53,17 | 8,97 | 19,2700 | ZH |
| Z-162QX | | | | | | | | 270,00 | 16,00 | 44,20 | 1,10 | 30,10 | 7,05 | 46,110 | 466,900 | 66,93 | 45,713 | 53,41 | 9,21 | 19,7000 | ZH |
| Z-162RI | | | | | | | | 180,00 | 20,00 | 61,00 | 1,10 | 46,20 | 7,40 | 46,110 | 466,900 | 57,23 | 28,755 | 75,64 | 14,64 | 29,5500 | ZK |
| Z-162RX | | | | | | | | 270,00 | 21,00 | 61,00 | 1,10 | 46,90 | 7,05 | 46,110 | 466,900 | 57,00 | 28,299 | 75,87 | 14,87 | 29,9800 | ZK |
| Z-162SI | 180,00 | 26,00 | 86,20 | 1,50 | | | | 71,40 | 7,40 | 46,110 | 466,900 | 51,24 | 18,192 | 109,33 | 23,13 | 44,9700 | ZL | | | | |
| Z-162SX | 270,00 | 26,00 | 86,20 | 1,50 | | | | 72,10 | 7,05 | 46,110 | 466,900 | 51,12 | 18,008 | 109,57 | 23,37 | 45,4000 | ZL | | | | |
| Z-162TI | 180,00 | 33,00 | 128,00 | 2,00 | | | | 113,40 | 7,30 | 46,110 | 466,900 | 46,65 | 11,284 | 165,30 | 37,30 | 70,6700 | ZM | | | | |
| Z-162TX | 270,00 | 33,00 | 128,00 | 2,00 | | | | 114,10 | 6,95 | 46,110 | 466,900 | 46,60 | 11,213 | 165,52 | 37,52 | 71,1000 | ZM | | | | |
| Z-162UI | 180,00 | 40,00 | 184,00 | 2,50 | | | | 169,40 | 7,30 | 46,110 | 466,900 | 44,02 | 7,491 | 240,17 | 56,17 | 104,9300 | ZO | | | | |
| Z-162UX | 270,00 | 40,00 | 184,00 | 2,50 | | | | 170,10 | 6,95 | 46,110 | 466,900 | 44,00 | 7,459 | 240,41 | 56,41 | 105,3600 | ZO | | | | |
| Z-162U-10I | 3,00 | 40,00 | 0,60 | 45,10 | | | | 180,00 | 29,00 | 101,00 | 2,40 | 46,50 | 27,25 | 11,500 | 214,200 | 11,70 | 1,120 | 281,40 | 180,40 | 105,5700 | ZP |
| Z-162U-10X | | | | | | | | 270,00 | 29,00 | 101,00 | 2,40 | 47,25 | 26,88 | 11,500 | 214,200 | 11,70 | 1,100 | 284,50 | 183,50 | 107,2000 | ZP |
| Z-162U-01I | | | | | | | | 180,00 | 39,00 | 140,00 | 2,40 | 85,50 | 27,25 | 11,500 | 214,200 | 11,30 | 0,592 | 482,20 | 342,20 | 190,0300 | ZP |
| Z-162U-01X | | | | | | | | 270,00 | 39,00 | 140,00 | 2,40 | 86,25 | 26,87 | 11,500 | 214,200 | 11,30 | 0,587 | 485,31 | 345,31 | 191,6600 | ZP |
| Z-162U-02I | | | | | | | | 180,00 | 43,00 | 158,00 | 2,40 | 103,50 | 27,25 | 11,500 | 214,200 | 11,10 | 0,486 | 574,86 | 416,86 | 229,1000 | ZQ |
| Z-162U-02X | | | | | | | | 270,00 | 43,00 | 158,00 | 2,40 | 104,25 | 26,87 | 11,500 | 214,200 | 11,10 | 0,483 | 577,97 | 419,97 | 230,7000 | ZQ |
| Z-162U-03I | | | | | | | | 180,00 | 47,00 | 179,00 | 3,00 | 124,50 | 27,25 | 11,500 | 214,200 | 11,00 | 0,402 | 682,96 | 503,96 | 274,3000 | ZR |
| Z-162U-03X | | | | | | | | 270,00 | 47,00 | 179,00 | 3,00 | 125,25 | 26,87 | 11,500 | 214,200 | 11,00 | 0,400 | 686,08 | 507,08 | 276,1100 | ZR |
| Z-162U-04I | | | | | 180,00 | 51,00 | 197,00 | 3,00 | 142,50 | 27,25 | 11,500 | 214,200 | 10,87 | 0,350 | 775,63 | 578,63 | 313,4700 | ZT | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----------|----|
| RZ-162NI | 2,80 | 20,00 | 0,35 | 24,60 | 180,00 | 27,00 | 95,80 | 1,50 | 71,40 | 12,20 | 22,000 | 282,900 | 22,00 | 4,314 | 156,29 | 60,49 | 69,0609 | ZO | | | |
| RZ-162NX | | | | | 270,00 | 27,00 | 95,80 | 1,50 | 72,10 | 11,85 | 22,000 | 282,900 | 21,95 | 4,271 | 156,91 | 61,11 | 69,7186 | ZO | | | |
| RZ-162N-01I | | | | | 180,00 | 30,00 | 112,00 | 2,00 | 88,20 | 11,90 | 22,000 | 282,900 | 21,01 | 3,465 | 187,31 | 75,31 | 84,8462 | ZP | | | |
| RZ-162N-01X | | | | | 270,00 | 31,00 | 112,00 | 2,00 | 88,90 | 11,55 | 22,000 | 282,900 | 20,98 | 3,437 | 187,92 | 75,92 | 85,5040 | ZP | | | |
| RZ-1620I | | | | | 180,00 | 35,00 | 138,00 | 2,00 | 113,40 | 12,30 | 22,000 | 282,900 | 20,16 | 2,676 | 235,53 | 97,53 | 108,5242 | ZP | | | |
| RZ-1620X | | | | | 270,00 | 35,00 | 138,00 | 2,00 | 114,10 | 11,95 | 22,000 | 282,900 | 20,14 | 2,659 | 236,15 | 98,15 | 109,1820 | ZP | | | |
| RZ-1620-01I | | | | | 180,00 | 36,00 | 146,00 | 2,00 | 121,80 | 12,10 | 22,000 | 282,900 | 19,92 | 2,487 | 250,94 | 104,94 | 116,4169 | ZQ | | | |
| RZ-1620-01X | | | | | 270,00 | 36,00 | 146,00 | 2,00 | 122,50 | 11,75 | 22,000 | 282,900 | 19,90 | 2,472 | 251,55 | 105,55 | 117,0746 | ZQ | | | |
| RZ-1620-02I | | | | | 180,00 | 39,00 | 171,00 | 2,50 | 147,00 | 12,00 | 22,000 | 282,900 | 19,33 | 2,052 | 298,16 | 127,16 | 140,0949 | ZQ | | | |
| RZ-1620-02X | | | | | 270,00 | 40,00 | 171,00 | 2,50 | 147,70 | 11,65 | 22,000 | 282,900 | 19,33 | 2,042 | 298,77 | 127,77 | 140,7527 | ZQ | | | |
| RZ-162PI | | | | | 180,00 | 42,00 | 194,00 | 2,50 | 169,40 | 12,30 | 22,000 | 282,900 | 19,10 | 1,776 | 340,91 | 146,91 | 161,1421 | ZT | | | |
| RZ-162PX | | | | | 270,00 | 43,00 | 194,00 | 2,50 | 170,10 | 11,98 | 22,000 | 282,900 | 19,09 | 1,769 | 341,53 | 147,53 | 161,7998 | ZT | | | |
| RZ-162P-01I | | | | | 180,00 | 43,00 | 202,00 | 2,50 | 177,80 | 12,10 | 22,000 | 282,900 | 19,02 | 1,691 | 356,32 | 154,32 | 169,0347 | ZU | | | |
| RZ-162P-01X | | | | | 270,00 | 44,00 | 202,00 | 2,50 | 178,50 | 11,75 | 22,000 | 282,900 | 19,01 | 1,684 | 356,93 | 154,93 | 169,6925 | ZU | | | |
| RZ-162QI | 14,00 | 0,40 | 18,60 | 180,00 | 16,00 | 44,20 | 1,10 | 29,40 | 7,40 | 36,800 | 386,700 | 66,53 | 40,296 | 52,89 | 8,69 | 19,2728 | ZL | | | | |
| RZ-162QX | | | | 270,00 | 16,00 | 44,20 | 1,10 | 30,10 | 7,05 | 36,800 | 386,700 | 65,73 | 39,263 | 53,12 | 8,92 | 19,7011 | ZL | | | | |
| RZ-162RI | | | | 180,00 | 20,00 | 61,00 | 1,10 | 46,20 | 7,40 | 36,800 | 386,700 | 56,03 | 24,698 | 75,17 | 14,17 | 29,5516 | ZN | | | | |
| RZ-162RX | | | | 270,00 | 21,00 | 61,00 | 1,10 | 46,90 | 7,05 | 36,800 | 386,700 | 55,80 | 24,306 | 75,40 | 14,40 | 29,9799 | ZN | | | | |
| RZ-162SI | | | | 180,00 | 26,00 | 86,20 | 1,50 | 71,40 | 7,40 | 36,800 | 386,700 | 50,03 | 15,625 | 108,60 | 22,40 | 44,9699 | ZO | | | | |
| RZ-162SX | | | | 270,00 | 26,00 | 86,20 | 1,50 | 72,10 | 7,05 | 36,800 | 386,700 | 49,92 | 15,467 | 108,83 | 22,63 | 45,3982 | ZO | | | | |
| RZ-162TI | | | | 180,00 | 33,00 | 128,00 | 2,00 | 113,40 | 7,30 | 36,800 | 386,700 | 45,45 | 9,691 | 164,12 | 36,12 | 70,6670 | ZP | | | | |
| RZ-162TX | | | | 270,00 | 33,00 | 128,00 | 2,00 | 114,10 | 6,95 | 36,800 | 386,700 | 45,40 | 9,631 | 164,35 | 36,35 | 71,0952 | ZP | | | | |
| RZ-162UI | | | | 180,00 | 40,00 | 184,00 | 2,50 | 169,40 | 7,30 | 36,800 | 386,700 | 42,82 | 6,434 | 238,41 | 54,41 | 104,9297 | ZR | | | | |
| RZ-162UX | | | | 270,00 | 40,00 | 184,00 | 2,50 | 170,10 | 6,95 | 36,800 | 386,700 | 42,80 | 6,407 | 238,64 | 54,64 | 105,3580 | ZR | | | | |
| RZ-162U-10I | | | | 3,00 | 40,00 | 0,60 | 45,10 | 180,00 | 29,00 | 101,00 | 2,40 | 46,50 | 27,25 | 9,200 | 176,900 | 11,70 | 0,965 | 274,80 | 173,80 | 105,5737 | ZR |
| RZ-162U-10X | | | | | | | | 270,00 | 29,00 | 101,00 | 2,40 | 47,25 | 26,88 | 9,200 | 176,900 | 11,70 | 0,949 | 277,80 | 176,80 | 107,1980 | ZR |
| RZ-162U-01I | | | | | | | | 180,00 | 39,00 | 140,00 | 2,40 | 85,50 | 27,25 | 9,200 | 176,900 | 11,23 | 0,509 | 469,72 | 329,72 | 190,0327 | ZS |
| RZ-162U-01X | | | | | | | | 270,00 | 39,00 | 140,00 | 2,40 | 86,25 | 26,87 | 9,200 | 176,900 | 11,21 | 0,504 | 472,71 | 332,71 | 191,6569 | ZS |
| RZ-162U-02I | 180,00 | 43,00 | 158,00 | | | | | 2,40 | 103,50 | 27,25 | 9,200 | 176,900 | 10,85 | 0,418 | 559,65 | 401,65 | 229,0138 | ZT | | | |
| RZ-162U-02X | 270,00 | 43,00 | 158,00 | | | | | 2,40 | 104,25 | 26,87 | 9,200 | 176,900 | 10,84 | 0,415 | 562,65 | 404,65 | 230,6380 | ZT | | | |
| RZ-162U-03I | 180,00 | 47,00 | 179,00 | | | | | 3,00 | 124,50 | 27,25 | 9,200 | 176,900 | 10,54 | 0,345 | 664,58 | 485,58 | 274,4917 | ZU | | | |
| RZ-162U-03X | 270,00 | 47,00 | 179,00 | | | | | 3,00 | 125,25 | 26,87 | 9,200 | 176,900 | 10,53 | 0,343 | 667,58 | 488,58 | 276,1159 | ZU | | | |
| RZ-162U-04I | 180,00 | 51,00 | 197,00 | | | | | 3,00 | 142,50 | 27,25 | 9,200 | 176,900 | 10,32 | 0,301 | 754,52 | 557,52 | 313,4728 | ZX | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| RZ-162U-04X | 3,00 | 40,00 | 0,60 | 45,10 | 270,00 | 51,00 | 197,00 | 3,00 | 143,25 | 26,87 | 9,200 | 176,900 | 10,31 | 0,299 | 757,52 | 560,52 | 315,0970 | ZX | | |
| RZ-162U-05I | | | | | 180,00 | 54,00 | 218,00 | 3,00 | 163,50 | 27,25 | 9,200 | 176,900 | 10,14 | 0,262 | 859,45 | 641,45 | 358,9507 | AA | | |
| RZ-162U-05X | | | | | 270,00 | 54,00 | 218,00 | 3,00 | 164,25 | 26,87 | 9,200 | 176,900 | 10,14 | 0,260 | 862,45 | 644,45 | 360,5749 | AA | | |
| RZ-162U-06I | | | | | 180,00 | 58,00 | 242,00 | 3,00 | 187,50 | 27,25 | 9,200 | 176,900 | 10,03 | 0,228 | 979,37 | 737,37 | 410,9255 | AD | | |
| RZ-162U-06X | | | | | 270,00 | 58,00 | 242,00 | 3,00 | 188,25 | 26,87 | 9,200 | 176,900 | 10,03 | 0,227 | 982,36 | 740,36 | 412,5497 | AD | | |
| RZ-162U-07I | | | | | 180,00 | 62,00 | 266,00 | 4,00 | 211,50 | 27,25 | 9,200 | 176,900 | 9,93 | 0,201 | 1099,28 | 833,28 | 462,9002 | AE | | |
| RZ-162U-07X | | | | | 270,00 | 62,00 | 266,00 | 4,00 | 212,25 | 26,87 | 9,200 | 176,900 | 9,93 | 0,201 | 1102,28 | 836,28 | 464,5245 | AE | | |
| RZ-162U-18I | 32,00 | 0,50 | 37,00 | 180,00 | 22,00 | 83,50 | 1,80 | 40,50 | 21,50 | 16,400 | 219,400 | 13,90 | 2,325 | 170,80 | 87,30 | 72,5627 | ZP | | | |
| RZ-162U-18X | | | | 270,00 | 22,00 | 83,50 | 1,80 | 41,25 | 21,13 | 16,400 | 219,400 | 13,90 | 2,279 | 172,60 | 89,10 | 73,8358 | ZP | | | |
| RZ-162U-19I | | | | 180,00 | 28,00 | 108,00 | 2,40 | 64,50 | 21,75 | 16,400 | 219,400 | 13,40 | 1,418 | 251,20 | 143,20 | 113,2997 | ZQ | | | |
| RZ-162U-19X | | | | 270,00 | 28,00 | 108,00 | 2,40 | 65,25 | 21,38 | 16,400 | 219,400 | 13,40 | 1,400 | 252,90 | 144,90 | 114,5727 | ZQ | | | |
| RZ-162U-20I | | | | 180,00 | 33,00 | 128,00 | 2,40 | 85,50 | 21,25 | 16,400 | 219,400 | 13,15 | 1,057 | 320,11 | 192,11 | 148,9446 | ZR | | | |
| RZ-162U-20X | | | | 270,00 | 33,00 | 128,00 | 2,40 | 86,25 | 20,87 | 16,400 | 219,400 | 13,13 | 1,047 | 321,86 | 193,86 | 150,2176 | ZR | | | |
| RZ-162U-21I | | | | 180,00 | 37,00 | 146,00 | 2,40 | 103,50 | 21,25 | 16,400 | 219,400 | 12,72 | 0,867 | 380,03 | 234,03 | 179,4973 | ZS | | | |
| RZ-162U-21X | | | | 270,00 | 37,00 | 146,00 | 2,40 | 104,25 | 20,87 | 16,400 | 219,400 | 12,70 | 0,861 | 381,77 | 235,77 | 180,7703 | ZS | | | |
| RZ-162U-22I | | | | 180,00 | 40,00 | 167,00 | 3,00 | 124,50 | 21,25 | 16,400 | 219,400 | 12,36 | 0,718 | 449,93 | 282,93 | 215,1422 | ZW | | | |
| RZ-162U-22X | | | | 270,00 | 41,00 | 167,00 | 3,00 | 125,25 | 20,87 | 16,400 | 219,400 | 12,35 | 0,713 | 451,68 | 284,68 | 216,4152 | ZW | | | |
| RZ-162U-23I | | | | 180,00 | 43,00 | 185,00 | 3,00 | 142,50 | 21,25 | 16,400 | 219,400 | 12,10 | 0,625 | 509,85 | 324,85 | 245,6949 | ZX | | | |
| RZ-162U-23X | | | | 270,00 | 43,00 | 185,00 | 3,00 | 143,25 | 20,87 | 16,400 | 219,400 | 12,09 | 0,622 | 511,59 | 326,59 | 246,9679 | ZX | | | |
| RZ-162U-24I | | | | 180,00 | 46,00 | 206,00 | 3,00 | 163,50 | 21,25 | 16,400 | 219,400 | 11,90 | 0,543 | 579,75 | 373,75 | 281,3398 | AA | | | |
| RZ-162U-24X | | | | 270,00 | 47,00 | 206,00 | 3,00 | 164,25 | 20,87 | 16,400 | 219,400 | 11,89 | 0,541 | 581,49 | 375,49 | 282,6128 | AA | | | |
| RZ-162U-25I | | | | 180,00 | 50,00 | 230,00 | 3,00 | 187,50 | 21,25 | 16,400 | 219,400 | 11,77 | 0,473 | 659,63 | 429,63 | 322,0767 | AC | | | |
| RZ-162U-25X | | | | 270,00 | 50,00 | 230,00 | 3,00 | 188,25 | 20,87 | 16,400 | 219,400 | 11,76 | 0,471 | 661,38 | 431,38 | 323,3498 | AC | | | |
| RZ-162U-26I | | | | 180,00 | 53,00 | 254,00 | 4,00 | 211,50 | 21,25 | 16,400 | 219,400 | 11,66 | 0,418 | 739,52 | 485,52 | 362,8137 | AD | | | |
| RZ-162U-26X | | | | 270,00 | 53,00 | 254,00 | 4,00 | 212,25 | 20,87 | 16,400 | 219,400 | 11,65 | 0,417 | 741,22 | 487,22 | 364,0867 | AD | | | |
| RZ-162U-28I | | | | 24,00 | 0,35 | 28,90 | 180,00 | 20,00 | 69,00 | 1,50 | 40,50 | 14,25 | 22,000 | 287,900 | 20,50 | 6,122 | 112,40 | 43,40 | 52,5454 | ZO |
| RZ-162U-28X | | | | | | | 270,00 | 20,00 | 69,00 | 1,50 | 41,25 | 13,88 | 22,000 | 287,900 | 20,50 | 6,002 | 113,30 | 44,30 | 53,4673 | ZO |
| RZ-162U-29I | 180,00 | 25,00 | 94,00 | | | | 1,50 | 64,50 | 14,75 | 22,000 | 287,900 | 19,70 | 3,733 | 165,20 | 71,20 | 82,0446 | ZP | | | |
| RZ-162U-29X | 270,00 | 25,00 | 94,00 | | | | 1,50 | 65,25 | 14,38 | 22,000 | 287,900 | 19,70 | 3,688 | 166,10 | 72,10 | 82,9665 | ZP | | | |
| RZ-162U-30I | 180,00 | 29,00 | 115,00 | | | | 2,00 | 85,50 | 14,75 | 22,000 | 287,900 | 19,48 | 2,783 | 210,56 | 95,56 | 107,8564 | ZP | | | |
| RZ-162U-30X | 270,00 | 30,00 | 115,00 | | | | 2,00 | 86,25 | 14,37 | 22,000 | 287,900 | 19,45 | 2,758 | 211,43 | 96,43 | 108,7783 | ZP | | | |
| RZ-162U-31I | 180,00 | 33,00 | 133,00 | | | | 2,00 | 103,50 | 14,75 | 22,000 | 287,900 | 18,81 | 2,284 | 249,42 | 116,42 | 129,9808 | ZQ | | | |
| RZ-162U-31X | 270,00 | 33,00 | 133,00 | | | | 2,00 | 104,25 | 14,37 | 22,000 | 287,900 | 18,79 | 2,268 | 250,28 | 117,28 | 130,9027 | ZQ | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| Z-162U-04X | 3,00 | 40,00 | 0,60 | 45,10 | 270,00 | 51,00 | 197,00 | 3,00 | 143,25 | 26,87 | 11,500 | 214,200 | 10,87 | 0,348 | 778,74 | 581,74 | 315,1000 | ZT | | |
| Z-162U-05I | | | | | 180,00 | 54,00 | 218,00 | 3,00 | 163,50 | 27,25 | 11,500 | 214,200 | 10,70 | 0,305 | 883,73 | 665,73 | 358,9500 | ZX | | |
| Z-162U-05X | | | | | 270,00 | 54,00 | 218,00 | 3,00 | 164,25 | 26,87 | 11,500 | 214,200 | 10,70 | 0,303 | 886,84 | 668,84 | 360,5700 | ZX | | |
| Z-162U-06I | | | | | 180,00 | 58,00 | 242,00 | 3,00 | 187,50 | 27,25 | 11,500 | 214,200 | 10,59 | 0,265 | 1007,28 | 765,28 | 410,9300 | AA | | |
| Z-162U-06X | | | | | 270,00 | 58,00 | 242,00 | 3,00 | 188,25 | 26,87 | 11,500 | 214,200 | 10,59 | 0,264 | 1010,39 | 768,39 | 412,5500 | AA | | |
| Z-162U-07I | | | | | 180,00 | 62,00 | 266,00 | 4,00 | 211,50 | 27,25 | 11,500 | 214,200 | 10,49 | 0,234 | 1130,83 | 864,83 | 462,9000 | AB | | |
| Z-162U-07X | | | | | 270,00 | 62,00 | 266,00 | 4,00 | 212,25 | 26,87 | 11,500 | 214,200 | 10,49 | 0,234 | 1133,94 | 867,94 | 464,5300 | AB | | |
| Z-162U-18I | 32,00 | 0,50 | 37,00 | 180,00 | 22,00 | 83,50 | 1,80 | 40,50 | 21,50 | 20,500 | 265,600 | 13,90 | 2,700 | 174,00 | 90,50 | 72,5600 | ZM | | | |
| Z-162U-18X | | | | 270,00 | 22,00 | 83,50 | 1,80 | 41,25 | 21,13 | 20,500 | 265,600 | 13,90 | 2,650 | 175,90 | 92,40 | 73,8400 | ZM | | | |
| Z-162U-19I | | | | 180,00 | 28,00 | 108,00 | 2,40 | 64,50 | 21,75 | 20,500 | 265,600 | 13,40 | 1,650 | 256,50 | 148,50 | 113,3000 | ZM | | | |
| Z-162U-19X | | | | 270,00 | 28,00 | 108,00 | 2,40 | 65,25 | 21,38 | 20,500 | 265,600 | 13,40 | 1,630 | 258,30 | 150,30 | 114,5700 | ZM | | | |
| Z-162U-20I | | | | 180,00 | 33,00 | 128,00 | 2,40 | 85,50 | 21,25 | 20,500 | 265,600 | 13,20 | 1,230 | 327,22 | 199,22 | 148,9400 | ZO | | | |
| Z-162U-20X | | | | 270,00 | 33,00 | 128,00 | 2,40 | 86,25 | 20,87 | 20,500 | 265,600 | 13,20 | 1,219 | 329,03 | 201,03 | 150,2200 | ZO | | | |
| Z-162U-21I | | | | 180,00 | 37,00 | 146,00 | 2,40 | 103,50 | 21,25 | 20,500 | 265,600 | 13,10 | 1,010 | 388,68 | 242,68 | 179,6000 | ZP | | | |
| Z-162U-21X | | | | 270,00 | 37,00 | 146,00 | 2,40 | 104,25 | 20,87 | 20,500 | 265,600 | 13,10 | 1,003 | 390,49 | 244,49 | 180,9000 | ZP | | | |
| Z-162U-22I | | | | 180,00 | 40,00 | 167,00 | 3,00 | 124,50 | 21,25 | 20,500 | 265,600 | 13,00 | 0,835 | 460,39 | 293,39 | 215,1000 | ZS | | | |
| Z-162U-22X | | | | 270,00 | 41,00 | 167,00 | 3,00 | 125,25 | 20,87 | 20,500 | 265,600 | 13,00 | 0,830 | 462,20 | 295,20 | 216,3000 | ZS | | | |
| Z-162U-23I | | | | 180,00 | 43,00 | 185,00 | 3,00 | 142,50 | 21,25 | 20,500 | 265,600 | 12,79 | 0,728 | 521,86 | 336,86 | 245,7000 | ZT | | | |
| Z-162U-23X | | | | 270,00 | 43,00 | 185,00 | 3,00 | 143,25 | 20,87 | 20,500 | 265,600 | 12,78 | 0,724 | 523,67 | 338,67 | 246,9700 | ZT | | | |
| Z-162U-24I | | | | 180,00 | 46,00 | 206,00 | 3,00 | 163,50 | 21,25 | 20,500 | 265,600 | 12,59 | 0,632 | 593,57 | 387,57 | 281,3400 | ZX | | | |
| Z-162U-24X | | | | 270,00 | 47,00 | 206,00 | 3,00 | 164,25 | 20,87 | 20,500 | 265,600 | 12,59 | 0,629 | 595,38 | 389,38 | 282,6100 | ZX | | | |
| Z-162U-25I | | | | 180,00 | 50,00 | 230,00 | 3,00 | 187,50 | 21,25 | 20,500 | 265,600 | 12,46 | 0,550 | 675,52 | 445,52 | 322,0800 | ZZ | | | |
| Z-162U-25X | | | | 270,00 | 50,00 | 230,00 | 3,00 | 188,25 | 20,87 | 20,500 | 265,600 | 12,46 | 0,548 | 677,33 | 447,33 | 323,3500 | ZZ | | | |
| Z-162U-26I | | | | 180,00 | 53,00 | 254,00 | 4,00 | 211,50 | 21,25 | 20,500 | 265,600 | 12,35 | 0,487 | 757,47 | 503,47 | 362,8400 | ZZ | | | |
| Z-162U-26X | | | | 270,00 | 53,00 | 254,00 | 4,00 | 212,25 | 20,87 | 20,500 | 265,600 | 12,34 | 0,485 | 759,29 | 505,29 | 364,0900 | ZZ | | | |
| Z-162U-28I | | | | 24,00 | 0,35 | 28,90 | 180,00 | 20,00 | 69,00 | 1,50 | 40,50 | 14,25 | 27,500 | 348,500 | 20,50 | 7,130 | 114,03 | 45,03 | 52,5400 | ZM |
| Z-162U-28X | | | | | | | 270,00 | 20,00 | 69,00 | 1,50 | 41,25 | 13,88 | 27,500 | 348,500 | 20,50 | 6,990 | 114,90 | 45,90 | 53,4700 | ZM |
| Z-162U-29I | | | | | | | 180,00 | 25,00 | 94,00 | 1,50 | 64,50 | 14,75 | 27,500 | 348,500 | 19,70 | 4,350 | 167,90 | 73,90 | 82,0400 | ZM |
| Z-162U-29X | 270,00 | 25,00 | 94,00 | | | | 1,50 | 65,25 | 14,38 | 27,500 | 348,500 | 19,70 | 4,290 | 168,80 | 74,80 | 82,9700 | ZM | | | |
| Z-162U-30I | 180,00 | 29,00 | 115,00 | | | | 2,00 | 85,50 | 14,75 | 27,500 | 348,500 | 19,40 | 3,240 | 214,09 | 99,09 | 107,8600 | ZM | | | |
| Z-162U-30X | 270,00 | 30,00 | 115,00 | | | | 2,00 | 86,25 | 14,37 | 27,500 | 348,500 | 19,40 | 3,211 | 214,99 | 99,99 | 108,7800 | ZM | | | |
| Z-162U-31I | 180,00 | 33,00 | 133,00 | | | | 2,00 | 103,50 | 14,75 | 27,500 | 348,500 | 19,30 | 2,660 | 253,71 | 120,71 | 129,9800 | ZN | | | |
| Z-162U-31X | 270,00 | 33,00 | 133,00 | | | | 2,00 | 104,25 | 14,37 | 27,500 | 348,500 | 19,30 | 2,640 | 254,61 | 121,61 | 131,1000 | ZN | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|---------|----|
| Z-162U-32I | 3,00 | 24,00 | 0,35 | 28,90 | 180,00 | 36,00 | 154,00 | 2,00 | 124,50 | 14,75 | 27,500 | 348,500 | 19,10 | 2,200 | 299,94 | 145,94 | 155,9000 | ZO | | | |
| Z-162U-32X | | | | | 270,00 | 36,00 | 154,00 | 2,00 | 125,25 | 14,37 | 27,500 | 348,500 | 19,10 | 2,187 | 300,84 | 146,84 | 156,8000 | ZO | | | |
| Z-162U-33I | | | | | 180,00 | 38,00 | 172,00 | 2,50 | 142,50 | 14,75 | 27,500 | 348,500 | 18,77 | 1,916 | 339,56 | 167,56 | 177,9000 | ZP | | | |
| Z-162U-33X | | | | | 270,00 | 38,00 | 172,00 | 2,50 | 143,25 | 14,37 | 27,500 | 348,500 | 18,75 | 1,906 | 340,46 | 168,46 | 178,9000 | ZP | | | |
| Z-162U-34I | | | | | 180,00 | 41,00 | 193,00 | 2,50 | 163,50 | 14,75 | 27,500 | 348,500 | 18,46 | 1,665 | 385,78 | 192,78 | 203,6000 | ZS | | | |
| Z-162U-34X | | | | | 270,00 | 41,00 | 193,00 | 2,50 | 164,25 | 14,37 | 27,500 | 348,500 | 18,46 | 1,658 | 386,68 | 193,68 | 204,5000 | ZS | | | |
| Z-162U-35I | | | | | 180,00 | 44,00 | 217,00 | 2,50 | 187,50 | 14,75 | 27,500 | 348,500 | 18,26 | 1,449 | 438,53 | 221,53 | 233,2300 | ZS | | | |
| Z-162U-35X | | | | | 270,00 | 44,00 | 217,00 | 2,50 | 188,25 | 14,37 | 27,500 | 348,500 | 18,26 | 1,443 | 439,51 | 222,51 | 234,1500 | ZS | | | |
| Z-162U-36I | | | | | 180,00 | 47,00 | 241,00 | 2,50 | 211,50 | 14,75 | 27,500 | 348,500 | 18,09 | 1,282 | 491,43 | 250,43 | 262,7300 | ZT | | | |
| Z-162U-36X | | | | | 270,00 | 47,00 | 241,00 | 2,50 | 212,25 | 14,37 | 27,500 | 348,500 | 18,09 | 1,272 | 492,33 | 251,33 | 263,6500 | ZT | | | |
| Z-162U-38I | | | | | 18,00 | 0,30 | 23,40 | 180,00 | 19,00 | 60,50 | 1,10 | 40,50 | 10,00 | 43,800 | 452,600 | 36,70 | 19,560 | 81,40 | 20,90 | 37,5300 | ZM |
| Z-162U-38X | | | | | | | | 270,00 | 19,00 | 60,50 | 1,10 | 41,25 | 9,63 | 43,800 | 452,600 | 36,70 | 19,170 | 81,80 | 21,30 | 38,1900 | ZM |
| Z-162U-39I | 180,00 | 23,00 | 86,00 | 1,50 | | | | 64,50 | 10,75 | 43,800 | 452,600 | 35,20 | 11,930 | 120,30 | 34,30 | 58,6000 | ZN | | | | |
| Z-162U-39X | 270,00 | 23,00 | 86,00 | 1,50 | | | | 65,25 | 10,38 | 43,800 | 452,600 | 35,20 | 11,780 | 120,70 | 34,70 | 59,2600 | ZN | | | | |
| Z-162U-40I | 180,00 | 28,00 | 105,50 | 2,00 | | | | 85,50 | 10,00 | 43,800 | 452,600 | 34,50 | 8,891 | 151,49 | 45,99 | 77,0400 | ZN | | | | |
| Z-162U-40X | 270,00 | 28,00 | 105,50 | 2,00 | | | | 86,25 | 9,62 | 43,800 | 452,600 | 34,50 | 8,811 | 151,90 | 46,40 | 77,7000 | ZN | | | | |
| Z-162U-41I | 180,00 | 31,00 | 123,50 | 2,00 | | | | 103,50 | 10,00 | 43,800 | 452,600 | 34,30 | 7,299 | 179,52 | 56,02 | 92,8400 | ZO | | | | |
| Z-162U-41X | 270,00 | 31,00 | 123,50 | 2,00 | | | | 104,25 | 9,62 | 43,800 | 452,600 | 34,30 | 7,244 | 179,94 | 56,44 | 93,5000 | ZO | | | | |
| Z-162U-42I | 180,00 | 34,00 | 144,50 | 2,00 | | | | 124,50 | 10,00 | 43,800 | 452,600 | 33,90 | 6,037 | 212,22 | 67,72 | 111,2800 | ZP | | | | |
| Z-162U-42X | 270,00 | 34,00 | 144,50 | 2,00 | | | | 125,25 | 9,62 | 43,800 | 452,600 | 33,90 | 6,000 | 212,64 | 68,14 | 111,9400 | ZP | | | | |
| Z-162U-43I | 180,00 | 36,00 | 162,50 | 2,50 | | | | 142,50 | 10,00 | 43,800 | 452,600 | 33,32 | 5,258 | 240,26 | 77,76 | 127,0800 | ZQ | | | | |
| Z-162U-43X | 270,00 | 37,00 | 162,50 | 2,50 | | | | 143,25 | 9,62 | 43,800 | 452,600 | 33,29 | 5,230 | 240,68 | 78,18 | 127,7400 | ZQ | | | | |
| Z-162U-44I | 180,00 | 39,00 | 183,50 | 2,50 | | | | 163,50 | 10,00 | 43,800 | 452,600 | 32,72 | 4,570 | 272,96 | 89,46 | 145,5200 | ZR | | | | |
| Z-162U-44X | 270,00 | 39,00 | 183,50 | 2,50 | | | | 164,25 | 9,62 | 43,800 | 452,600 | 32,70 | 4,549 | 273,38 | 89,88 | 146,1800 | ZR | | | | |
| Z-162U-45I | 180,00 | 42,00 | 207,50 | 2,50 | | | | 187,50 | 10,00 | 43,800 | 452,600 | 32,33 | 3,976 | 310,34 | 102,84 | 166,6000 | ZS | | | | |
| Z-162U-45X | 270,00 | 42,00 | 207,50 | 2,50 | | | | 188,25 | 9,62 | 43,800 | 452,600 | 32,32 | 3,960 | 310,76 | 103,26 | 167,2500 | ZS | | | | |
| Z-162U-46I | 180,00 | 45,00 | 231,50 | 2,50 | | | | 211,50 | 10,00 | 43,800 | 452,600 | 31,99 | 3,520 | 347,72 | 116,22 | 187,8000 | ZT | | | | |
| Z-162U-46X | 270,00 | 45,00 | 231,50 | 2,50 | | | | 212,25 | 9,62 | 43,800 | 452,600 | 31,98 | 3,505 | 348,14 | 116,64 | 188,5000 | ZT | | | | |
| Z-163I | 3,20 | 43,20 | 0,60 | 48,60 | 180,00 | 25,00 | 100,00 | 1,80 | 40,00 | 30,00 | 11,880 | 238,400 | 16,03 | 1,451 | 256,13 | 156,13 | 105,8800 | ZM | | | |
| Z-163X | | | | | 270,00 | 26,00 | 100,00 | 1,80 | 40,80 | 29,60 | 11,880 | 238,400 | 15,92 | 1,421 | 259,52 | 159,52 | 107,8800 | ZM | | | |
| Z-164I | | | | | 180,00 | 37,00 | 142,00 | 2,40 | 81,60 | 30,20 | 11,880 | 238,400 | 13,41 | 0,681 | 474,62 | 332,62 | 209,7700 | ZO | | | |
| Z-164X | | | | | 270,00 | 37,00 | 142,00 | 2,40 | 82,40 | 29,80 | 11,880 | 238,400 | 13,38 | 0,674 | 478,02 | 336,02 | 211,7700 | ZO | | | |
| Z-165I | | | | | 180,00 | 47,00 | 180,00 | 3,00 | 129,60 | 30,20 | 11,880 | 238,400 | 12,39 | 0,423 | 715,50 | 535,50 | 329,6500 | ZU | | | |

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----------|----|
| RZ-162U-32I | 3,00 | 24,00 | 0,35 | 28,90 | 180,00 | 36,00 | 154,00 | 2,00 | 124,50 | 14,75 | 22,000 | 287,900 | 18,26 | 1,890 | 294,74 | 140,74 | 155,7926 | ZR | | | |
| RZ-162U-32X | | | | | 270,00 | 36,00 | 154,00 | 2,00 | 125,25 | 14,37 | 22,000 | 287,900 | 18,24 | 1,878 | 295,61 | 141,61 | 156,7145 | ZR | | | |
| RZ-162U-33I | | | | | 180,00 | 38,00 | 172,00 | 2,50 | 142,50 | 14,75 | 22,000 | 287,900 | 17,86 | 1,646 | 333,59 | 161,59 | 177,9170 | ZS | | | |
| RZ-162U-33X | | | | | 270,00 | 38,00 | 172,00 | 2,50 | 143,25 | 14,37 | 22,000 | 287,900 | 17,84 | 1,637 | 334,46 | 162,46 | 178,8388 | ZS | | | |
| RZ-162U-34I | | | | | 180,00 | 41,00 | 193,00 | 2,50 | 163,50 | 14,75 | 22,000 | 287,900 | 17,55 | 1,430 | 378,92 | 185,92 | 203,7288 | ZW | | | |
| RZ-162U-34X | | | | | 270,00 | 41,00 | 193,00 | 2,50 | 164,25 | 14,37 | 22,000 | 287,900 | 17,55 | 1,424 | 379,79 | 186,79 | 204,6506 | ZW | | | |
| RZ-162U-35I | | | | | 180,00 | 44,00 | 217,00 | 2,50 | 187,50 | 14,75 | 22,000 | 287,900 | 17,36 | 1,244 | 430,72 | 213,72 | 233,2280 | ZW | | | |
| RZ-162U-35X | | | | | 270,00 | 44,00 | 217,00 | 2,50 | 188,25 | 14,37 | 22,000 | 287,900 | 17,35 | 1,239 | 431,59 | 214,59 | 234,1498 | ZW | | | |
| RZ-162U-36I | | | | | 180,00 | 47,00 | 241,00 | 2,50 | 211,50 | 14,75 | 22,000 | 287,900 | 17,18 | 1,101 | 482,52 | 241,52 | 262,7272 | ZX | | | |
| RZ-162U-36X | | | | | 270,00 | 47,00 | 241,00 | 2,50 | 212,25 | 14,37 | 22,000 | 287,900 | 17,18 | 1,097 | 483,39 | 242,39 | 263,6490 | ZX | | | |
| RZ-162U-38I | 18,00 | 0,30 | 23,40 | 180,00 | 19,00 | 60,50 | 1,10 | 40,50 | 10,00 | 35,000 | 373,900 | 36,70 | 16,800 | 80,67 | 20,17 | 37,5325 | ZO | | | | |
| RZ-162U-38X | | | | 270,00 | 19,00 | 60,50 | 1,10 | 41,25 | 9,63 | 35,000 | 373,900 | 36,70 | 16,471 | 81,08 | 20,58 | 38,1909 | ZO | | | | |
| RZ-162U-39I | | | | 180,00 | 23,00 | 86,00 | 1,50 | 64,50 | 10,75 | 35,000 | 373,900 | 35,20 | 10,244 | 119,07 | 33,07 | 58,6033 | ZP | | | | |
| RZ-162U-39X | | | | 270,00 | 23,00 | 86,00 | 1,50 | 65,25 | 10,38 | 35,000 | 373,900 | 35,20 | 10,120 | 119,49 | 33,49 | 59,2618 | ZP | | | | |
| RZ-162U-40I | | | | 180,00 | 28,00 | 105,50 | 2,00 | 85,50 | 10,00 | 35,000 | 373,900 | 35,32 | 7,636 | 149,88 | 44,38 | 77,0403 | ZQ | | | | |
| RZ-162U-40X | | | | 270,00 | 28,00 | 105,50 | 2,00 | 86,25 | 9,62 | 35,000 | 373,900 | 35,24 | 7,568 | 150,29 | 44,79 | 77,6988 | ZQ | | | | |
| RZ-162U-41I | | | | 180,00 | 31,00 | 123,50 | 2,00 | 103,50 | 10,00 | 35,000 | 373,900 | 34,00 | 6,269 | 177,57 | 54,07 | 92,8434 | ZR | | | | |
| RZ-162U-41X | | | | 270,00 | 31,00 | 123,50 | 2,00 | 104,25 | 9,62 | 35,000 | 373,900 | 33,96 | 6,222 | 177,97 | 54,47 | 93,5019 | ZR | | | | |
| RZ-162U-42I | | | | 180,00 | 34,00 | 144,50 | 2,00 | 124,50 | 10,00 | 35,000 | 373,900 | 32,92 | 5,185 | 209,87 | 65,37 | 111,2804 | ZS | | | | |
| RZ-162U-42X | | | | 270,00 | 34,00 | 144,50 | 2,00 | 125,25 | 9,62 | 35,000 | 373,900 | 32,89 | 5,153 | 210,27 | 65,77 | 111,9389 | ZS | | | | |
| RZ-162U-43I | | | | 180,00 | 36,00 | 162,50 | 2,50 | 142,50 | 10,00 | 35,000 | 373,900 | 32,14 | 4,516 | 237,55 | 75,05 | 127,0836 | ZT | | | | |
| RZ-162U-43X | | | | 270,00 | 37,00 | 162,50 | 2,50 | 143,25 | 9,62 | 35,000 | 373,900 | 32,10 | 4,492 | 237,95 | 75,45 | 127,7420 | ZT | | | | |
| RZ-162U-44I | | | | 180,00 | 39,00 | 183,50 | 2,50 | 163,50 | 10,00 | 35,000 | 373,900 | 31,53 | 3,925 | 269,85 | 86,35 | 145,5206 | ZU | | | | |
| RZ-162U-44X | | | | 270,00 | 39,00 | 183,50 | 2,50 | 164,25 | 9,62 | 35,000 | 373,900 | 31,52 | 3,907 | 270,25 | 86,75 | 146,1790 | ZU | | | | |
| RZ-162U-45I | | | | 180,00 | 42,00 | 207,50 | 2,50 | 187,50 | 10,00 | 35,000 | 373,900 | 31,15 | 3,415 | 306,76 | 99,26 | 166,5914 | ZW | | | | |
| RZ-162U-45X | | | | 270,00 | 42,00 | 207,50 | 2,50 | 188,25 | 9,62 | 35,000 | 373,900 | 31,13 | 3,401 | 307,16 | 99,66 | 167,2499 | ZW | | | | |
| RZ-162U-46I | | | | 180,00 | 45,00 | 231,50 | 2,50 | 211,50 | 10,00 | 35,000 | 373,900 | 30,80 | 3,022 | 343,67 | 112,17 | 187,6623 | ZX | | | | |
| RZ-162U-46X | | | | 270,00 | 45,00 | 231,50 | 2,50 | 212,25 | 9,62 | 35,000 | 373,900 | 30,79 | 3,011 | 344,07 | 112,57 | 188,3207 | ZX | | | | |
| RZ-163I | | | | 3,20 | 43,20 | 0,60 | 48,60 | 180,00 | 25,00 | 100,00 | 1,80 | 40,00 | 30,00 | 9,511 | 197,700 | 15,42 | 1,247 | 251,02 | 151,02 | 105,8849 | ZP |
| RZ-163X | | | | | | | | 270,00 | 26,00 | 100,00 | 1,80 | 40,80 | 29,60 | 9,511 | 197,700 | 15,31 | 1,220 | 254,30 | 154,30 | 107,8828 | ZP |
| RZ-164I | 180,00 | 37,00 | 142,00 | | | | | 2,40 | 81,60 | 30,20 | 9,511 | 197,700 | 12,80 | 0,585 | 463,73 | 321,73 | 209,7720 | ZR | | | |
| RZ-164X | 270,00 | 37,00 | 142,00 | | | | | 2,40 | 82,40 | 29,80 | 9,511 | 197,700 | 12,77 | 0,579 | 467,01 | 325,01 | 211,7699 | ZR | | | |
| RZ-165I | 180,00 | 47,00 | 180,00 | | | | | 3,00 | 129,60 | 30,20 | 9,511 | 197,700 | 11,78 | 0,363 | 698,71 | 518,71 | 329,6418 | ZY | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|----------|----|
| RZ-165X | 3,20 | 43,20 | 0,60 | 48,60 | 270,00 | 47,00 | 190,00 | 3,00 | 130,40 | 29,80 | 9,511 | 197,700 | 11,77 | 0,361 | 711,99 | 521,99 | 331,6396 | ZY | | |
| RZ-165AI | | | | | 180,00 | 55,00 | 234,00 | 3,00 | 174,40 | 29,80 | 9,511 | 197,700 | 11,29 | 0,268 | 936,56 | 702,56 | 441,5202 | AE | | |
| RZ-165AX | | | | | 270,00 | 55,00 | 234,00 | 3,00 | 175,20 | 29,40 | 9,511 | 197,700 | 11,28 | 0,267 | 939,84 | 705,84 | 443,5180 | AE | | |
| RZ-166I | 35,20 | 0,60 | 40,60 | 180,00 | 22,00 | 87,60 | 1,80 | 40,00 | 23,80 | 15,000 | 240,900 | 17,59 | 2,435 | 180,41 | 92,81 | 84,7079 | ZO | | | |
| RZ-166X | | | | 270,00 | 22,00 | 87,60 | 1,80 | 40,80 | 23,40 | 15,000 | 240,900 | 17,47 | 2,383 | 182,43 | 94,83 | 86,3062 | ZO | | | |
| RZ-166AI | | | | 180,00 | 23,00 | 90,80 | 1,80 | 43,20 | 23,80 | 15,000 | 240,900 | 17,13 | 2,240 | 191,68 | 100,88 | 91,1010 | ZP | | | |
| RZ-166AX | | | | 270,00 | 23,00 | 90,80 | 1,80 | 44,00 | 23,40 | 15,000 | 240,900 | 17,03 | 2,196 | 193,70 | 102,90 | 92,6993 | ZP | | | |
| RZ-167I | | | | 180,00 | 32,00 | 129,00 | 2,40 | 81,60 | 23,70 | 15,000 | 240,900 | 14,65 | 1,143 | 326,73 | 197,73 | 167,8176 | ZR | | | |
| RZ-167X | | | | 270,00 | 32,00 | 129,00 | 2,40 | 82,40 | 23,30 | 15,000 | 240,900 | 14,62 | 1,131 | 328,74 | 199,74 | 169,4159 | ZR | | | |
| RZ-168I | | | | 180,00 | 41,00 | 177,00 | 3,00 | 129,60 | 23,70 | 15,000 | 240,900 | 13,50 | 0,709 | 495,78 | 318,78 | 263,7134 | ZU | | | |
| RZ-168X | | | | 270,00 | 41,00 | 177,00 | 3,00 | 130,40 | 23,30 | 15,000 | 240,900 | 13,49 | 0,704 | 497,80 | 320,80 | 265,3117 | ZU | | | |
| RZ-168AI | | | | 180,00 | 44,00 | 199,00 | 3,00 | 152,00 | 23,50 | 15,000 | 240,900 | 13,17 | 0,602 | 574,28 | 375,28 | 308,4648 | ZY | | | |
| RZ-168AX | | | | 270,00 | 44,00 | 199,00 | 3,00 | 152,80 | 23,10 | 15,000 | 240,900 | 13,16 | 0,599 | 576,30 | 377,30 | 310,0630 | ZY | | | |
| RZ-168BI | | | | 180,00 | 47,00 | 222,00 | 3,00 | 174,40 | 23,80 | 15,000 | 240,900 | 12,95 | 0,523 | 653,77 | 431,77 | 353,2161 | AA | | | |
| RZ-168BX | | | | 270,00 | 47,00 | 222,00 | 3,00 | 175,20 | 23,40 | 15,000 | 240,900 | 12,95 | 0,521 | 655,79 | 433,79 | 354,8144 | AA | | | |
| RZ-168CI | | | | 180,00 | 51,00 | 247,00 | 3,00 | 200,00 | 23,50 | 15,000 | 240,900 | 12,81 | 0,455 | 743,34 | 496,34 | 404,3605 | AD | | | |
| RZ-168CX | | | | 270,00 | 51,00 | 247,00 | 3,00 | 200,80 | 23,10 | 15,000 | 240,900 | 12,81 | 0,453 | 745,35 | 498,35 | 405,9588 | AD | | | |
| RZ-168DI | | | | 180,00 | 54,00 | 273,00 | 4,00 | 225,60 | 23,70 | 15,000 | 240,900 | 12,69 | 0,403 | 833,90 | 560,90 | 455,5050 | AF | | | |
| RZ-168DX | | | | 270,00 | 54,00 | 273,00 | 4,00 | 226,40 | 23,30 | 15,000 | 240,900 | 12,69 | 0,401 | 835,92 | 562,92 | 457,1032 | AF | | | |
| RZ-168EI | | | | 180,00 | 57,00 | 298,00 | 4,00 | 251,20 | 23,40 | 15,000 | 240,900 | 12,58 | 0,361 | 923,46 | 625,46 | 506,6494 | AL | | | |
| RZ-168EX | | | | 270,00 | 57,00 | 298,00 | 4,00 | 252,00 | 23,00 | 15,000 | 240,900 | 12,58 | 0,360 | 925,48 | 627,48 | 508,2476 | AL | | | |
| RZ-169I | | | | 28,20 | 0,35 | 33,40 | 180,00 | 19,00 | 76,40 | 1,50 | 40,00 | 18,20 | 18,800 | 297,500 | 22,96 | 5,106 | 130,99 | 54,59 | 66,1781 | ZN |
| RZ-169X | | | | | | | 270,00 | 20,00 | 76,40 | 1,50 | 40,80 | 17,80 | 18,800 | 297,500 | 22,80 | 4,997 | 132,17 | 55,77 | 67,4267 | ZN |
| RZ-170I | | | | | | | 180,00 | 28,00 | 118,00 | 2,00 | 81,60 | 18,20 | 18,800 | 297,500 | 19,06 | 2,397 | 234,29 | 116,29 | 131,1075 | ZQ |
| RZ-170X | 270,00 | 29,00 | 118,00 | | | | 2,00 | 82,40 | 17,80 | 18,800 | 297,500 | 19,02 | 2,373 | 235,48 | 117,48 | 132,3562 | ZQ | | | |
| RZ-171I | 180,00 | 36,00 | 166,00 | | | | 2,50 | 129,60 | 18,20 | 18,800 | 297,500 | 17,55 | 1,487 | 353,49 | 187,49 | 206,0261 | ZS | | | |
| RZ-171X | 270,00 | 36,00 | 166,00 | | | | 2,50 | 130,40 | 17,80 | 18,800 | 297,500 | 17,53 | 1,477 | 354,67 | 188,67 | 207,2747 | ZS | | | |
| RZ-171AI | 180,00 | 39,00 | 188,00 | | | | 2,50 | 152,00 | 18,00 | 18,800 | 297,500 | 17,11 | 1,263 | 408,71 | 220,71 | 240,9881 | ZW | | | |
| RZ-171AX | 270,00 | 39,00 | 188,00 | | | | 2,50 | 152,80 | 17,60 | 18,800 | 297,500 | 17,09 | 1,256 | 409,90 | 221,90 | 242,2367 | ZW | | | |
| RZ-171BI | 180,00 | 42,00 | 210,00 | | | | 2,50 | 174,40 | 17,80 | 18,800 | 297,500 | 16,82 | 1,098 | 463,94 | 253,94 | 275,9501 | ZX | | | |
| RZ-171BX | 270,00 | 42,00 | 210,00 | | | | 2,50 | 175,20 | 17,40 | 18,800 | 297,500 | 16,81 | 1,092 | 465,13 | 255,13 | 277,1987 | ZX | | | |
| RZ-171CI | 180,00 | 45,00 | 236,00 | | | | 2,50 | 200,00 | 18,00 | 18,800 | 297,500 | 16,64 | 0,955 | 527,99 | 291,99 | 315,9067 | ZX | | | |
| RZ-171CX | 270,00 | 45,00 | 236,00 | | | | 2,50 | 200,80 | 17,60 | 18,800 | 297,500 | 16,63 | 0,951 | 529,10 | 293,10 | 317,1553 | ZX | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|---------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|----------|----|
| Z-165X | 3,20 | 43,20 | 0,60 | 48,60 | 270,00 | 47,00 | 190,00 | 3,00 | 130,40 | 29,80 | 11,880 | 238,400 | 12,38 | 0,420 | 729,66 | 539,66 | 331,6400 | ZU | | |
| Z-165AI | | | | | 180,00 | 55,00 | 234,00 | 3,00 | 174,40 | 29,80 | 11,880 | 238,400 | 11,90 | 0,312 | 960,34 | 726,34 | 441,5200 | AB | | |
| Z-165AX | | | | | 270,00 | 55,00 | 234,00 | 3,00 | 175,20 | 29,40 | 11,880 | 238,400 | 11,89 | 0,311 | 963,73 | 729,73 | 443,5200 | AB | | |
| Z-166I | 35,20 | 0,60 | 40,60 | 180,00 | 22,00 | 87,60 | 1,80 | 40,00 | 23,80 | 18,770 | 290,500 | 18,34 | 2,835 | 183,49 | 95,89 | 84,7000 | ZL | | | |
| Z-166X | | | | 270,00 | 22,00 | 87,60 | 1,80 | 40,80 | 23,40 | 18,770 | 290,500 | 18,22 | 2,774 | 185,57 | 97,97 | 86,3100 | ZL | | | |
| Z-166AI | | | | 180,00 | 23,00 | 90,80 | 1,80 | 43,20 | 23,80 | 18,770 | 290,500 | 17,88 | 2,608 | 195,02 | 104,22 | 91,1000 | ZM | | | |
| Z-166AX | | | | 270,00 | 23,00 | 90,80 | 1,80 | 44,00 | 23,40 | 18,770 | 290,500 | 17,77 | 2,557 | 197,11 | 106,31 | 92,7000 | ZM | | | |
| Z-167I | | | | 180,00 | 32,00 | 129,00 | 2,40 | 81,60 | 23,70 | 18,770 | 290,500 | 15,39 | 1,331 | 333,28 | 204,28 | 167,8200 | ZO | | | |
| Z-167X | | | | 270,00 | 32,00 | 129,00 | 2,40 | 82,40 | 23,30 | 18,770 | 290,500 | 15,36 | 1,317 | 335,36 | 206,36 | 169,4200 | ZO | | | |
| Z-168I | | | | 180,00 | 41,00 | 177,00 | 3,00 | 129,60 | 23,70 | 18,770 | 290,500 | 14,25 | 0,825 | 506,35 | 329,35 | 263,7000 | ZR | | | |
| Z-168X | | | | 270,00 | 41,00 | 177,00 | 3,00 | 130,40 | 23,30 | 18,770 | 290,500 | 14,24 | 0,820 | 508,43 | 331,43 | 265,3000 | ZR | | | |
| Z-168AI | | | | 180,00 | 44,00 | 199,00 | 3,00 | 152,00 | 23,50 | 18,770 | 290,500 | 13,91 | 0,701 | 586,71 | 387,71 | 308,4700 | ZU | | | |
| Z-168AX | | | | 270,00 | 44,00 | 199,00 | 3,00 | 152,80 | 23,10 | 18,770 | 290,500 | 13,90 | 0,697 | 588,80 | 389,80 | 310,0600 | ZU | | | |
| Z-168BI | | | | 180,00 | 47,00 | 222,00 | 3,00 | 174,40 | 23,80 | 18,770 | 290,500 | 13,70 | 0,609 | 668,08 | 446,08 | 353,2100 | ZX | | | |
| Z-168BX | | | | 270,00 | 47,00 | 222,00 | 3,00 | 175,20 | 23,40 | 18,770 | 290,500 | 13,69 | 0,607 | 670,16 | 448,16 | 354,8100 | ZX | | | |
| Z-168CI | | | | 180,00 | 51,00 | 247,00 | 3,00 | 200,00 | 23,50 | 18,770 | 290,500 | 13,56 | 0,530 | 759,78 | 512,78 | 404,3600 | AA | | | |
| Z-168CX | | | | 270,00 | 51,00 | 247,00 | 3,00 | 200,80 | 23,10 | 18,770 | 290,500 | 13,55 | 0,528 | 761,87 | 514,87 | 405,9600 | AA | | | |
| Z-168DI | | | | 180,00 | 54,00 | 273,00 | 4,00 | 225,60 | 23,70 | 18,770 | 290,500 | 13,44 | 0,469 | 852,48 | 579,48 | 455,5000 | AC | | | |
| Z-168DX | | | | 270,00 | 54,00 | 273,00 | 4,00 | 226,40 | 23,30 | 18,770 | 290,500 | 13,43 | 0,467 | 854,57 | 581,57 | 457,1000 | AC | | | |
| Z-168EI | | | | 180,00 | 57,00 | 298,00 | 4,00 | 251,20 | 23,40 | 18,770 | 290,500 | 13,33 | 0,421 | 944,19 | 646,19 | 506,6500 | AG | | | |
| Z-168EX | | | | 270,00 | 57,00 | 298,00 | 4,00 | 252,00 | 23,00 | 18,770 | 290,500 | 13,32 | 0,419 | 946,27 | 648,27 | 508,2500 | AG | | | |
| Z-169I | | | | 28,20 | 0,35 | 33,40 | 180,00 | 19,00 | 76,40 | 1,50 | 40,00 | 18,20 | 23,500 | 358,700 | 23,88 | 5,945 | 132,80 | 56,40 | 66,1800 | ZK |
| Z-169X | | | | | | | 270,00 | 20,00 | 76,40 | 1,50 | 40,80 | 17,80 | 23,500 | 358,700 | 23,72 | 5,818 | 134,02 | 57,62 | 67,4300 | ZK |
| Z-170I | | | | | | | 180,00 | 28,00 | 118,00 | 2,00 | 81,60 | 18,20 | 23,500 | 358,700 | 19,98 | 2,790 | 238,15 | 120,15 | 131,1100 | ZN |
| Z-170X | | | | | | | 270,00 | 29,00 | 118,00 | 2,00 | 82,40 | 17,80 | 23,500 | 358,700 | 19,94 | 2,762 | 239,37 | 121,37 | 132,3600 | ZN |
| Z-171I | | | | | | | 180,00 | 36,00 | 166,00 | 2,50 | 129,60 | 18,20 | 23,500 | 358,700 | 18,47 | 1,731 | 359,71 | 193,71 | 206,1000 | ZP |
| Z-171X | | | | | | | 270,00 | 36,00 | 166,00 | 2,50 | 130,40 | 17,80 | 23,500 | 358,700 | 18,45 | 1,720 | 360,93 | 194,93 | 207,4000 | ZP |
| Z-171AI | | | | | | | 180,00 | 39,00 | 188,00 | 2,50 | 152,00 | 18,00 | 23,500 | 358,700 | 18,03 | 1,470 | 416,04 | 228,04 | 240,9000 | ZS |
| Z-171AX | | | | | | | 270,00 | 39,00 | 188,00 | 2,50 | 152,80 | 17,60 | 23,500 | 358,700 | 18,01 | 1,462 | 417,26 | 229,26 | 242,1000 | ZS |
| Z-171BI | | | | | | | 180,00 | 42,00 | 210,00 | 2,50 | 174,40 | 17,80 | 23,500 | 358,700 | 17,74 | 1,278 | 472,36 | 262,36 | 275,9500 | ZT |
| Z-171BX | 270,00 | 42,00 | 210,00 | | | | 2,50 | 175,20 | 17,40 | 23,500 | 358,700 | 17,73 | 1,272 | 473,59 | 263,59 | 277,2000 | ZT | | | |
| Z-171CI | 180,00 | 45,00 | 236,00 | | | | 2,50 | 200,00 | 18,00 | 23,500 | 358,700 | 17,55 | 1,112 | 537,59 | 301,59 | 315,9100 | ZT | | | |
| Z-171CX | 270,00 | 45,00 | 236,00 | | | | 2,50 | 200,80 | 17,60 | 23,500 | 358,700 | 17,55 | 1,107 | 538,82 | 302,82 | 317,1600 | ZT | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----|
| Z-171DI | 3,20 | 28,20 | 0,35 | 33,40 | 180,00 | 48,00 | 262,00 | 3,00 | 225,60 | 18,20 | 23,500 | 358,700 | 17,39 | 0,984 | 602,83 | 340,83 | 355,8600 | ZX | | |
| Z-171DX | | | | | 270,00 | 48,00 | 262,00 | 3,00 | 226,40 | 17,40 | 23,500 | 358,700 | 17,39 | 0,980 | 604,05 | 342,05 | 357,1100 | ZX | | |
| Z-171EI | | | | | 180,00 | 51,00 | 287,00 | 3,00 | 251,20 | 17,90 | 23,500 | 358,700 | 17,25 | 0,882 | 667,06 | 380,06 | 395,8200 | ZZ | | |
| Z-171EX | | | | | 270,00 | 51,00 | 287,00 | 3,00 | 252,00 | 17,50 | 23,500 | 358,700 | 17,24 | 0,879 | 668,28 | 381,28 | 397,0700 | ZZ | | |
| Z-172I | 23,20 | 0,35 | 28,40 | 180,00 | 19,00 | 68,40 | 1,50 | 40,00 | 14,20 | 30,400 | 430,100 | 33,73 | 11,611 | 102,83 | 34,43 | 52,9400 | ZK | | | |
| Z-172X | | | | 270,00 | 19,00 | 68,40 | 1,50 | 40,80 | 13,80 | 30,400 | 430,100 | 33,50 | 11,364 | 103,58 | 35,18 | 53,9100 | ZK | | | |
| Z-173I | | | | 180,00 | 27,00 | 110,00 | 2,00 | 81,60 | 14,20 | 30,400 | 430,100 | 27,99 | 5,485 | 183,35 | 73,35 | 104,8600 | ZM | | | |
| Z-173X | | | | 270,00 | 27,00 | 110,00 | 2,80 | 82,40 | 13,80 | 30,400 | 430,100 | 27,93 | 5,395 | 184,10 | 74,10 | 105,8800 | ZM | | | |
| Z-174I | | | | 180,00 | 35,00 | 158,00 | 2,00 | 129,60 | 14,20 | 30,400 | 430,100 | 25,75 | 3,380 | 276,25 | 118,25 | 164,8200 | ZO | | | |
| Z-174X | | | | 270,00 | 35,00 | 158,00 | 2,00 | 130,40 | 13,80 | 30,400 | 430,100 | 25,73 | 3,359 | 277,00 | 119,00 | 165,8200 | ZO | | | |
| Z-174AI | | | | 180,00 | 30,00 | 180,00 | 2,50 | 152,00 | 14,00 | 30,400 | 430,100 | 25,10 | 2,872 | 319,21 | 139,21 | 192,7800 | ZO | | | |
| Z-174AX | | | | 270,00 | 38,00 | 180,00 | 2,50 | 152,80 | 13,60 | 30,400 | 430,100 | 25,08 | 2,856 | 319,96 | 139,96 | 193,9000 | ZR | | | |
| Z-174BI | | | | 180,00 | 40,00 | 202,00 | 2,50 | 174,40 | 13,80 | 30,400 | 430,100 | 24,68 | 2,496 | 362,17 | 160,17 | 220,8000 | ZS | | | |
| Z-174BX | | | | 270,00 | 40,00 | 202,00 | 2,50 | 175,20 | 13,40 | 30,400 | 430,100 | 24,67 | 2,484 | 362,92 | 160,92 | 221,8000 | ZS | | | |
| Z-174CI | | | | 180,00 | 43,00 | 228,00 | 2,50 | 200,00 | 14,00 | 30,400 | 430,100 | 24,41 | 2,171 | 412,12 | 184,12 | 252,6000 | ZS | | | |
| Z-174CX | | | | 270,00 | 43,00 | 228,00 | 2,50 | 200,80 | 13,60 | 30,400 | 430,100 | 24,46 | 2,162 | 412,87 | 184,87 | 253,6000 | ZS | | | |
| Z-174DI | | | | 180,00 | 46,00 | 254,00 | 3,00 | 225,60 | 14,20 | 30,400 | 430,100 | 24,17 | 1,921 | 462,07 | 208,07 | 284,5000 | ZT | | | |
| Z-174DX | | | | 270,00 | 46,00 | 254,00 | 3,00 | 226,40 | 13,80 | 30,400 | 430,100 | 24,16 | 1,914 | 462,82 | 208,82 | 285,5000 | ZT | | | |
| Z-174EI | | | | 180,00 | 49,00 | 279,00 | 3,00 | 251,20 | 13,90 | 30,400 | 430,100 | 23,95 | 1,723 | 511,02 | 232,02 | 316,6600 | ZU | | | |
| Z-174EX | | | | 270,00 | 49,00 | 279,00 | 3,00 | 252,00 | 13,50 | 30,400 | 430,100 | 23,95 | 1,717 | 511,77 | 232,77 | 317,6500 | ZU | | | |
| Z-175I | | | | 19,20 | 0,30 | 24,30 | 180,00 | 18,00 | 62,00 | 1,10 | 40,00 | 11,00 | 45,500 | 510,000 | 50,95 | 22,678 | 82,48 | 20,48 | 42,3500 | ZH |
| Z-175X | | | | | | | 270,00 | 18,00 | 62,00 | 1,10 | 40,80 | 10,60 | 45,500 | 510,000 | 50,58 | 22,196 | 82,93 | 20,93 | 43,1500 | ZH |
| Z-176I | | | | | | | 180,00 | 26,00 | 103,00 | 2,00 | 81,60 | 10,70 | 45,500 | 510,000 | 41,83 | 10,645 | 146,64 | 43,64 | 83,9100 | ZL |
| Z-176X | | | | | | | 270,00 | 27,00 | 103,00 | 2,00 | 82,40 | 10,30 | 45,500 | 510,000 | 41,74 | 10,537 | 147,09 | 44,09 | 84,7100 | ZL |
| Z-177I | 180,00 | 34,00 | 151,00 | | | | 2,00 | 129,60 | 10,70 | 45,500 | 510,000 | 38,29 | 6,603 | 221,36 | 70,36 | 131,8600 | ZN | | | |
| Z-177X | 270,00 | 34,00 | 151,00 | | | | 2,00 | 130,40 | 10,30 | 45,500 | 510,000 | 38,25 | 6,561 | 221,80 | 70,80 | 132,6600 | ZN | | | |
| Z-177AI | 180,00 | 36,00 | 174,00 | | | | 2,50 | 152,00 | 11,00 | 45,500 | 510,000 | 37,25 | 5,609 | 256,83 | 82,83 | 154,3200 | ZP | | | |
| Z-177AX | 270,00 | 37,00 | 174,00 | | | | 2,50 | 152,80 | 10,60 | 45,500 | 510,000 | 37,22 | 5,579 | 257,27 | 83,27 | 155,0300 | ZP | | | |
| Z-177BI | 180,00 | 39,00 | 196,00 | | | | 2,50 | 174,40 | 10,80 | 45,500 | 510,000 | 36,58 | 4,875 | 291,30 | 95,30 | 176,6100 | ZO | | | |
| Z-177BX | 270,00 | 39,00 | 196,00 | | | | 2,50 | 175,20 | 10,40 | 45,500 | 510,000 | 36,57 | 4,852 | 291,74 | 95,74 | 177,4100 | ZO | | | |
| Z-177CI | 180,00 | 42,00 | 221,00 | | | | 2,50 | 200,00 | 10,50 | 45,500 | 510,000 | 36,15 | 4,241 | 330,55 | 109,55 | 202,1080 | ZR | | | |
| Z-177CX | 270,00 | 42,00 | 221,00 | | | | 2,50 | 200,80 | 10,10 | 45,500 | 510,000 | 36,14 | 4,223 | 330,99 | 109,99 | 202,9700 | ZR | | | |
| Z-177DI | 180,00 | 45,00 | 247,00 | | | | 2,50 | 225,60 | 10,70 | 45,500 | 510,000 | 35,77 | 3,753 | 370,79 | 123,79 | 227,7600 | ZS | | | |

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----|
| RZ-171DI | 3,20 | 28,20 | 0,35 | 33,40 | 180,00 | 48,00 | 262,00 | 3,00 | 225,60 | 18,20 | 18,800 | 297,500 | 16,47 | 0,845 | 591,88 | 329,88 | 355,8633 | ZZ | | |
| RZ-171DX | | | | | 270,00 | 48,00 | 262,00 | 3,00 | 226,40 | 17,40 | 18,800 | 297,500 | 16,47 | 0,842 | 593,07 | 331,07 | 357,1119 | ZZ | | |
| RZ-171EI | | | | | 180,00 | 51,00 | 287,00 | 3,00 | 251,20 | 17,90 | 18,800 | 297,500 | 16,33 | 0,758 | 654,86 | 367,86 | 395,8198 | ZZ | | |
| RZ-171EX | | | | | 270,00 | 51,00 | 287,00 | 3,00 | 252,00 | 17,50 | 18,800 | 297,500 | 16,32 | 0,755 | 656,04 | 369,04 | 397,0685 | ZZ | | |
| RZ-172I | 23,20 | 0,35 | 28,40 | 180,00 | 19,00 | 68,40 | 1,50 | 40,00 | 14,20 | 24,300 | 356,700 | 32,63 | 9,973 | 101,73 | 33,33 | 52,9425 | ZN | | | |
| RZ-172X | | | | 270,00 | 19,00 | 68,40 | 1,50 | 40,80 | 13,80 | 24,300 | 356,700 | 32,40 | 9,761 | 102,50 | 34,10 | 53,9414 | ZN | | | |
| RZ-173I | | | | 180,00 | 27,00 | 110,00 | 2,00 | 81,60 | 14,20 | 24,300 | 356,700 | 26,88 | 4,681 | 181,00 | 71,00 | 104,8860 | ZP | | | |
| RZ-173X | | | | 270,00 | 27,00 | 110,00 | 2,80 | 82,40 | 13,80 | 24,300 | 356,700 | 26,83 | 4,634 | 181,74 | 71,74 | 105,8849 | ZP | | | |
| RZ-174I | | | | 180,00 | 35,00 | 158,00 | 2,00 | 129,60 | 14,20 | 24,300 | 356,700 | 24,65 | 2,903 | 272,49 | 114,49 | 164,8209 | ZR | | | |
| RZ-174X | | | | 270,00 | 35,00 | 158,00 | 2,00 | 130,40 | 13,80 | 24,300 | 356,700 | 24,63 | 2,885 | 273,21 | 115,21 | 165,8198 | ZR | | | |
| RZ-174AI | | | | 180,00 | 30,00 | 180,00 | 2,50 | 152,00 | 14,00 | 24,300 | 356,700 | 24,00 | 2,466 | 314,78 | 134,78 | 192,7905 | ZU | | | |
| RZ-174AX | | | | 270,00 | 38,00 | 180,00 | 2,50 | 152,80 | 13,60 | 24,300 | 356,700 | 23,98 | 2,453 | 315,50 | 135,50 | 193,7894 | ZU | | | |
| RZ-174BI | | | | 180,00 | 40,00 | 202,00 | 2,50 | 174,40 | 13,80 | 24,300 | 356,700 | 23,58 | 2,144 | 357,07 | 155,07 | 220,7601 | ZW | | | |
| RZ-174BX | | | | 270,00 | 40,00 | 202,00 | 2,50 | 175,20 | 13,40 | 24,300 | 356,700 | 23,57 | 2,134 | 357,79 | 155,79 | 221,7590 | ZW | | | |
| RZ-174CI | | | | 180,00 | 43,00 | 228,00 | 2,50 | 200,00 | 14,00 | 24,300 | 356,700 | 23,30 | 1,865 | 406,25 | 178,25 | 252,7253 | ZW | | | |
| RZ-174CX | | | | 270,00 | 43,00 | 228,00 | 2,50 | 200,80 | 13,60 | 24,300 | 356,700 | 23,30 | 1,857 | 406,98 | 178,98 | 253,7243 | ZW | | | |
| RZ-174DI | | | | 180,00 | 46,00 | 254,00 | 3,00 | 225,60 | 14,20 | 24,300 | 356,700 | 23,06 | 1,650 | 455,44 | 201,44 | 284,6906 | ZX | | | |
| RZ-174DX | | | | 270,00 | 46,00 | 254,00 | 3,00 | 226,40 | 13,80 | 24,300 | 356,700 | 23,06 | 1,644 | 456,17 | 202,17 | 285,6895 | ZX | | | |
| RZ-174EI | | | | 180,00 | 49,00 | 279,00 | 3,00 | 251,20 | 13,90 | 24,300 | 356,700 | 22,85 | 1,480 | 503,63 | 224,63 | 316,6559 | ZY | | | |
| RZ-174EX | | | | 270,00 | 49,00 | 279,00 | 3,00 | 252,00 | 13,50 | 24,300 | 356,700 | 22,84 | 1,475 | 504,35 | 225,35 | 317,6548 | ZY | | | |
| RZ-175I | | | | 19,20 | 0,30 | 24,30 | 180,00 | 18,00 | 62,00 | 1,10 | 40,00 | 11,00 | 36,400 | 422,900 | 49,65 | 19,478 | 81,85 | 19,85 | 42,3540 | ZL |
| RZ-175X | | | | | | | 270,00 | 18,00 | 62,00 | 1,10 | 40,80 | 10,60 | 36,400 | 422,900 | 49,28 | 19,064 | 82,28 | 20,28 | 43,1531 | ZL |
| RZ-176I | | | | | | | 180,00 | 26,00 | 103,00 | 2,00 | 81,60 | 10,70 | 36,400 | 422,900 | 40,52 | 9,143 | 145,28 | 42,28 | 83,9088 | ZO |
| RZ-176X | | | | | | | 270,00 | 27,00 | 103,00 | 2,00 | 82,40 | 10,30 | 36,400 | 422,900 | 40,43 | 9,051 | 145,71 | 42,71 | 84,7079 | ZO |
| RZ-177I | 180,00 | 34,00 | 151,00 | | | | 2,00 | 129,60 | 10,70 | 36,400 | 422,900 | 36,98 | 5,671 | 219,17 | 68,17 | 131,8567 | ZQ | | | |
| RZ-177X | 270,00 | 34,00 | 151,00 | | | | 2,00 | 130,40 | 10,30 | 36,400 | 422,900 | 36,94 | 5,635 | 219,60 | 68,60 | 132,6558 | ZQ | | | |
| RZ-177AI | 180,00 | 36,00 | 174,00 | | | | 2,50 | 152,00 | 11,00 | 36,400 | 422,900 | 35,95 | 4,817 | 254,25 | 80,25 | 154,2324 | ZS | | | |
| RZ-177AX | 270,00 | 37,00 | 174,00 | | | | 2,50 | 152,80 | 10,60 | 36,400 | 422,900 | 35,91 | 4,791 | 254,68 | 80,68 | 155,0315 | ZS | | | |
| RZ-177BI | 180,00 | 39,00 | 196,00 | | | | 2,50 | 174,40 | 10,80 | 36,400 | 422,900 | 35,28 | 4,187 | 288,33 | 92,33 | 176,6081 | ZR | | | |
| RZ-177BX | 270,00 | 39,00 | 196,00 | | | | 2,50 | 175,20 | 10,40 | 36,400 | 422,900 | 35,26 | 4,167 | 288,76 | 92,76 | 177,4072 | ZR | | | |
| RZ-177CI | 180,00 | 42,00 | 221,00 | | | | 2,50 | 200,00 | 10,50 | 36,400 | 422,900 | 34,84 | 3,642 | 327,13 | 106,13 | 202,1803 | ZU | | | |
| RZ-177CX | 270,00 | 42,00 | 221,00 | | | | 2,50 | 200,80 | 10,10 | 36,400 | 422,900 | 34,83 | 3,628 | 327,56 | 106,56 | 202,9794 | ZU | | | |
| RZ-177DI | 180,00 | 45,00 | 247,00 | | | | 2,50 | 225,60 | 10,70 | 36,400 | 422,900 | 34,46 | 3,223 | 366,94 | 119,94 | 227,7525 | ZW | | | |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|---------|----------|----|
| RZ-177DX | 3,20 | 19,20 | 0,30 | 24,30 | 270,00 | 45,00 | 247,00 | 2,50 | 226,40 | 10,30 | 36,400 | 422,900 | 34,45 | 3,211 | 367,37 | 120,37 | 228,5516 | ZW | | | |
| RZ-177EI | | | | | 180,00 | 47,00 | 273,00 | 3,00 | 251,20 | 10,90 | 36,400 | 422,900 | 34,12 | 2,890 | 406,74 | 133,74 | 253,3247 | ZW | | | |
| RZ-177EX | | | | | 270,00 | 47,00 | 273,00 | 3,00 | 252,00 | 10,50 | 36,400 | 422,900 | 34,11 | 2,881 | 407,17 | 134,17 | 254,1238 | ZW | | | |
| RZ-177FI | 3,60 | 40,00 | 0,60 | 46,00 | 180,00 | 20,00 | 92,10 | 1,80 | 37,80 | 27,15 | 15,600 | 298,000 | 22,82 | 3,208 | 180,16 | 88,06 | 103,5422 | AE | | | |
| RZ-177FX | | | | | 270,00 | 20,00 | 92,10 | 1,80 | 38,70 | 26,70 | 15,600 | 298,000 | 22,58 | 3,125 | 182,47 | 90,37 | 105,8431 | AE | | | |
| RZ-177GI | | | | | 180,00 | 26,00 | 114,00 | 2,40 | 59,40 | 27,30 | 15,600 | 298,000 | 19,65 | 1,966 | 257,67 | 143,67 | 158,7646 | AF | | | |
| RZ-177GX | | | | | 270,00 | 26,00 | 114,00 | 2,40 | 60,30 | 26,85 | 15,600 | 298,000 | 19,58 | 1,935 | 259,99 | 145,99 | 161,0656 | AF | | | |
| RZ-177HI | | | | | 180,00 | 32,00 | 146,00 | 2,40 | 91,80 | 27,10 | 15,600 | 298,000 | 17,84 | 1,244 | 373,09 | 227,09 | 241,5984 | AG | | | |
| RZ-177HX | | | | | 270,00 | 32,00 | 146,00 | 2,40 | 92,70 | 26,65 | 15,600 | 298,000 | 17,80 | 1,231 | 375,41 | 229,41 | 243,8993 | AG | | | |
| RZ-177JI | | | | | 180,00 | 41,00 | 200,00 | 3,00 | 145,80 | 27,10 | 15,600 | 298,000 | 16,45 | 0,771 | 566,13 | 366,13 | 379,6546 | AK | | | |
| RZ-177JX | | | | | 270,00 | 41,00 | 200,00 | 3,00 | 146,70 | 26,65 | 15,600 | 298,000 | 16,44 | 0,767 | 568,45 | 368,45 | 381,9555 | AK | | | |
| RZ-177KI | | | | | 180,00 | 50,00 | 272,00 | 4,00 | 217,80 | 27,10 | 15,600 | 298,000 | 15,66 | 0,512 | 823,52 | 551,52 | 563,7295 | AO | | | |
| RZ-177KX | | | | | 270,00 | 50,00 | 272,00 | 4,00 | 218,70 | 26,65 | 15,600 | 298,000 | 15,65 | 0,510 | 825,83 | 553,83 | 566,0305 | AO | | | |
| RZ-177K-10I | | | | | 32,00 | 0,40 | 37,80 | 180,00 | 20,00 | 89,00 | 1,50 | 48,60 | 20,20 | 28,200 | 368,500 | 23,80 | 5,133 | 155,30 | 66,30 | 102,3285 | AE |
| RZ-177K-10X | | | | | | | | 270,00 | 20,00 | 89,00 | 1,50 | 49,50 | 19,75 | 28,200 | 368,500 | 23,80 | 5,032 | 156,60 | 67,60 | 104,1237 | AE |
| RZ-177K-11I | | | | | | | | 180,00 | 25,00 | 118,00 | 2,00 | 77,40 | 20,30 | 28,200 | 368,500 | 22,90 | 3,130 | 226,70 | 108,70 | 159,7760 | AF |
| RZ-177K-11X | 270,00 | 25,00 | 118,00 | 2,00 | | | | 78,30 | 19,85 | 28,200 | 368,500 | 22,90 | 3,092 | 228,10 | 110,10 | 161,5713 | AF | | | | |
| RZ-177K-01I | 180,00 | 32,00 | 154,00 | 2,00 | | | | 113,40 | 20,30 | 28,200 | 368,500 | 22,13 | 2,104 | 315,80 | 161,80 | 231,5855 | AG | | | | |
| RZ-177K-01X | 270,00 | 32,00 | 154,00 | 2,00 | | | | 114,30 | 19,85 | 28,200 | 368,500 | 22,10 | 2,086 | 317,12 | 163,12 | 233,3807 | AG | | | | |
| RZ-177K-02I | 180,00 | 35,00 | 179,00 | 2,50 | | | | 138,60 | 20,20 | 28,200 | 368,500 | 21,46 | 1,711 | 377,93 | 198,93 | 281,8521 | AG | | | | |
| RZ-177K-02X | 270,00 | 35,00 | 179,00 | 2,50 | | | | 139,50 | 19,75 | 28,200 | 368,500 | 21,44 | 1,700 | 379,26 | 200,26 | 283,6474 | AG | | | | |
| RZ-177K-03I | 180,00 | 38,00 | 205,00 | 2,50 | | | | 163,80 | 20,60 | 28,200 | 368,500 | 20,90 | 1,442 | 441,06 | 236,06 | 332,1187 | AH | | | | |
| RZ-177K-03X | 270,00 | 39,00 | 205,00 | 2,50 | | | | 164,70 | 20,15 | 28,200 | 368,500 | 20,88 | 1,434 | 442,39 | 237,39 | 333,9140 | AH | | | | |
| RZ-177K-04I | 180,00 | 41,00 | 230,00 | 2,50 | | | | 189,00 | 20,50 | 28,200 | 368,500 | 20,47 | 1,246 | 503,20 | 273,20 | 382,3854 | AH | | | | |
| RZ-177K-04X | 270,00 | 41,00 | 230,00 | 2,50 | | | | 189,90 | 20,05 | 28,200 | 368,500 | 20,46 | 1,240 | 504,52 | 274,52 | 384,1806 | AH | | | | |
| RZ-177LI | 25,00 | 0,35 | 30,80 | 180,00 | | | | 17,00 | 68,10 | 1,50 | 37,80 | 15,15 | 29,400 | 463,300 | 46,84 | 15,785 | 95,67 | 27,57 | 60,8737 | AD | |
| RZ-177LX | | | | 270,00 | 17,00 | 68,10 | 1,50 | 38,70 | 14,70 | 29,400 | 463,300 | 46,32 | 15,381 | 96,32 | 28,22 | 62,2264 | AD | | | | |
| RZ-177MI | | | | 180,00 | 22,00 | 89,70 | 1,50 | 59,40 | 15,15 | 29,400 | 463,300 | 39,95 | 9,675 | 134,56 | 44,86 | 93,3397 | AE | | | | |
| RZ-177MX | | | | 270,00 | 22,00 | 89,70 | 1,50 | 60,30 | 14,70 | 29,400 | 463,300 | 39,79 | 9,521 | 135,28 | 45,58 | 94,6924 | AE | | | | |
| RZ-177NI | | | | 180,00 | 27,00 | 122,00 | 2,00 | 91,80 | 15,10 | 29,400 | 463,300 | 36,01 | 6,121 | 192,90 | 70,90 | 142,0386 | AF | | | | |
| RZ-177NX | | | | 270,00 | 27,00 | 122,00 | 2,00 | 92,70 | 14,65 | 29,400 | 463,300 | 35,93 | 6,059 | 193,62 | 71,62 | 143,3914 | AF | | | | |
| RZ-177OI | | | | 180,00 | 34,00 | 176,00 | 2,50 | 145,80 | 15,10 | 29,400 | 463,300 | 33,00 | 3,796 | 290,31 | 114,31 | 223,2035 | AG | | | | |
| RZ-177OX | | | | 270,00 | 35,00 | 176,00 | 2,50 | 146,70 | 14,65 | 29,400 | 463,300 | 32,96 | 3,773 | 291,03 | 115,03 | 224,5563 | AG | | | | |

Extension springs

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|---------|----------|----|
| Z-177DX | 3,20 | 19,20 | 0,30 | 24,30 | 270,00 | 45,00 | 247,00 | 2,50 | 226,40 | 10,30 | 45,500 | 510,000 | 35,79 | 3,739 | 371,24 | 124,24 | 228,7000 | ZS | | | |
| Z-177EI | | | | | 180,00 | 47,00 | 273,00 | 3,00 | 251,20 | 10,90 | 45,500 | 510,000 | 35,43 | 3,365 | 411,04 | 138,04 | 253,5000 | ZS | | | |
| Z-177EX | | | | | 270,00 | 47,00 | 273,00 | 3,00 | 252,00 | 10,50 | 45,500 | 510,000 | 35,42 | 3,354 | 411,49 | 138,49 | 254,3000 | ZS | | | |
| Z-177FI | 3,60 | 40,00 | 0,60 | 46,00 | 180,00 | 20,00 | 92,10 | 1,80 | 37,80 | 27,15 | 19,600 | 357,100 | 23,71 | 3,735 | 182,48 | 90,38 | 103,5400 | AB | | | |
| Z-177FX | | | | | 270,00 | 20,00 | 92,10 | 1,80 | 38,70 | 26,70 | 19,600 | 357,100 | 23,46 | 3,639 | 184,86 | 92,76 | 105,8400 | AB | | | |
| Z-177GI | | | | | 180,00 | 26,00 | 114,00 | 2,40 | 59,40 | 27,30 | 19,600 | 357,100 | 20,53 | 2,288 | 261,46 | 147,46 | 158,7500 | AC | | | |
| Z-177GX | | | | | 270,00 | 26,00 | 114,00 | 2,40 | 60,30 | 26,85 | 19,600 | 357,100 | 20,46 | 2,253 | 263,84 | 149,84 | 161,0600 | AC | | | |
| Z-177HI | | | | | 180,00 | 32,00 | 146,00 | 2,40 | 91,80 | 27,10 | 19,600 | 357,100 | 18,72 | 1,448 | 379,08 | 233,08 | 241,6000 | AD | | | |
| Z-177HX | | | | | 270,00 | 32,00 | 146,00 | 2,40 | 92,70 | 26,65 | 19,600 | 357,100 | 18,69 | 1,434 | 381,46 | 235,46 | 243,9000 | AD | | | |
| Z-177JI | | | | | 180,00 | 41,00 | 200,00 | 3,00 | 145,80 | 27,10 | 19,600 | 357,100 | 17,34 | 0,898 | 575,10 | 375,10 | 379,6500 | AG | | | |
| Z-177JX | | | | | 270,00 | 41,00 | 200,00 | 3,00 | 146,70 | 26,65 | 19,600 | 357,100 | 17,32 | 0,893 | 578,17 | 378,17 | 381,9000 | AG | | | |
| Z-177KI | | | | | 180,00 | 50,00 | 272,00 | 4,00 | 217,80 | 27,10 | 19,600 | 357,100 | 16,54 | 0,596 | 838,06 | 566,06 | 563,7300 | AL | | | |
| Z-177KX | | | | | 270,00 | 50,00 | 272,00 | 4,00 | 218,70 | 26,65 | 19,600 | 357,100 | 16,54 | 0,594 | 840,44 | 568,44 | 566,0300 | AL | | | |
| Z-177K-10I | | | | | 32,00 | 0,40 | 37,80 | 180,00 | 20,00 | 89,00 | 1,50 | 48,60 | 20,20 | 35,300 | 441,600 | 23,80 | 5,980 | 157,00 | 68,00 | 102,3300 | AC |
| Z-177K-10X | | | | | | | | 270,00 | 20,00 | 89,00 | 1,50 | 49,50 | 19,75 | 35,300 | 441,600 | 23,80 | 5,860 | 158,40 | 69,40 | 104,1200 | AC |
| Z-177K-11I | | | | | | | | 180,00 | 25,00 | 118,00 | 2,00 | 77,40 | 20,30 | 35,300 | 441,600 | 22,90 | 3,640 | 229,50 | 111,50 | 159,7800 | AC |
| Z-177K-11X | | | | | | | | 270,00 | 25,00 | 118,00 | 2,00 | 78,30 | 19,85 | 35,300 | 441,600 | 22,90 | 3,600 | 230,90 | 112,90 | 161,5700 | AC |
| Z-177K-01I | 180,00 | 32,00 | 154,00 | 2,00 | | | | 113,40 | 20,30 | 35,300 | 441,600 | 22,40 | 2,449 | 319,89 | 165,89 | 231,5900 | AD | | | | |
| Z-177K-01X | 270,00 | 32,00 | 154,00 | 2,00 | | | | 114,30 | 19,85 | 35,300 | 441,600 | 22,40 | 2,429 | 321,25 | 167,25 | 233,3800 | AD | | | | |
| Z-177K-02I | 180,00 | 35,00 | 179,00 | 2,50 | | | | 138,60 | 20,20 | 35,300 | 441,600 | 22,30 | 1,992 | 382,97 | 203,97 | 281,8500 | AD | | | | |
| Z-177K-02X | 270,00 | 35,00 | 179,00 | 2,50 | | | | 139,50 | 19,75 | 35,300 | 441,600 | 22,30 | 1,979 | 384,33 | 205,33 | 283,6500 | AD | | | | |
| Z-177K-03I | 180,00 | 38,00 | 205,00 | 2,50 | | | | 163,80 | 20,60 | 35,300 | 441,600 | 21,99 | 1,679 | 447,04 | 242,04 | 332,1000 | AE | | | | |
| Z-177K-03X | 270,00 | 39,00 | 205,00 | 2,50 | | | | 164,70 | 20,15 | 35,300 | 441,600 | 21,98 | 1,669 | 448,40 | 243,40 | 333,9000 | AE | | | | |
| Z-177K-04I | 180,00 | 41,00 | 230,00 | 2,50 | | | | 189,00 | 20,50 | 35,300 | 441,600 | 21,57 | 1,450 | 510,12 | 280,12 | 382,3854 | AE | | | | |
| Z-177K-04X | 270,00 | 41,00 | 230,00 | 2,50 | | | | 189,90 | 20,05 | 35,300 | 441,600 | 21,56 | 1,443 | 511,48 | 281,48 | 384,1806 | AE | | | | |
| Z-177LI | 25,00 | 0,35 | 30,80 | 180,00 | | | | 17,00 | 68,10 | 1,50 | 37,80 | 15,15 | 36,800 | 555,100 | 48,22 | 18,379 | 96,31 | 28,21 | 60,8737 | AA | |
| Z-177LX | | | | 270,00 | | | | 17,00 | 68,10 | 1,50 | 38,70 | 14,70 | 36,800 | 555,100 | 47,69 | 17,907 | 97,05 | 28,95 | 62,2264 | AA | |
| Z-177MI | | | | 180,00 | 22,00 | 89,70 | 1,50 | 59,40 | 15,15 | 36,800 | 555,100 | 41,32 | 11,264 | 135,72 | 46,02 | 93,3397 | AB | | | | |
| Z-177MX | | | | 270,00 | 22,00 | 89,70 | 1,50 | 60,30 | 14,70 | 36,800 | 555,100 | 41,17 | 11,086 | 136,46 | 46,76 | 94,6924 | AB | | | | |
| Z-177NI | | | | 180,00 | 27,00 | 122,00 | 2,00 | 91,80 | 15,10 | 36,800 | 555,100 | 37,39 | 7,126 | 194,75 | 72,75 | 142,0386 | AC | | | | |
| Z-177NX | | | | 270,00 | 27,00 | 122,00 | 2,00 | 92,70 | 14,65 | 36,800 | 555,100 | 37,31 | 7,054 | 195,49 | 73,49 | 143,3914 | AC | | | | |
| Z-177OI | | | | 180,00 | 34,00 | 176,00 | 2,50 | 145,80 | 15,10 | 36,800 | 555,100 | 34,38 | 4,420 | 293,28 | 117,28 | 223,2035 | AD | | | | |
| Z-177OX | | | | 270,00 | 35,00 | 176,00 | 2,50 | 146,70 | 14,65 | 36,800 | 555,100 | 34,34 | 4,392 | 294,03 | 118,03 | 224,5563 | AD | | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----------|----|
| Z-177PI | 3,60 | 25,00 | 0,35 | 30,80 | 180,00 | 42,00 | 248,00 | 2,50 | 217,80 | 15,10 | 36,800 | 555,100 | 32,65 | 2,934 | 424,65 | 176,65 | 331,4234 | AE | | | |
| Z-177PX | | | | | 270,00 | 42,00 | 248,00 | 2,50 | 218,70 | 14,65 | 36,800 | 555,100 | 32,63 | 2,922 | 425,41 | 177,41 | 332,7762 | AE | | | |
| Z-177QI | 18,00 | 0,40 | 23,80 | 180,00 | 16,00 | 56,90 | 1,10 | 37,80 | 9,55 | 72,000 | 739,600 | 104,19 | 60,321 | 67,97 | 11,07 | 40,9617 | AA | | | | |
| Z-177QX | | | | 270,00 | 16,00 | 56,90 | 1,10 | 38,70 | 9,10 | 72,000 | 739,600 | 102,95 | 58,774 | 68,26 | 11,36 | 41,8720 | AA | | | | |
| Z-177RI | | | | 180,00 | 20,00 | 78,50 | 1,50 | 59,40 | 9,55 | 72,000 | 739,600 | 88,09 | 36,971 | 96,56 | 18,06 | 62,8080 | AA | | | | |
| Z-177RX | | | | 270,00 | 21,00 | 78,50 | 1,50 | 60,30 | 9,10 | 72,000 | 739,600 | 87,74 | 36,384 | 96,85 | 18,35 | 63,7183 | AA | | | | |
| Z-177SI | | | | 180,00 | 26,00 | 111,00 | 2,00 | 91,80 | 9,60 | 72,000 | 739,600 | 78,91 | 23,390 | 139,55 | 28,55 | 95,5774 | AB | | | | |
| Z-177SX | | | | 270,00 | 26,00 | 111,00 | 2,00 | 92,70 | 9,15 | 72,000 | 739,600 | 78,73 | 23,150 | 139,84 | 28,84 | 96,4876 | AB | | | | |
| Z-177TI | | | | 180,00 | 33,00 | 165,00 | 2,50 | 145,80 | 9,60 | 72,000 | 739,600 | 71,88 | 14,508 | 211,03 | 46,03 | 150,1930 | AC | | | | |
| Z-177TX | | | | 270,00 | 33,00 | 165,00 | 2,50 | 146,70 | 9,15 | 72,000 | 739,600 | 71,80 | 14,420 | 211,32 | 46,32 | 151,1033 | AC | | | | |
| Z-177UI | | | | 180,00 | 40,00 | 237,00 | 2,50 | 217,80 | 9,60 | 72,000 | 739,600 | 67,84 | 9,631 | 306,34 | 69,34 | 223,0139 | AD | | | | |
| Z-177UX | | | | 270,00 | 40,00 | 237,00 | 2,50 | 218,70 | 9,15 | 72,000 | 739,600 | 67,82 | 9,591 | 306,63 | 69,63 | 223,9241 | AD | | | | |
| Z-178I | | | | 4,00 | 44,00 | 0,60 | 50,60 | 180,00 | 24,00 | 117,00 | 2,40 | 58,00 | 29,50 | 24,500 | 436,300 | 22,50 | 3,019 | 253,43 | 136,43 | 190,4181 | AD |
| Z-178X | | | | | | | | 270,00 | 24,00 | 117,00 | 2,40 | 59,00 | 29,00 | 24,500 | 436,300 | 22,50 | 2,964 | 255,96 | 138,96 | 193,5397 | AD |
| Z-178AI | 180,00 | 28,00 | 145,00 | | | | | 2,40 | 86,00 | 29,50 | 24,500 | 436,300 | 21,50 | 1,990 | 352,20 | 207,20 | 277,8231 | AF | | | |
| Z-178AX | 270,00 | 28,00 | 145,00 | | | | | 2,40 | 87,00 | 29,00 | 24,500 | 436,300 | 21,50 | 1,960 | 354,70 | 209,70 | 280,9447 | AF | | | |
| Z-179I | 180,00 | 34,00 | 173,00 | | | | | 3,00 | 114,00 | 29,50 | 24,500 | 436,300 | 21,20 | 1,482 | 450,92 | 277,92 | 365,2281 | AF | | | |
| Z-179X | 270,00 | 34,00 | 173,00 | | | | | 3,00 | 115,00 | 29,00 | 24,500 | 436,300 | 21,20 | 1,466 | 453,44 | 280,44 | 368,3497 | AF | | | |
| Z-180I | 180,00 | 41,00 | 225,00 | | | | | 3,00 | 166,00 | 29,50 | 24,500 | 436,300 | 20,92 | 1,006 | 634,30 | 409,30 | 527,5517 | AJ | | | |
| Z-180X | 270,00 | 41,00 | 225,00 | | | | | 3,00 | 167,00 | 29,00 | 24,500 | 436,300 | 20,90 | 1,000 | 636,82 | 411,82 | 530,6733 | AJ | | | |
| Z-181I | 180,00 | 44,00 | 249,00 | | | | | 3,00 | 190,00 | 29,50 | 24,500 | 436,300 | 20,51 | 0,876 | 718,93 | 469,93 | 602,4702 | AL | | | |
| Z-181X | 270,00 | 44,00 | 249,00 | | | | | 3,00 | 191,00 | 29,00 | 24,500 | 436,300 | 20,49 | 0,872 | 721,46 | 472,46 | 605,5919 | AL | | | |
| Z-182I | 180,00 | 47,00 | 277,00 | | | | | 4,00 | 218,00 | 29,50 | 24,500 | 436,300 | 20,19 | 0,762 | 817,67 | 540,67 | 689,8753 | AO | | | |
| Z-182X | 270,00 | 47,00 | 277,00 | | | | | 4,00 | 219,00 | 29,00 | 24,500 | 436,300 | 20,19 | 0,758 | 820,20 | 543,20 | 692,9969 | AO | | | |
| Z-183I | 180,00 | 51,00 | 309,00 | | | | | 4,00 | 250,00 | 29,50 | 24,500 | 436,300 | 19,99 | 0,663 | 930,52 | 621,52 | 789,7667 | AP | | | |
| Z-183X | 270,00 | 51,00 | 309,00 | | | | | 4,00 | 251,00 | 29,00 | 24,500 | 436,300 | 19,98 | 0,660 | 932,93 | 623,93 | 792,8883 | AP | | | |
| Z-184I | 180,00 | 54,00 | 341,00 | | | | | 4,00 | 282,00 | 29,50 | 24,500 | 436,300 | 19,81 | 0,586 | 1043,37 | 702,37 | 889,6581 | AR | | | |
| Z-184X | 270,00 | 54,00 | 341,00 | | | | | 4,00 | 283,00 | 29,00 | 24,500 | 436,300 | 19,80 | 0,584 | 1045,90 | 704,90 | 892,7797 | AR | | | |
| Z-185I | 180,00 | 57,00 | 373,00 | | | | | 4,00 | 314,00 | 29,50 | 24,500 | 436,300 | 19,65 | 0,526 | 1156,22 | 783,22 | 989,5496 | AT | | | |
| Z-185X | 270,00 | 57,00 | 373,00 | | | | | 4,00 | 315,00 | 29,00 | 24,500 | 436,300 | 19,64 | 0,524 | 1158,75 | 785,75 | 992,6712 | AT | | | |
| Z-186I | 36,00 | 0,50 | 42,50 | | | | | 180,00 | 21,00 | 104,00 | 2,00 | 58,00 | 23,00 | 34,300 | 528,100 | 32,38 | 5,896 | 187,76 | 83,76 | 152,3344 | AC |
| Z-186X | | | | | | | | 270,00 | 21,00 | 104,00 | 2,00 | 59,00 | 22,50 | 34,300 | 528,100 | 32,19 | 5,788 | 189,31 | 85,31 | 154,8317 | AC |
| Z-186AI | | | | | | | | 180,00 | 25,00 | 132,00 | 2,00 | 86,00 | 23,00 | 34,300 | 528,100 | 27,00 | 3,880 | 259,20 | 127,20 | 222,2585 | AC |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|--------|----------|----|
| RZ-177PI | 3,60 | 25,00 | 0,35 | 30,80 | 180,00 | 42,00 | 248,00 | 2,50 | 217,80 | 15,10 | 29,400 | 463,300 | 31,27 | 2,520 | 420,19 | 172,19 | 331,4234 | AH | | | |
| RZ-177PX | | | | | 270,00 | 42,00 | 248,00 | 2,50 | 218,70 | 14,65 | 29,400 | 463,300 | 31,26 | 2,510 | 420,91 | 172,91 | 332,7762 | AH | | | |
| RZ-177QI | 18,00 | 0,40 | 23,80 | 180,00 | 16,00 | 56,90 | 1,10 | 37,80 | 9,55 | 57,600 | 617,100 | 102,35 | 51,809 | 67,70 | 10,80 | 40,9617 | AD | | | | |
| RZ-177QX | | | | 270,00 | 16,00 | 56,90 | 1,10 | 38,70 | 9,10 | 57,600 | 617,100 | 101,12 | 50,481 | 67,99 | 11,09 | 41,8720 | AD | | | | |
| RZ-177RI | | | | 180,00 | 20,00 | 78,50 | 1,50 | 59,40 | 9,55 | 57,600 | 617,100 | 86,25 | 31,754 | 96,13 | 17,63 | 62,8080 | AD | | | | |
| RZ-177RX | | | | 270,00 | 21,00 | 78,50 | 1,50 | 60,30 | 9,10 | 57,600 | 617,100 | 85,90 | 31,250 | 96,41 | 17,91 | 63,7183 | AD | | | | |
| RZ-177SI | | | | 180,00 | 26,00 | 111,00 | 2,00 | 91,80 | 9,60 | 57,600 | 617,100 | 77,07 | 20,089 | 138,87 | 27,87 | 95,5774 | AE | | | | |
| RZ-177SX | | | | 270,00 | 26,00 | 111,00 | 2,00 | 92,70 | 9,15 | 57,600 | 617,100 | 76,89 | 19,886 | 139,15 | 28,15 | 96,4876 | AE | | | | |
| RZ-177TI | | | | 180,00 | 33,00 | 165,00 | 2,50 | 145,80 | 9,60 | 57,600 | 617,100 | 70,05 | 12,460 | 209,93 | 44,93 | 150,1930 | AF | | | | |
| RZ-177TX | | | | 270,00 | 33,00 | 165,00 | 2,50 | 146,70 | 9,15 | 57,600 | 617,100 | 69,97 | 12,382 | 210,21 | 45,21 | 151,1033 | AF | | | | |
| RZ-177UI | | | | 180,00 | 40,00 | 237,00 | 2,50 | 217,80 | 9,60 | 57,600 | 617,100 | 66,01 | 8,272 | 304,67 | 67,67 | 223,0139 | AG | | | | |
| RZ-177UX | | | | 270,00 | 40,00 | 237,00 | 2,50 | 218,70 | 9,15 | 57,600 | 617,100 | 65,98 | 8,237 | 304,96 | 67,96 | 223,9241 | AG | | | | |
| RZ-178I | | | | 4,00 | 44,00 | 0,60 | 50,60 | 180,00 | 24,00 | 117,00 | 2,40 | 58,00 | 29,50 | 19,600 | 366,500 | 24,63 | 2,593 | 250,83 | 133,83 | 190,4181 | AG |
| RZ-178X | | | | | | | | 270,00 | 24,00 | 117,00 | 2,40 | 59,00 | 29,00 | 19,600 | 366,500 | 24,48 | 2,545 | 253,30 | 136,30 | 193,5397 | AG |
| RZ-178AI | 180,00 | 28,00 | 145,00 | | | | | 2,40 | 86,00 | 29,50 | 19,600 | 366,500 | 21,50 | 1,707 | 348,20 | 203,20 | 277,8231 | AH | | | |
| RZ-178AX | 270,00 | 28,00 | 145,00 | | | | | 2,40 | 87,00 | 29,00 | 19,600 | 366,500 | 21,50 | 1,687 | 350,70 | 205,70 | 280,9447 | AH | | | |
| RZ-179I | 180,00 | 34,00 | 173,00 | | | | | 3,00 | 114,00 | 29,50 | 19,600 | 366,500 | 21,14 | 1,273 | 445,61 | 272,61 | 365,2281 | AJ | | | |
| RZ-179X | 270,00 | 34,00 | 173,00 | | | | | 3,00 | 115,00 | 29,00 | 19,600 | 366,500 | 21,10 | 1,261 | 448,09 | 275,09 | 368,3497 | AJ | | | |
| RZ-180I | 180,00 | 41,00 | 225,00 | | | | | 3,00 | 166,00 | 29,50 | 19,600 | 366,500 | 19,88 | 0,864 | 626,48 | 401,48 | 527,5517 | AM | | | |
| RZ-180X | 270,00 | 41,00 | 225,00 | | | | | 3,00 | 167,00 | 29,00 | 19,600 | 366,500 | 19,86 | 0,859 | 628,95 | 403,95 | 530,6733 | AM | | | |
| RZ-181I | 180,00 | 44,00 | 249,00 | | | | | 3,00 | 190,00 | 29,50 | 19,600 | 366,500 | 19,46 | 0,753 | 709,95 | 460,95 | 602,4702 | AO | | | |
| RZ-181X | 270,00 | 44,00 | 249,00 | | | | | 3,00 | 191,00 | 29,00 | 19,600 | 366,500 | 19,45 | 0,749 | 712,43 | 463,43 | 605,5919 | AO | | | |
| RZ-182I | 180,00 | 47,00 | 277,00 | | | | | 4,00 | 218,00 | 29,50 | 19,600 | 366,500 | 19,15 | 0,654 | 807,34 | 530,34 | 689,8753 | AR | | | |
| RZ-182X | 270,00 | 47,00 | 277,00 | | | | | 4,00 | 219,00 | 29,00 | 19,600 | 366,500 | 19,14 | 0,651 | 809,74 | 532,74 | 692,9969 | AR | | | |
| RZ-183I | 180,00 | 51,00 | 309,00 | | | | | 4,00 | 250,00 | 29,50 | 19,600 | 366,500 | 18,94 | 0,569 | 918,55 | 609,55 | 789,7667 | AS | | | |
| RZ-183X | 270,00 | 51,00 | 309,00 | | | | | 4,00 | 251,00 | 29,00 | 19,600 | 366,500 | 18,94 | 0,567 | 921,03 | 612,03 | 792,8883 | AS | | | |
| RZ-184I | 180,00 | 54,00 | 341,00 | | | | | 4,00 | 282,00 | 29,50 | 19,600 | 366,500 | 18,76 | 0,504 | 1029,95 | 688,95 | 889,6581 | AU | | | |
| RZ-184X | 270,00 | 54,00 | 341,00 | | | | | 4,00 | 283,00 | 29,00 | 19,600 | 366,500 | 18,76 | 0,502 | 1032,43 | 691,43 | 892,7797 | AU | | | |
| RZ-185I | 180,00 | 57,00 | 373,00 | | | | | 4,00 | 314,00 | 29,50 | 19,600 | 366,500 | 18,60 | 0,452 | 1141,26 | 768,26 | 989,5496 | AX | | | |
| RZ-185X | 270,00 | 57,00 | 373,00 | | | | | 4,00 | 315,00 | 29,00 | 19,600 | 366,500 | 18,60 | 0,450 | 1143,73 | 770,73 | 992,6712 | AX | | | |
| RZ-186I | 36,00 | 0,50 | 42,50 | | | | | 180,00 | 21,00 | 104,00 | 2,00 | 58,00 | 23,00 | 27,500 | 443,600 | 31,11 | 5,064 | 186,19 | 82,19 | 152,3344 | AE |
| RZ-186X | | | | | | | | 270,00 | 21,00 | 104,00 | 2,00 | 59,00 | 22,50 | 27,500 | 443,600 | 30,92 | 4,972 | 187,71 | 83,71 | 154,8317 | AE |
| RZ-186AI | | | | | | | | 180,00 | 25,00 | 132,00 | 2,00 | 86,00 | 23,00 | 27,500 | 443,600 | 27,00 | 3,335 | 256,80 | 124,80 | 222,2585 | AF |

Extension springs

Stainless steel X10CrNi188

no. 1.4310 (A301, BS 301S21)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|-------|----------|----|
| RZ-186AX | 4,00 | 36,00 | 0,50 | 42,50 | 270,00 | 25,00 | 132,00 | 2,00 | 87,00 | 22,50 | 27,500 | 443,600 | 27,00 | 3,294 | 258,30 | 126,30 | 224,7557 | AF | | | |
| RZ-187I | | | | | 180,00 | 30,00 | 160,00 | 2,00 | 114,00 | 23,00 | 27,500 | 443,600 | 26,65 | 2,486 | 327,42 | 167,42 | 292,1825 | AG | | | |
| RZ-187X | | | | | 270,00 | 30,00 | 160,00 | 2,00 | 115,00 | 22,50 | 27,500 | 443,600 | 26,60 | 2,463 | 328,94 | 168,94 | 294,6797 | AG | | | |
| RZ-188I | | | | | 180,00 | 37,00 | 212,00 | 2,50 | 166,00 | 23,00 | 27,500 | 443,600 | 25,03 | 1,688 | 458,57 | 246,57 | 422,0413 | AL | | | |
| RZ-188X | | | | | 270,00 | 37,00 | 212,00 | 2,50 | 167,00 | 22,50 | 27,500 | 443,600 | 25,01 | 1,678 | 460,09 | 248,09 | 424,5386 | AM | | | |
| RZ-189I | | | | | 180,00 | 39,00 | 236,00 | 2,50 | 190,00 | 23,00 | 27,500 | 443,600 | 24,51 | 1,470 | 519,10 | 283,10 | 481,9762 | AN | | | |
| RZ-189X | | | | | 270,00 | 39,00 | 236,00 | 2,50 | 191,00 | 22,50 | 27,500 | 443,600 | 24,49 | 1,462 | 520,62 | 284,62 | 484,4735 | AN | | | |
| RZ-190I | | | | | 180,00 | 42,00 | 264,00 | 3,00 | 218,00 | 23,00 | 27,500 | 443,600 | 24,10 | 1,278 | 589,71 | 325,71 | 551,9002 | AO | | | |
| RZ-190X | | | | | 270,00 | 42,00 | 264,00 | 3,00 | 219,00 | 22,50 | 27,500 | 443,600 | 24,09 | 1,272 | 591,23 | 327,23 | 554,3975 | AO | | | |
| RZ-191I | | | | | 180,00 | 45,00 | 296,00 | 3,00 | 250,00 | 23,00 | 27,500 | 443,600 | 23,84 | 1,112 | 670,42 | 374,42 | 631,8134 | AP | | | |
| RZ-191X | | | | | 270,00 | 45,00 | 296,00 | 3,00 | 251,00 | 22,50 | 27,500 | 443,600 | 23,83 | 1,107 | 671,94 | 375,94 | 634,3106 | AP | | | |
| RZ-192I | | | | | 180,00 | 48,00 | 328,00 | 3,00 | 282,00 | 23,00 | 27,500 | 443,600 | 23,61 | 0,984 | 751,10 | 423,10 | 711,7265 | AR | | | |
| RZ-192X | | | | | 270,00 | 48,00 | 328,00 | 3,00 | 283,00 | 22,50 | 27,500 | 443,600 | 23,60 | 0,980 | 752,64 | 424,64 | 714,2238 | AR | | | |
| RZ-193I | | | | | 180,00 | 51,00 | 360,00 | 3,00 | 314,00 | 23,00 | 27,500 | 443,600 | 23,41 | 0,882 | 831,83 | 471,83 | 791,6397 | AS | | | |
| RZ-193X | | | | | 270,00 | 51,00 | 360,00 | 3,00 | 315,00 | 22,50 | 27,500 | 443,600 | 23,40 | 0,879 | 833,35 | 473,35 | 794,1369 | AS | | | |
| RZ-194I | | | | | 29,00 | 0,35 | 35,40 | 180,00 | 20,00 | 93,60 | 1,50 | 58,00 | 17,80 | 35,200 | 542,500 | 45,48 | 10,619 | 141,38 | 47,78 | 119,0113 | AF |
| RZ-194X | | | | | | | | 270,00 | 20,00 | 93,60 | 1,50 | 59,00 | 17,30 | 35,200 | 542,500 | 45,19 | 10,426 | 142,27 | 48,67 | 120,9623 | AF |
| RZ-194AI | | | | | | | | 180,00 | 23,00 | 121,00 | 2,00 | 86,00 | 17,50 | 35,200 | 542,500 | 38,80 | 6,993 | 193,50 | 72,50 | 173,6394 | AF |
| RZ-194AX | | | | | | | | 270,00 | 23,00 | 121,00 | 2,00 | 87,00 | 17,00 | 35,200 | 542,500 | 38,80 | 6,909 | 194,40 | 73,40 | 175,5904 | AF |
| RZ-195I | | | | | | | | 180,00 | 29,00 | 149,00 | 2,00 | 114,00 | 17,50 | 35,200 | 542,500 | 38,66 | 5,213 | 246,33 | 97,33 | 228,2675 | AG |
| RZ-195X | 270,00 | 29,00 | 149,00 | 2,00 | | | | 115,00 | 17,00 | 35,200 | 542,500 | 38,59 | 5,166 | 247,22 | 98,22 | 230,2186 | AG | | | | |
| RZ-196I | 180,00 | 35,00 | 201,00 | 2,50 | | | | 166,00 | 17,50 | 35,200 | 542,500 | 36,20 | 3,540 | 344,35 | 143,35 | 329,7198 | AH | | | | |
| RZ-196X | 270,00 | 35,00 | 201,00 | 2,50 | | | | 167,00 | 17,00 | 35,200 | 542,500 | 36,16 | 3,518 | 345,23 | 144,23 | 331,6708 | AH | | | | |
| RZ-197I | 180,00 | 38,00 | 225,00 | 2,50 | | | | 190,00 | 17,50 | 35,200 | 542,500 | 35,39 | 3,083 | 389,58 | 164,58 | 376,5439 | AJ | | | | |
| RZ-197X | 270,00 | 38,00 | 225,00 | 2,50 | | | | 191,00 | 17,00 | 35,200 | 542,500 | 35,36 | 3,067 | 390,47 | 165,47 | 378,4949 | AJ | | | | |
| RZ-198I | 180,00 | 40,00 | 253,00 | 3,00 | | | | 218,00 | 17,50 | 35,200 | 542,500 | 34,78 | 2,680 | 442,36 | 189,36 | 431,1720 | AM | | | | |
| RZ-198X | 270,00 | 40,00 | 253,00 | 3,00 | | | | 219,00 | 17,00 | 35,200 | 542,500 | 34,76 | 2,667 | 443,25 | 190,25 | 433,1230 | AM | | | | |
| RZ-199I | 180,00 | 43,00 | 285,00 | 3,00 | | | | 250,00 | 17,50 | 35,200 | 542,500 | 34,38 | 2,331 | 502,68 | 217,68 | 493,6042 | AN | | | | |
| RZ-199X | 270,00 | 43,00 | 285,00 | 3,00 | | | | 251,00 | 17,00 | 35,200 | 542,500 | 34,36 | 2,322 | 503,56 | 218,56 | 495,5552 | AN | | | | |
| RZ-200I | 180,00 | 46,00 | 317,00 | 3,00 | | | | 282,00 | 17,50 | 35,200 | 542,500 | 34,03 | 2,063 | 562,99 | 245,99 | 556,0363 | AO | | | | |
| RZ-200X | 270,00 | 46,00 | 317,00 | 3,00 | | | | 283,00 | 17,00 | 35,200 | 542,500 | 34,02 | 2,055 | 563,88 | 246,88 | 557,9873 | AO | | | | |
| RZ-201I | 180,00 | 49,00 | 349,00 | 3,00 | | | | 314,00 | 17,50 | 35,200 | 542,500 | 33,71 | 1,850 | 623,31 | 274,31 | 618,4685 | AP | | | | |
| RZ-201X | 270,00 | 49,00 | 349,00 | 3,00 | | | | 315,00 | 17,00 | 35,200 | 542,500 | 33,00 | 1,844 | 624,19 | 275,19 | 620,4195 | AP | | | | |

Extension springs

| artitel number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|----------|----|
| Z-186AX | 4,00 | 36,00 | 0,50 | 42,50 | 270,00 | 25,00 | 132,00 | 2,00 | 87,00 | 22,50 | 34,300 | 528,100 | 27,00 | 3,840 | 260,70 | 128,70 | 224,7557 | AC | | | |
| Z-187I | | | | | 180,00 | 30,00 | 160,00 | 2,00 | 114,00 | 23,00 | 34,300 | 528,100 | 26,60 | 2,894 | 330,63 | 170,63 | 292,1825 | AD | | | |
| Z-187X | | | | | 270,00 | 30,00 | 160,00 | 2,00 | 115,00 | 22,50 | 34,300 | 528,100 | 26,60 | 2,868 | 332,10 | 172,10 | 294,6797 | AD | | | |
| Z-188I | | | | | 180,00 | 37,00 | 212,00 | 2,50 | 166,00 | 23,00 | 34,300 | 528,100 | 26,20 | 1,965 | 463,29 | 251,29 | 422,0413 | AJ | | | |
| Z-188X | | | | | 270,00 | 37,00 | 212,00 | 2,50 | 167,00 | 22,50 | 34,300 | 528,100 | 26,20 | 1,953 | 464,84 | 252,84 | 424,5386 | AJ | | | |
| Z-189I | | | | | 180,00 | 39,00 | 236,00 | 2,50 | 190,00 | 23,00 | 34,300 | 528,100 | 25,77 | 1,712 | 524,51 | 288,51 | 481,9762 | AK | | | |
| Z-189X | | | | | 270,00 | 39,00 | 236,00 | 2,50 | 191,00 | 22,50 | 34,300 | 528,100 | 25,75 | 1,702 | 526,07 | 290,07 | 484,4735 | AK | | | |
| Z-190I | | | | | 180,00 | 42,00 | 264,00 | 3,00 | 218,00 | 23,00 | 34,300 | 528,100 | 25,37 | 1,488 | 595,95 | 331,95 | 551,9002 | AL | | | |
| Z-190X | | | | | 270,00 | 42,00 | 264,00 | 3,00 | 219,00 | 22,50 | 34,300 | 528,100 | 25,36 | 1,481 | 597,50 | 333,50 | 554,3975 | AL | | | |
| Z-191I | | | | | 180,00 | 45,00 | 296,00 | 3,00 | 250,00 | 23,00 | 34,300 | 528,100 | 25,11 | 1,294 | 677,58 | 381,58 | 631,8134 | AM | | | |
| Z-191X | | | | | 270,00 | 45,00 | 296,00 | 3,00 | 251,00 | 22,50 | 34,300 | 528,100 | 25,10 | 1,289 | 679,13 | 383,13 | 634,3106 | AM | | | |
| Z-192I | | | | | 180,00 | 48,00 | 328,00 | 3,00 | 282,00 | 23,00 | 34,300 | 528,100 | 24,88 | 1,145 | 759,22 | 431,22 | 711,7265 | AO | | | |
| Z-192X | | | | | 270,00 | 48,00 | 328,00 | 3,00 | 283,00 | 22,50 | 34,300 | 528,100 | 24,87 | 1,141 | 760,77 | 432,77 | 714,2238 | AO | | | |
| Z-193I | | | | | 180,00 | 51,00 | 360,00 | 3,00 | 314,00 | 23,00 | 34,300 | 528,100 | 24,67 | 1,027 | 840,86 | 480,86 | 791,6397 | AP | | | |
| Z-193X | | | | | 270,00 | 51,00 | 360,00 | 3,00 | 315,00 | 22,50 | 34,300 | 528,100 | 24,67 | 1,024 | 842,86 | 482,86 | 794,1369 | AP | | | |
| Z-194I | | | | | 29,00 | 0,35 | 35,40 | 180,00 | 20,00 | 93,60 | 1,50 | 58,00 | 17,80 | 44,000 | 645,800 | 42,50 | 12,364 | 142,28 | 48,68 | 119,0113 | AC |
| Z-194X | | | | | | | | 270,00 | 20,00 | 93,60 | 1,50 | 59,00 | 17,30 | 44,000 | 645,800 | 42,50 | 12,139 | 143,18 | 49,58 | 120,9623 | AC |
| Z-194AI | | | | | | | | 180,00 | 23,00 | 121,00 | 2,00 | 86,00 | 17,50 | 44,000 | 645,800 | 38,80 | 8,140 | 194,90 | 73,90 | 173,6394 | AD |
| Z-194AX | | | | | | | | 270,00 | 23,00 | 121,00 | 2,00 | 87,00 | 17,00 | 44,000 | 645,800 | 38,80 | 8,040 | 195,80 | 74,80 | 175,5904 | AD |
| Z-195I | | | | | | | | 180,00 | 29,00 | 149,00 | 2,00 | 114,00 | 17,50 | 44,000 | 645,800 | 38,20 | 6,070 | 248,17 | 99,17 | 228,2675 | AD |
| Z-195X | 270,00 | 29,00 | 149,00 | 2,00 | | | | 115,00 | 17,00 | 44,000 | 645,800 | 38,20 | 6,015 | 249,05 | 100,05 | 230,2186 | AD | | | | |
| Z-196I | 180,00 | 35,00 | 201,00 | 2,50 | | | | 166,00 | 17,50 | 44,000 | 645,800 | 37,75 | 4,121 | 347,05 | 146,05 | 329,7198 | AE | | | | |
| Z-196X | 270,00 | 35,00 | 201,00 | 2,50 | | | | 167,00 | 17,00 | 44,000 | 645,800 | 37,71 | 4,096 | 347,95 | 146,95 | 331,6708 | AE | | | | |
| Z-197I | 180,00 | 38,00 | 225,00 | 2,50 | | | | 190,00 | 17,50 | 44,000 | 645,800 | 36,94 | 3,590 | 392,68 | 167,68 | 376,5439 | AF | | | | |
| Z-197X | 270,00 | 38,00 | 225,00 | 2,50 | | | | 191,00 | 17,00 | 44,000 | 645,800 | 36,91 | 3,570 | 393,58 | 168,58 | 378,4949 | AF | | | | |
| Z-198I | 180,00 | 40,00 | 253,00 | 3,00 | | | | 218,00 | 17,50 | 44,000 | 645,800 | 36,32 | 3,120 | 445,92 | 192,92 | 431,1720 | AJ | | | | |
| Z-198X | 270,00 | 40,00 | 253,00 | 3,00 | | | | 219,00 | 17,00 | 44,000 | 645,800 | 36,31 | 3,105 | 446,81 | 193,81 | 433,1230 | AJ | | | | |
| Z-199I | 180,00 | 43,00 | 285,00 | 3,00 | | | | 250,00 | 17,50 | 44,000 | 645,800 | 35,93 | 2,714 | 506,77 | 221,77 | 493,6042 | AK | | | | |
| Z-199X | 270,00 | 43,00 | 285,00 | 3,00 | | | | 251,00 | 17,00 | 44,000 | 645,800 | 35,91 | 2,703 | 507,67 | 222,67 | 495,5552 | AK | | | | |
| Z-200I | 180,00 | 46,00 | 317,00 | 3,00 | | | | 282,00 | 17,50 | 44,000 | 645,800 | 35,57 | 2,403 | 567,62 | 250,62 | 556,0363 | AL | | | | |
| Z-200X | 270,00 | 46,00 | 317,00 | 3,00 | | | | 283,00 | 17,00 | 44,000 | 645,800 | 35,56 | 2,393 | 568,52 | 251,52 | 557,9873 | AL | | | | |
| Z-201I | 180,00 | 49,00 | 349,00 | 3,00 | | | | 314,00 | 17,50 | 44,000 | 645,800 | 35,26 | 2,154 | 628,38 | 279,38 | 618,4685 | AM | | | | |
| Z-201X | 270,00 | 49,00 | 349,00 | 3,00 | | | | 315,00 | 17,00 | 44,000 | 645,800 | 35,25 | 2,147 | 629,37 | 280,37 | 620,4195 | AM | | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|--------|----------|----|
| Z-2021 | 4,00 | 24,00 | 0,35 | 30,40 | 180,00 | 20,00 | 85,60 | 1,50 | 58,00 | 13,80 | 68,800 | 765,700 | 60,50 | 24,148 | 114,47 | 28,87 | 95,2090 | AB | | | | |
| Z-202X | | | | | 270,00 | 20,00 | 85,60 | 1,50 | 59,00 | 13,30 | 68,800 | 765,700 | 60,50 | 23,709 | 115,00 | 29,40 | 96,7698 | AB | | | | |
| Z-202AI | | | | | 180,00 | 23,00 | 113,50 | 2,00 | 86,00 | 13,75 | 68,800 | 765,700 | 57,80 | 15,900 | 157,30 | 43,80 | 138,9115 | AB | | | | |
| Z-202AX | | | | | 270,00 | 23,00 | 113,50 | 2,00 | 87,00 | 13,25 | 68,800 | 765,700 | 57,80 | 15,710 | 157,90 | 44,40 | 140,4723 | AB | | | | |
| Z-203I | | | | | 180,00 | 28,00 | 141,00 | 2,00 | 114,00 | 13,50 | 68,800 | 765,700 | 56,80 | 11,855 | 199,80 | 58,80 | 182,6140 | AC | | | | |
| Z-203X | | | | | 270,00 | 28,00 | 141,00 | 2,00 | 115,00 | 13,00 | 68,800 | 765,700 | 56,80 | 11,748 | 200,33 | 59,33 | 184,1748 | AC | | | | |
| Z-204I | | | | | 180,00 | 34,00 | 193,00 | 2,50 | 166,00 | 13,50 | 68,800 | 765,700 | 55,80 | 8,049 | 279,58 | 86,58 | 263,7758 | AD | | | | |
| Z-204X | | | | | 270,00 | 34,00 | 193,00 | 2,50 | 167,00 | 13,00 | 68,800 | 765,700 | 55,80 | 8,000 | 280,11 | 87,11 | 265,3366 | AD | | | | |
| Z-205I | | | | | 180,00 | 36,00 | 217,00 | 2,50 | 190,00 | 13,50 | 68,800 | 765,700 | 54,75 | 7,011 | 316,40 | 99,40 | 301,2351 | AD | | | | |
| Z-205X | | | | | 270,00 | 37,00 | 217,00 | 2,50 | 191,00 | 13,00 | 68,800 | 765,700 | 54,70 | 6,973 | 316,94 | 99,94 | 302,7959 | AD | | | | |
| Z-206I | | | | | 180,00 | 39,00 | 245,00 | 2,50 | 218,00 | 13,50 | 68,800 | 765,700 | 53,77 | 6,093 | 359,37 | 114,37 | 344,9376 | AE | | | | |
| Z-206X | | | | | 270,00 | 39,00 | 245,00 | 2,50 | 219,00 | 13,00 | 68,800 | 765,700 | 53,75 | 6,065 | 359,90 | 114,90 | 346,4984 | AE | | | | |
| Z-207I | | | | | 180,00 | 42,00 | 277,00 | 3,00 | 250,00 | 13,50 | 68,800 | 765,700 | 53,13 | 5,301 | 408,46 | 131,46 | 394,8833 | AE | | | | |
| Z-207X | | | | | 270,00 | 42,00 | 277,00 | 3,00 | 251,00 | 13,00 | 68,800 | 765,700 | 53,11 | 5,279 | 409,01 | 132,01 | 396,4442 | AE | | | | |
| Z-208I | | | | | 180,00 | 45,00 | 309,00 | 3,00 | 282,00 | 13,50 | 68,800 | 765,700 | 52,58 | 4,691 | 457,56 | 148,56 | 444,8291 | AJ | | | | |
| Z-208X | | | | | 270,00 | 45,00 | 309,00 | 3,00 | 283,00 | 13,00 | 68,800 | 765,700 | 52,56 | 4,674 | 458,10 | 149,10 | 446,3899 | AJ | | | | |
| Z-209I | | | | | 180,00 | 47,00 | 341,00 | 3,00 | 314,00 | 13,50 | 68,800 | 765,700 | 52,08 | 4,206 | 506,69 | 165,69 | 494,7748 | AK | | | | |
| Z-209X | | | | | 270,00 | 47,00 | 341,00 | 3,00 | 315,00 | 13,00 | 68,800 | 765,700 | 52,06 | 4,193 | 507,20 | 166,20 | 496,3356 | AK | | | | |
| Z-209AI | | | | | 4,50 | 60,00 | 1,00 | 68,00 | 180,00 | 27,00 | 143,00 | 2,40 | 60,75 | 41,13 | 21,000 | 438,000 | 23,80 | 1,960 | 356,30 | 213,30 | 312,4577 | AK |
| Z-209AX | | | | | | | | | 270,00 | 27,00 | 143,00 | 2,40 | 61,88 | 40,56 | 21,000 | 438,000 | 23,80 | 1,920 | 360,60 | 217,60 | 317,9637 | AK |
| Z-209BI | 180,00 | 35,00 | 180,00 | 3,00 | | | | | 96,75 | 41,63 | 21,000 | 438,000 | 22,90 | 1,190 | 529,80 | 349,80 | 487,8725 | AK | | | | |
| Z-209BX | 270,00 | 35,00 | 180,00 | 3,00 | | | | | 97,88 | 41,60 | 21,000 | 438,000 | 22,90 | 1,180 | 534,10 | 354,10 | 493,3786 | AK | | | | |
| Z-209CI | 180,00 | 40,00 | 212,00 | 3,00 | | | | | 128,25 | 41,88 | 21,000 | 438,000 | 22,50 | 0,890 | 681,30 | 469,30 | 641,3605 | AL | | | | |
| Z-209CX | 270,00 | 40,00 | 212,00 | 3,00 | | | | | 129,98 | 41,01 | 21,000 | 438,000 | 22,50 | 0,880 | 687,80 | 475,80 | 649,7901 | AL | | | | |
| Z-209DI | 180,00 | 43,00 | 239,00 | 3,00 | | | | | 155,25 | 41,88 | 21,000 | 438,000 | 22,40 | 0,730 | 810,70 | 571,70 | 772,9216 | AL | | | | |
| Z-209DX | 270,00 | 43,00 | 239,00 | 3,00 | | | | | 156,38 | 41,31 | 21,000 | 438,000 | 22,40 | 0,720 | 815,00 | 576,00 | 778,4277 | AL | | | | |
| Z-209EI | 180,00 | 47,00 | 270,00 | 4,00 | | | | | 186,75 | 41,60 | 21,000 | 438,000 | 22,20 | 0,600 | 961,10 | 691,10 | 926,4096 | AN | | | | |
| Z-209EX | 270,00 | 47,00 | 270,00 | 4,00 | | | | | 187,88 | 41,00 | 21,000 | 438,000 | 22,20 | 0,600 | 965,40 | 695,40 | 931,9157 | AN | | | | |
| Z-209GI | 180,00 | 50,00 | 295,00 | 4,00 | | | | | 213,75 | 40,60 | 21,000 | 438,000 | 22,10 | 0,530 | 1088,50 | 793,50 | 1057,9707 | AN | | | | |
| Z-209GX | 270,00 | 50,00 | 295,00 | 4,00 | | | | | 214,88 | 40,00 | 21,000 | 438,000 | 22,10 | 0,520 | 1092,80 | 797,80 | 1063,4768 | AN | | | | |
| Z-209HI | 180,00 | 54,00 | 329,00 | 4,00 | | | | | 245,25 | 41,90 | 21,000 | 438,000 | 22,00 | 0,460 | 1242,00 | 913,00 | 1211,4587 | AR | | | | |
| Z-209HX | 270,00 | 54,00 | 329,00 | 4,00 | | | | | 246,38 | 41,30 | 21,000 | 438,000 | 22,00 | 0,450 | 1246,20 | 917,20 | 1216,9648 | AR | | | | |
| Z-209JI | 180,00 | 60,00 | 365,00 | 4,00 | | | | | 281,25 | 41,90 | 21,000 | 438,000 | 21,90 | 0,390 | 1414,50 | 1049,50 | 1386,8735 | AR | | | | |

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|
| RZ-2021 | 4,00 | 24,00 | 0,35 | 30,40 | 180,00 | 20,00 | 85,60 | 1,50 | 58,00 | 13,80 | 55,000 | 643,300 | 68,92 | 20,741 | 113,97 | 28,37 | 95,2090 | AE |
| RZ-202X | | | | | 270,00 | 20,00 | 85,60 | 1,50 | 59,00 | 13,30 | 55,000 | 643,300 | 68,46 | 20,364 | 114,49 | 28,89 | 96,7698 | AE |
| RZ-202AI | | | | | 180,00 | 23,00 | 113,50 | 2,00 | 86,00 | 13,75 | 55,000 | 643,300 | 58,90 | 13,659 | 156,60 | 43,10 | 138,9115 | AE |
| RZ-202AX | | | | | 270,00 | 23,00 | 113,50 | 2,00 | 87,00 | 13,25 | 55,000 | 643,300 | 58,90 | 13,494 | 157,10 | 43,60 | 140,4723 | AE |
| RZ-203I | | | | | 180,00 | 28,00 | 141,00 | 2,00 | 114,00 | 13,50 | 55,000 | 643,300 | 58,10 | 10,182 | 198,79 | 57,79 | 182,6140 | AF |
| RZ-203X | | | | | 270,00 | 28,00 | 141,00 | 2,00 | 115,00 | 13,00 | 55,000 | 643,300 | 57,98 | 10,090 | 199,31 | 58,31 | 184,1748 | AF |
| RZ-204I | | | | | 180,00 | 34,00 | 193,00 | 2,50 | 166,00 | 13,50 | 55,000 | 643,300 | 54,19 | 6,914 | 278,11 | 85,11 | 263,7758 | AG |
| RZ-204X | | | | | 270,00 | 34,00 | 193,00 | 2,50 | 167,00 | 13,00 | 55,000 | 643,300 | 54,13 | 6,871 | 278,63 | 85,63 | 265,3366 | AG |
| RZ-205I | | | | | 180,00 | 36,00 | 217,00 | 2,50 | 190,00 | 13,50 | 55,000 | 643,300 | 52,91 | 6,022 | 314,71 | 97,71 | 301,2351 | AG |
| RZ-205X | | | | | 270,00 | 37,00 | 217,00 | 2,50 | 191,00 | 13,00 | 55,000 | 643,300 | 52,86 | 5,989 | 315,24 | 98,24 | 302,7959 | AG |
| RZ-206I | | | | | 180,00 | 39,00 | 245,00 | 2,50 | 218,00 | 13,50 | 55,000 | 643,300 | 51,93 | 5,234 | 357,42 | 112,42 | 344,9376 | AH |
| RZ-206X | | | | | 270,00 | 39,00 | 245,00 | 2,50 | 219,00 | 13,00 | 55,000 | 643,300 | 51,91 | 5,209 | 357,95 | 112,95 | 346,4984 | AH |
| RZ-207I | | | | | 180,00 | 42,00 | 277,00 | 3,00 | 250,00 | 13,50 | 55,000 | 643,300 | 51,29 | 4,553 | 406,23 | 129,23 | 394,8833 | AH |
| RZ-207X | | | | | 270,00 | 42,00 | 277,00 | 3,00 | 251,00 | 13,00 | 55,000 | 643,300 | 51,28 | 4,534 | 406,76 | 129,76 | 396,4442 | AH |
| RZ-208I | | | | | 180,00 | 45,00 | 309,00 | 3,00 | 282,00 | 13,50 | 55,000 | 643,300 | 50,74 | 4,029 | 455,05 | 146,05 | 444,8291 | AM |
| RZ-208X | | | | | 270,00 | 45,00 | 309,00 | 3,00 | 283,00 | 13,00 | 55,000 | 643,300 | 50,72 | 4,014 | 455,57 | 146,57 | 446,3899 | AM |
| RZ-209I | | | | | 180,00 | 47,00 | 341,00 | 3,00 | 314,00 | 13,50 | 55,000 | 643,300 | 50,24 | 3,613 | 503,86 | 162,86 | 494,7748 | AN |
| RZ-209X | | | | | 270,00 | 47,00 | 341,00 | 3,00 | 315,00 | 13,00 | 55,000 | 643,300 | 50,23 | 3,601 | 504,38 | 163,38 | 496,3356 | AN |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|----------|----|
| Z-209JX | 4,50 | 60,00 | 1,00 | 68,00 | 270,00 | 60,00 | 365,00 | 4,00 | 282,38 | 41,30 | 21,000 | 438,000 | 21,90 | 0,390 | 1418,80 | 1053,80 | 1392,3796 | AR | | |
| Z-209KI | | | | | 180,00 | 63,00 | 401,00 | 6,00 | 317,25 | 41,90 | 21,000 | 438,000 | 21,80 | 0,350 | 1587,00 | 1186,00 | 1562,2883 | AT | | |
| Z-209KX | | | | | 270,00 | 63,00 | 401,00 | 6,00 | 318,38 | 41,30 | 21,000 | 438,000 | 21,80 | 0,350 | 1591,30 | 1190,30 | 1567,7944 | AT | | |
| Z-209LI | 50,00 | 0,80 | 57,60 | 180,00 | 22,00 | 126,00 | 2,40 | 60,75 | 32,60 | 28,000 | 532,300 | 27,10 | 3,550 | 268,10 | 142,10 | 256,1590 | AG | | | |
| Z-209LX | | | | 270,00 | 22,00 | 126,00 | 2,40 | 61,88 | 32,00 | 28,000 | 532,300 | 27,10 | 3,480 | 271,00 | 145,00 | 260,6730 | AG | | | |
| Z-209MI | | | | 180,00 | 28,00 | 162,00 | 3,00 | 96,75 | 32,60 | 28,000 | 532,300 | 26,10 | 2,160 | 395,10 | 233,10 | 399,9675 | AH | | | |
| Z-209MX | | | | 270,00 | 28,00 | 162,00 | 3,00 | 97,88 | 32,00 | 28,000 | 532,300 | 26,10 | 2,140 | 397,90 | 235,90 | 404,4815 | AH | | | |
| Z-210I | | | | 180,00 | 34,00 | 194,00 | 3,00 | 128,25 | 32,87 | 28,000 | 532,300 | 25,70 | 1,613 | 506,74 | 312,74 | 525,8000 | AH | | | |
| Z-210X | | | | 270,00 | 34,00 | 195,00 | 3,00 | 129,98 | 32,81 | 28,000 | 532,300 | 25,70 | 1,598 | 510,58 | 315,58 | 532,7108 | AH | | | |
| Z-211I | | | | 180,00 | 38,00 | 220,00 | 3,00 | 155,25 | 32,37 | 28,000 | 532,300 | 25,50 | 1,324 | 600,97 | 380,97 | 633,6564 | AK | | | |
| Z-211X | | | | 270,00 | 38,00 | 222,00 | 3,00 | 156,38 | 32,81 | 28,000 | 532,300 | 25,50 | 1,314 | 605,81 | 383,81 | 638,1704 | AK | | | |
| Z-212I | | | | 180,00 | 41,00 | 252,00 | 4,00 | 186,75 | 32,62 | 28,000 | 532,300 | 25,40 | 1,095 | 712,57 | 460,57 | 759,4889 | AL | | | |
| Z-212X | | | | 270,00 | 42,00 | 254,00 | 4,00 | 187,88 | 33,06 | 28,000 | 532,300 | 25,38 | 1,088 | 717,42 | 463,42 | 764,0029 | AL | | | |
| Z-213I | | | | 180,00 | 44,00 | 280,00 | 4,00 | 213,75 | 33,12 | 28,000 | 532,300 | 24,90 | 0,954 | 808,81 | 528,81 | 867,3453 | AN | | | |
| Z-213X | | | | 270,00 | 45,00 | 282,00 | 4,00 | 214,88 | 33,56 | 28,000 | 532,300 | 24,88 | 0,949 | 813,65 | 531,65 | 871,8593 | AN | | | |
| Z-214I | | | | 180,00 | 48,00 | 310,00 | 4,00 | 245,25 | 32,37 | 28,000 | 532,300 | 24,52 | 0,829 | 918,41 | 608,41 | 993,1778 | AR | | | |
| Z-214X | | | | 270,00 | 48,00 | 312,00 | 4,00 | 246,38 | 32,81 | 28,000 | 532,300 | 24,51 | 0,825 | 923,26 | 611,26 | 997,6918 | AR | | | |
| Z-215I | | | | 180,00 | 51,00 | 346,00 | 4,00 | 281,25 | 32,37 | 28,000 | 532,300 | 24,27 | 0,721 | 1045,39 | 699,39 | 1136,9864 | AT | | | |
| Z-215X | | | | 270,00 | 51,00 | 348,00 | 4,00 | 282,38 | 32,81 | 28,000 | 532,300 | 24,26 | 0,718 | 1050,23 | 702,23 | 1141,5004 | AT | | | |
| Z-216I | | | | 180,00 | 54,00 | 382,00 | 4,00 | 317,25 | 32,37 | 28,000 | 532,300 | 24,05 | 0,638 | 1172,37 | 790,37 | 1280,7949 | BA | | | |
| Z-216X | | | | 270,00 | 54,00 | 384,00 | 4,00 | 318,38 | 32,81 | 28,000 | 532,300 | 24,05 | 0,636 | 1177,21 | 793,21 | 1285,3089 | BA | | | |
| Z-216HI | | | | 40,00 | 0,50 | 48,80 | 180,00 | 20,00 | 110,00 | 2,00 | 60,75 | 24,60 | 56,500 | 658,200 | 35,00 | 7,470 | 190,60 | 80,60 | 199,8603 | AG |
| Z-216HX | | | | | | | 270,00 | 20,00 | 110,00 | 2,00 | 61,88 | 24,00 | 56,500 | 658,200 | 35,00 | 7,320 | 192,20 | 82,20 | 203,3822 | AG |
| Z-216JI | | | | | | | 180,00 | 25,00 | 146,00 | 2,00 | 96,75 | 24,60 | 56,500 | 658,200 | 33,70 | 4,560 | 278,10 | 132,10 | 312,0626 | AG |
| Z-216JX | 270,00 | 25,00 | 146,00 | | | | 2,00 | 97,88 | 24,00 | 56,500 | 658,200 | 33,70 | 4,500 | 279,70 | 133,70 | 315,5845 | AG | | | |
| Z-217I | 180,00 | 30,00 | 178,00 | | | | 2,50 | 128,25 | 24,87 | 56,500 | 658,200 | 33,20 | 3,395 | 355,22 | 177,22 | 410,2396 | AH | | | |
| Z-217X | 270,00 | 30,00 | 179,00 | | | | 2,50 | 129,38 | 24,81 | 56,500 | 658,200 | 33,20 | 3,365 | 357,83 | 178,83 | 413,7615 | AH | | | |
| Z-218I | 180,00 | 33,00 | 205,00 | | | | 2,50 | 155,25 | 24,87 | 56,500 | 658,200 | 32,80 | 2,787 | 420,09 | 215,09 | 494,3913 | AJ | | | |
| Z-218X | 270,00 | 33,00 | 206,00 | | | | 2,50 | 156,38 | 24,81 | 56,500 | 658,200 | 32,80 | 2,767 | 423,50 | 217,50 | 497,9132 | AJ | | | |
| Z-219I | 180,00 | 37,00 | 236,00 | | | | 2,50 | 186,75 | 24,62 | 56,500 | 658,200 | 32,60 | 2,306 | 497,00 | 261,00 | 592,5683 | AK | | | |
| Z-219X | 270,00 | 37,00 | 237,00 | | | | 2,50 | 187,88 | 24,56 | 56,500 | 658,200 | 32,60 | 2,291 | 499,61 | 262,61 | 596,0902 | AK | | | |
| Z-220I | 180,00 | 39,00 | 264,00 | | | | 3,00 | 213,75 | 15,23 | 56,500 | 658,200 | 32,13 | 2,008 | 563,67 | 299,67 | 676,7200 | AL | | | |
| Z-220X | 270,00 | 39,00 | 265,00 | | | | 3,00 | 214,88 | 25,06 | 56,500 | 658,200 | 32,10 | 1,997 | 566,28 | 301,28 | 680,2419 | AL | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|------------------|-----------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------|--------------------------------------|----------------------|---------------------------------|--------------------------------|----------------------|--------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------------|----------------|----------|----|
| Z-221I | 4,50 | 40,00 | 0,50 | 48,80 | 180,00 | 42,00 | 295,00 | 3,00 | 245,25 | 24,87 | 56,500 | 658,200 | 31,62 | 1,745 | 639,78 | 344,78 | 774,8970 | AM | | |
| Z-221X | | | | | 270,00 | 42,00 | 296,00 | 3,00 | 246,38 | 24,81 | 56,500 | 658,200 | 31,61 | 1,737 | 642,39 | 346,39 | 778,4189 | AM | | |
| Z-222I | | | | | 180,00 | 45,00 | 330,00 | 3,00 | 281,25 | 24,37 | 56,500 | 658,200 | 31,30 | 1,518 | 726,34 | 396,34 | 887,0993 | AO | | |
| Z-222X | | | | | 270,00 | 45,00 | 331,00 | 3,00 | 282,38 | 24,31 | 56,500 | 658,200 | 31,29 | 1,512 | 728,95 | 397,95 | 890,6212 | AO | | |
| Z-223I | | | | | 180,00 | 48,00 | 366,00 | 3,00 | 317,25 | 24,37 | 56,500 | 658,200 | 31,01 | 1,344 | 813,89 | 447,89 | 999,3015 | AW | | |
| Z-223X | | | | | 270,00 | 48,00 | 368,00 | 3,00 | 318,38 | 24,81 | 56,500 | 658,200 | 31,00 | 1,339 | 817,50 | 449,50 | 1002,8235 | AW | | |
| Z-223HI | 30,00 | 0,40 | 37,20 | 180,00 | 17,00 | 94,00 | 1,50 | 60,75 | 16,60 | 72,000 | 858,700 | 58,60 | 20,150 | 133,00 | 39,00 | 143,5616 | AF | | | |
| Z-223HX | | | | 270,00 | 17,00 | 94,00 | 1,50 | 61,88 | 16,00 | 72,000 | 858,700 | 58,60 | 19,760 | 133,80 | 39,80 | 146,0915 | AF | | | |
| Z-223JI | | | | 180,00 | 22,00 | 130,00 | 2,00 | 96,75 | 16,60 | 72,000 | 858,700 | 56,30 | 12,290 | 194,00 | 64,00 | 224,1576 | AG | | | |
| Z-223JX | | | | 270,00 | 22,00 | 130,00 | 2,00 | 97,88 | 16,00 | 72,000 | 858,700 | 56,30 | 12,140 | 194,80 | 64,80 | 226,6875 | AG | | | |
| Z-224I | | | | 180,00 | 28,00 | 162,00 | 2,50 | 128,25 | 16,87 | 72,000 | 858,700 | 55,30 | 9,161 | 247,88 | 85,88 | 294,6791 | AG | | | |
| Z-224X | | | | 270,00 | 29,00 | 163,00 | 2,50 | 129,38 | 16,81 | 72,000 | 858,700 | 55,30 | 9,079 | 249,66 | 86,66 | 297,2090 | AG | | | |
| Z-225I | | | | 180,00 | 31,00 | 189,00 | 2,50 | 155,25 | 16,87 | 72,000 | 858,700 | 54,80 | 7,521 | 293,62 | 104,62 | 355,1261 | AH | | | |
| Z-225X | | | | 270,00 | 32,00 | 190,00 | 2,50 | 156,38 | 16,81 | 72,000 | 858,700 | 54,80 | 7,465 | 295,40 | 105,40 | 357,6560 | AH | | | |
| Z-226I | | | | 180,00 | 35,00 | 221,00 | 2,50 | 186,75 | 17,13 | 72,000 | 858,700 | 54,64 | 6,221 | 347,45 | 126,45 | 425,6476 | AK | | | |
| Z-226X | | | | 270,00 | 35,00 | 222,00 | 2,50 | 187,88 | 17,06 | 72,000 | 858,700 | 54,59 | 6,183 | 349,26 | 127,26 | 428,1775 | AK | | | |
| Z-227I | | | | 180,00 | 37,00 | 248,00 | 2,50 | 213,75 | 17,12 | 72,000 | 858,700 | 53,44 | 5,418 | 393,22 | 145,22 | 486,0946 | AL | | | |
| Z-227X | | | | 270,00 | 37,00 | 249,00 | 2,50 | 214,88 | 17,06 | 72,000 | 858,700 | 53,39 | 5,389 | 394,98 | 145,98 | 488,6245 | AL | | | |
| Z-228I | | | | 180,00 | 40,00 | 279,00 | 3,00 | 245,25 | 16,88 | 72,000 | 858,700 | 52,52 | 4,709 | 446,08 | 167,08 | 556,6161 | AM | | | |
| Z-228X | | | | 270,00 | 40,00 | 280,00 | 3,00 | 246,38 | 16,81 | 72,000 | 858,700 | 52,50 | 4,687 | 447,84 | 167,84 | 559,1460 | AM | | | |
| Z-229I | | | | 180,00 | 43,00 | 315,00 | 3,00 | 281,25 | 16,87 | 72,000 | 858,700 | 51,93 | 4,097 | 507,06 | 192,06 | 637,2122 | AN | | | |
| Z-229X | | | | 270,00 | 43,00 | 316,00 | 3,00 | 282,38 | 16,81 | 72,000 | 858,700 | 51,91 | 4,080 | 508,84 | 192,84 | 639,7420 | AN | | | |
| Z-230I | | | | 180,00 | 45,00 | 351,00 | 3,00 | 317,25 | 16,88 | 72,000 | 858,700 | 51,40 | 3,625 | 568,04 | 217,04 | 717,8082 | AP | | | |
| Z-230X | | | | 270,00 | 45,00 | 352,00 | 3,00 | 318,38 | 16,81 | 72,000 | 858,700 | 51,39 | 3,612 | 569,82 | 217,82 | 720,3380 | AP | | | |
| Z-230HI | | | | 25,00 | 0,35 | 32,10 | 180,00 | 17,00 | 87,00 | 1,50 | 60,75 | 13,30 | 110,000 | 1008,000 | 88,10 | 38,790 | 110,20 | 23,20 | 115,4123 | AF |
| Z-230HX | | | | | | | 270,00 | 17,00 | 87,00 | 1,50 | 61,88 | 12,60 | 110,000 | 1008,000 | 88,10 | 38,030 | 110,60 | 23,60 | 117,4461 | AF |
| Z-230JI | | | | | | | 180,00 | 22,00 | 124,00 | 2,00 | 96,75 | 12,60 | 110,000 | 1008,000 | 84,30 | 23,650 | 162,00 | 38,00 | 180,2052 | AG |
| Z-230JX | | | | | | | 270,00 | 22,00 | 124,00 | 2,00 | 97,88 | 13,00 | 110,000 | 1008,000 | 84,30 | 23,370 | 162,40 | 38,40 | 182,2389 | AG |
| Z-231I | | | | | | | 180,00 | 28,00 | 155,00 | 2,00 | 128,25 | 13,37 | 110,000 | 1008,000 | 82,70 | 17,633 | 205,98 | 50,98 | 236,8989 | AG |
| Z-231X | | | | | | | 270,00 | 28,00 | 156,00 | 2,00 | 129,38 | 13,31 | 110,000 | 1008,000 | 82,70 | 17,424 | 207,44 | 51,44 | 238,9327 | AG |
| Z-232I | 180,00 | 31,00 | 182,00 | | | | 2,50 | 155,25 | 13,37 | 110,000 | 1008,000 | 82,00 | 14,475 | 244,10 | 62,10 | 285,4936 | AG | | | |
| Z-232X | 270,00 | 31,00 | 183,00 | | | | 2,50 | 156,38 | 13,31 | 110,000 | 1008,000 | 82,00 | 14,368 | 245,56 | 62,56 | 287,5273 | AG | | | |
| Z-233I | 180,00 | 34,00 | 214,00 | | | | 2,50 | 186,75 | 13,62 | 110,000 | 1008,000 | 81,70 | 11,973 | 289,07 | 75,07 | 342,1873 | AL | | | |
| Z-233X | 270,00 | 34,00 | 215,00 | | | | 2,50 | 187,88 | 13,56 | 110,000 | 1008,000 | 81,61 | 11,899 | 290,54 | 75,54 | 344,2211 | AL | | | |

Extension springs

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|---------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----------|----|
| Z-234I | 4,50 | 25,00 | 0,35 | 32,10 | 180,00 | 36,00 | 241,00 | 2,50 | 213,75 | 13,62 | 110,000 | 1008,000 | 79,79 | 10,428 | 327,20 | 86,20 | 390,7820 | AM | | | |
| Z-234X | | | | | 270,00 | 36,00 | 242,00 | 2,50 | 214,88 | 13,56 | 110,000 | 1008,000 | 79,71 | 10,372 | 328,66 | 86,66 | 392,8157 | AM | | | |
| Z-235I | | | | | 180,00 | 39,00 | 272,00 | 3,00 | 245,25 | 13,37 | 110,000 | 1008,000 | 78,32 | 9,064 | 371,17 | 99,17 | 447,4757 | AM | | | |
| Z-235X | | | | | 270,00 | 39,00 | 273,00 | 3,00 | 246,38 | 13,31 | 110,000 | 1008,000 | 78,29 | 9,021 | 372,63 | 99,63 | 449,5095 | AM | | | |
| Z-236I | | | | | 180,00 | 41,00 | 308,00 | 3,00 | 281,25 | 13,37 | 110,000 | 1008,000 | 77,37 | 7,885 | 422,00 | 114,00 | 512,2686 | AN | | | |
| Z-236X | | | | | 270,00 | 41,00 | 309,00 | 3,00 | 282,38 | 13,31 | 110,000 | 1008,000 | 77,34 | 7,853 | 423,46 | 114,46 | 514,3024 | AN | | | |
| Z-237I | | | | | 180,00 | 44,00 | 344,00 | 3,00 | 317,25 | 13,37 | 110,000 | 1008,000 | 76,54 | 6,977 | 472,83 | 128,83 | 577,0615 | AO | | | |
| Z-237X | | | | | 270,00 | 44,00 | 345,00 | 3,00 | 318,38 | 13,31 | 110,000 | 1008,000 | 76,52 | 6,952 | 474,29 | 129,29 | 579,0952 | AO | | | |
| Z-238AI | 5,00 | 60,00 | 1,00 | 69,00 | 180,00 | 23,00 | 149,00 | 2,40 | 67,50 | 40,70 | 27,000 | 585,000 | 30,40 | 3,060 | 331,30 | 182,30 | 382,2750 | AM | | | |
| Z-238AX | | | | | 270,00 | 23,00 | 149,00 | 2,40 | 68,75 | 40,10 | 27,000 | 585,000 | 30,40 | 3,000 | 334,90 | 185,90 | 388,9816 | AM | | | |
| Z-238BI | | | | | 180,00 | 30,00 | 189,00 | 3,00 | 107,50 | 40,70 | 27,000 | 585,000 | 29,30 | 1,860 | 487,80 | 298,80 | 596,8855 | AM | | | |
| Z-238BX | | | | | 270,00 | 30,00 | 189,00 | 3,00 | 108,75 | 40,10 | 27,000 | 585,000 | 29,30 | 1,840 | 491,60 | 302,60 | 603,5921 | AM | | | |
| Z-238CI | | | | | 180,00 | 32,00 | 223,00 | 3,00 | 142,50 | 40,20 | 27,000 | 585,000 | 28,80 | 1,390 | 624,00 | 401,00 | 784,6697 | AO | | | |
| Z-238CX | | | | | 270,00 | 32,00 | 223,00 | 3,00 | 143,75 | 39,60 | 27,000 | 585,000 | 28,80 | 1,380 | 627,60 | 404,60 | 791,3763 | AO | | | |
| Z-238DI | | | | | 180,00 | 36,00 | 253,00 | 4,00 | 172,50 | 40,20 | 27,000 | 585,000 | 28,50 | 1,140 | 741,50 | 488,50 | 945,6276 | AO | | | |
| Z-238DX | | | | | 270,00 | 36,00 | 253,00 | 4,00 | 173,75 | 39,60 | 27,000 | 585,000 | 28,50 | 1,130 | 745,10 | 492,10 | 952,3342 | AO | | | |
| Z-238EI | | | | | 180,00 | 41,00 | 289,00 | 4,00 | 207,50 | 40,70 | 27,000 | 585,000 | 28,40 | 0,940 | 879,50 | 590,50 | 1133,4118 | AQ | | | |
| Z-238EX | | | | | 270,00 | 41,00 | 289,00 | 4,00 | 208,75 | 40,10 | 27,000 | 585,000 | 28,40 | 0,940 | 883,20 | 594,20 | 1140,1184 | AQ | | | |
| Z-238GI | | | | | 180,00 | 45,00 | 318,00 | 4,00 | 237,50 | 40,20 | 27,000 | 585,000 | 28,30 | 0,820 | 996,00 | 678,00 | 1294,3697 | AQ | | | |
| Z-238GX | | | | | 270,00 | 45,00 | 318,00 | 4,00 | 238,75 | 39,60 | 27,000 | 585,000 | 28,30 | 0,820 | 999,60 | 681,60 | 1301,0762 | AQ | | | |
| Z-238HI | | | | | 180,00 | 47,00 | 353,00 | 4,00 | 272,50 | 40,20 | 27,000 | 585,000 | 28,20 | 0,720 | 1133,10 | 780,10 | 1482,1539 | AT | | | |
| Z-238HX | | | | | 270,00 | 47,00 | 353,00 | 4,00 | 273,75 | 39,60 | 27,000 | 585,000 | 28,20 | 0,710 | 1136,70 | 783,70 | 1488,8604 | AT | | | |
| Z-238JI | | | | | 180,00 | 55,00 | 393,00 | 4,00 | 312,50 | 40,20 | 27,000 | 585,000 | 28,10 | 0,620 | 1289,70 | 896,70 | 1696,7644 | BC | | | |
| Z-238JX | | | | | 270,00 | 55,00 | 393,00 | 4,00 | 313,75 | 39,60 | 27,000 | 585,000 | 28,10 | 0,620 | 1293,40 | 900,40 | 1703,4710 | BC | | | |
| Z-238KI | | | | | 180,00 | 60,00 | 433,00 | 6,20 | 352,50 | 40,20 | 27,000 | 585,000 | 28,00 | 0,550 | 1446,40 | 1013,40 | 1911,3749 | BF | | | |
| Z-238KX | | | | | 270,00 | 60,00 | 433,00 | 6,20 | 353,75 | 39,60 | 27,000 | 585,000 | 28,00 | 0,550 | 1450,00 | 1017,00 | 1918,0815 | BF | | | |
| Z-239I | | | | | 50,00 | 0,80 | 58,30 | 180,00 | 20,00 | 132,00 | 2,40 | 67,50 | 32,20 | 47,000 | 707,900 | 36,00 | 5,590 | 250,30 | 118,30 | 312,7704 | AN |
| Z-239X | | | | | | | | 270,00 | 20,00 | 132,00 | 2,40 | 68,75 | 31,60 | 47,000 | 707,900 | 36,00 | 5,480 | 252,60 | 120,60 | 318,2576 | AN |
| Z-239AI | 180,00 | 26,00 | 172,00 | 3,00 | | | | 107,50 | 32,20 | 47,000 | 707,900 | 34,70 | 3,410 | 365,90 | 193,90 | 488,3609 | AM | | | | |
| Z-239AX | 270,00 | 26,00 | 172,00 | 3,00 | | | | 108,75 | 31,60 | 47,000 | 707,900 | 34,70 | 3,360 | 368,30 | 196,30 | 493,8481 | AM | | | | |
| Z-240I | 180,00 | 32,00 | 207,00 | 3,00 | | | | 142,50 | 32,25 | 47,000 | 707,900 | 34,20 | 2,541 | 467,12 | 260,12 | 642,0025 | AM | | | | |
| Z-240X | 270,00 | 32,00 | 208,00 | 3,00 | | | | 143,75 | 32,12 | 47,000 | 707,900 | 34,20 | 2,518 | 470,48 | 262,48 | 647,4897 | AM | | | | |
| Z-241I | 180,00 | 35,00 | 237,00 | 3,00 | | | | 172,50 | 32,25 | 47,000 | 707,900 | 33,90 | 2,086 | 553,87 | 316,87 | 773,6953 | AO | | | | |
| Z-241X | 270,00 | 36,00 | 238,00 | 3,00 | | | | 173,75 | 32,12 | 47,000 | 707,900 | 33,90 | 2,070 | 557,23 | 319,23 | 779,1825 | AO | | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|----------|----|
| Z-242I | 5,00 | 50,00 | 0,80 | 58,30 | 180,00 | 39,00 | 272,00 | 4,00 | 207,50 | 32,25 | 47,000 | 707,900 | 33,70 | 1,725 | 655,08 | 383,08 | 927,3369 | AQ | | |
| Z-242X | | | | | 270,00 | 39,00 | 274,00 | 4,00 | 208,75 | 32,62 | 47,000 | 707,900 | 33,74 | 1,715 | 659,44 | 385,44 | 932,8241 | AQ | | |
| Z-243I | | | | | 180,00 | 42,00 | 303,00 | 4,00 | 237,50 | 32,75 | 47,000 | 707,900 | 33,12 | 1,503 | 742,83 | 439,83 | 1059,0297 | AT | | |
| Z-243X | | | | | 270,00 | 42,00 | 304,00 | 4,00 | 238,75 | 32,62 | 47,000 | 707,900 | 33,10 | 1,495 | 746,20 | 442,20 | 1064,5169 | AT | | |
| Z-244I | | | | | 180,00 | 45,00 | 337,00 | 4,00 | 272,50 | 32,25 | 47,000 | 707,900 | 34,22 | 1,306 | 843,04 | 506,04 | 1212,6713 | AW | | |
| Z-244X | | | | | 270,00 | 45,00 | 338,00 | 4,00 | 273,75 | 32,12 | 47,000 | 707,900 | 32,60 | 1,300 | 846,41 | 508,41 | 1218,1585 | AW | | |
| Z-245I | | | | | 180,00 | 48,00 | 377,00 | 4,00 | 312,50 | 32,25 | 47,000 | 707,900 | 32,28 | 1,136 | 958,71 | 581,71 | 1388,2618 | BC | | |
| Z-245X | | | | | 270,00 | 48,00 | 378,00 | 4,00 | 313,75 | 32,12 | 47,000 | 707,900 | 32,27 | 1,132 | 962,08 | 584,08 | 1393,7490 | BC | | |
| Z-246I | | | | | 180,00 | 51,00 | 417,00 | 6,25 | 352,50 | 32,25 | 47,000 | 707,900 | 31,99 | 1,005 | 1074,38 | 657,38 | 1563,8522 | BF | | |
| Z-246X | | | | | 270,00 | 51,00 | 418,00 | 6,27 | 353,75 | 32,12 | 47,000 | 707,900 | 31,98 | 1,002 | 1077,75 | 659,75 | 1569,3394 | BF | | |
| Z-246HI | 40,00 | 0,50 | 48,00 | 180,00 | 17,00 | 116,00 | 2,00 | 67,50 | 24,20 | 75,000 | 873,500 | 49,60 | 11,880 | 183,20 | 67,20 | 243,2659 | AK | | | |
| Z-246HX | | | | 270,00 | 17,00 | 116,00 | 2,00 | 68,75 | 23,60 | 75,000 | 873,500 | 49,60 | 11,640 | 184,60 | 68,60 | 247,5337 | AK | | | |
| Z-246JI | | | | 180,00 | 23,00 | 156,00 | 2,00 | 107,50 | 24,20 | 75,000 | 873,500 | 47,70 | 7,240 | 266,20 | 110,20 | 379,8362 | AL | | | |
| Z-246JX | | | | 270,00 | 23,00 | 156,00 | 2,00 | 108,75 | 23,60 | 75,000 | 873,500 | 47,70 | 7,150 | 267,60 | 111,60 | 384,1040 | AL | | | |
| Z-247I | | | | 180,00 | 29,00 | 191,00 | 2,50 | 142,50 | 24,25 | 75,000 | 873,500 | 46,80 | 5,400 | 338,87 | 147,87 | 499,3353 | AL | | | |
| Z-247X | | | | 270,00 | 30,00 | 192,00 | 2,50 | 143,75 | 24,12 | 75,000 | 873,500 | 46,80 | 5,352 | 341,22 | 149,22 | 503,6031 | AL | | | |
| Z-248I | | | | 180,00 | 33,00 | 221,00 | 2,50 | 172,50 | 24,25 | 75,000 | 873,500 | 46,50 | 4,433 | 401,13 | 180,13 | 601,7630 | AN | | | |
| Z-248X | | | | 270,00 | 33,00 | 223,00 | 2,50 | 173,75 | 24,62 | 75,000 | 873,500 | 46,50 | 4,400 | 404,48 | 181,48 | 606,0308 | AN | | | |
| Z-249I | | | | 180,00 | 36,00 | 256,00 | 3,00 | 207,50 | 24,25 | 75,000 | 873,500 | 46,20 | 3,667 | 473,77 | 217,77 | 721,2620 | AP | | | |
| Z-249X | | | | 270,00 | 36,00 | 258,00 | 3,00 | 208,75 | 24,62 | 75,000 | 873,500 | 46,20 | 3,644 | 477,12 | 219,12 | 725,5299 | AP | | | |
| Z-250I | | | | 180,00 | 38,00 | 286,00 | 3,00 | 237,50 | 24,25 | 75,000 | 873,500 | 45,37 | 3,194 | 536,04 | 250,04 | 823,6898 | AQ | | | |
| Z-250X | | | | 270,00 | 38,00 | 288,00 | 3,00 | 238,75 | 24,62 | 75,000 | 873,500 | 45,34 | 3,177 | 539,38 | 251,38 | 827,9576 | AQ | | | |
| Z-251I | | | | 180,00 | 41,00 | 321,00 | 3,00 | 272,50 | 24,25 | 75,000 | 873,500 | 44,64 | 2,776 | 608,68 | 287,68 | 943,1888 | AY | | | |
| Z-251X | | | | 270,00 | 41,00 | 323,00 | 3,00 | 273,75 | 24,62 | 75,000 | 873,500 | 44,63 | 2,763 | 612,02 | 289,02 | 947,4566 | AY | | | |
| Z-252I | | | | 180,00 | 44,00 | 361,00 | 3,00 | 312,50 | 24,25 | 75,000 | 873,500 | 44,17 | 2,415 | 691,69 | 330,69 | 1079,7592 | BB | | | |
| Z-252X | | | | 270,00 | 44,00 | 363,00 | 3,00 | 313,75 | 24,62 | 75,000 | 873,500 | 44,16 | 2,405 | 695,04 | 332,04 | 1084,0270 | BB | | | |
| Z-253I | | | | 180,00 | 47,00 | 401,00 | 6,01 | 352,50 | 24,25 | 75,000 | 873,500 | 43,75 | 2,137 | 774,71 | 373,71 | 1216,3295 | BD | | | |
| Z-253X | | | | 270,00 | 47,00 | 403,00 | 6,04 | 353,75 | 24,62 | 75,000 | 873,500 | 43,74 | 2,129 | 778,05 | 375,05 | 1220,5973 | BD | | | |
| Z-253HI | | | | 30,00 | 0,35 | 37,90 | 180,00 | 17,00 | 100,00 | 1,50 | 67,50 | 16,20 | 110,000 | 1134,000 | 88,30 | 32,600 | 131,40 | 31,40 | 173,7614 | AF |
| Z-253HX | | | | | | | 270,00 | 17,00 | 100,00 | 1,50 | 68,75 | 15,60 | 110,000 | 1134,000 | 88,30 | 31,960 | 132,00 | 32,00 | 176,8098 | AF |
| Z-253JI | 180,00 | 23,00 | 140,00 | | | | 2,00 | 107,50 | 16,20 | 110,000 | 1134,000 | 84,60 | 19,870 | 191,50 | 51,50 | 271,3116 | AK | | | |
| Z-253JX | 270,00 | 23,00 | 140,00 | | | | 2,00 | 108,75 | 15,60 | 110,000 | 1134,000 | 84,60 | 19,630 | 192,20 | 52,20 | 274,3600 | AK | | | |
| Z-254I | 180,00 | 28,00 | 175,00 | | | | 2,50 | 142,50 | 16,25 | 110,000 | 1134,000 | 87,81 | 14,818 | 244,13 | 69,13 | 356,6680 | AK | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|----------|----------|
| Z-254X | 5,00 | 30,00 | 0,35 | 37,90 | 270,00 | 28,00 | 177,00 | 2,50 | 143,75 | 16,62 | 110,000 | 1134,000 | 87,64 | 14,685 | 246,76 | 69,76 | 359,7165 | AK | | | |
| Z-255I | | | | | 180,00 | 31,00 | 205,00 | 2,50 | 172,50 | 16,25 | 110,000 | 1134,000 | 84,67 | 12,164 | 289,21 | 84,21 | 429,8307 | AM | | | |
| Z-255X | | | | | 270,00 | 31,00 | 207,00 | 2,50 | 173,75 | 16,62 | 110,000 | 1134,000 | 84,57 | 12,074 | 291,84 | 84,84 | 432,8792 | AM | | | |
| Z-256I | | | | | 180,00 | 34,00 | 240,00 | 2,50 | 207,50 | 16,25 | 110,000 | 1134,000 | 82,10 | 10,062 | 341,81 | 101,81 | 515,1872 | AO | | | |
| Z-256X | | | | | 270,00 | 34,00 | 242,00 | 2,50 | 208,75 | 16,62 | 110,000 | 1134,000 | 82,02 | 10,000 | 344,44 | 102,44 | 518,2356 | AO | | | |
| Z-257I | | | | | 180,00 | 36,00 | 270,00 | 3,00 | 237,50 | 16,25 | 110,000 | 1134,000 | 80,23 | 8,763 | 386,89 | 116,89 | 588,3498 | AP | | | |
| Z-257X | | | | | 270,00 | 37,00 | 272,00 | 3,00 | 238,75 | 16,62 | 110,000 | 1134,000 | 80,16 | 8,717 | 389,52 | 117,52 | 591,3983 | AP | | | |
| Z-258I | | | | | 180,00 | 39,00 | 305,00 | 3,00 | 272,50 | 16,25 | 110,000 | 1134,000 | 78,80 | 7,617 | 439,49 | 134,49 | 673,7063 | AY | | | |
| Z-258X | | | | | 270,00 | 39,00 | 307,00 | 3,00 | 273,75 | 16,62 | 110,000 | 1134,000 | 78,77 | 7,581 | 442,12 | 135,12 | 676,7547 | AY | | | |
| Z-259I | | | | | 180,00 | 42,00 | 345,00 | 3,00 | 312,50 | 16,25 | 110,000 | 1134,000 | 77,87 | 6,626 | 499,60 | 154,60 | 771,2565 | AW | | | |
| Z-259X | | | | | 270,00 | 42,00 | 347,00 | 3,00 | 313,75 | 16,62 | 110,000 | 1134,000 | 77,85 | 6,599 | 502,23 | 155,23 | 774,3050 | AW | | | |
| Z-260I | | | | | 180,00 | 45,00 | 385,00 | 3,00 | 352,50 | 16,25 | 110,000 | 1134,000 | 77,06 | 5,863 | 559,71 | 174,71 | 868,8068 | BA | | | |
| Z-260X | | | | | 270,00 | 45,00 | 387,00 | 3,00 | 353,75 | 16,62 | 110,000 | 1134,000 | 77,03 | 5,842 | 562,34 | 175,34 | 871,8552 | BA | | | |
| Z-260HI | | | | | 5,50 | 60,00 | 1,00 | 69,30 | 180,00 | 22,00 | 154,00 | 2,40 | 74,25 | 39,90 | 38,000 | 774,500 | 38,90 | 4,600 | 313,90 | 159,90 | 458,3477 |
| Z-260HX | 270,00 | 22,00 | 154,00 | 2,40 | | | | | 75,63 | 39,20 | 38,000 | 774,500 | 38,90 | 4,510 | 317,10 | 163,10 | 466,4181 | AK | | | |
| Z-260JI | 180,00 | 28,00 | 198,00 | 3,00 | | | | | 118,25 | 39,90 | 38,000 | 774,500 | 37,50 | 2,800 | 460,20 | 262,20 | 715,6657 | AN | | | |
| Z-260JX | 270,00 | 28,00 | 198,00 | 3,00 | | | | | 119,63 | 39,20 | 38,000 | 774,500 | 37,50 | 2,770 | 463,40 | 265,40 | 723,7361 | AN | | | |
| Z-270I | 180,00 | 34,00 | 236,00 | 3,00 | | | | | 156,75 | 39,62 | 38,000 | 774,500 | 36,90 | 2,094 | 587,72 | 351,72 | 940,8190 | AN | | | |
| Z-270X | 270,00 | 34,00 | 238,00 | 3,00 | | | | | 158,13 | 39,93 | 38,000 | 774,500 | 36,90 | 2,075 | 592,91 | 354,91 | 948,8894 | AN | | | |
| Z-271I | 180,00 | 37,00 | 268,00 | 4,00 | | | | | 189,75 | 39,12 | 38,000 | 774,500 | 37,49 | 1,719 | 696,46 | 428,46 | 1133,8075 | AO | | | |
| Z-271X | 270,00 | 37,00 | 270,00 | 4,00 | | | | | 191,13 | 39,43 | 38,000 | 774,500 | 37,45 | 1,706 | 701,65 | 431,65 | 1141,8779 | AO | | | |
| Z-272I | 180,00 | 41,00 | 306,00 | 4,00 | | | | | 228,25 | 38,87 | 38,000 | 774,500 | 36,50 | 1,422 | 823,98 | 517,98 | 1358,9607 | AU | | | |
| Z-272X | 270,00 | 41,00 | 308,00 | 4,00 | | | | | 229,63 | 39,18 | 38,000 | 774,500 | 36,47 | 1,413 | 829,18 | 521,18 | 1367,0312 | AU | | | |
| Z-273I | 180,00 | 44,00 | 340,00 | 4,00 | | | | | 261,25 | 39,37 | 38,000 | 774,500 | 35,79 | 1,238 | 934,72 | 594,72 | 1551,9492 | AW | | | |
| Z-273X | 270,00 | 44,00 | 342,00 | 4,00 | | | | | 262,63 | 39,68 | 38,000 | 774,500 | 35,76 | 1,232 | 939,92 | 597,92 | 1560,0197 | AW | | | |
| Z-274I | 180,00 | 47,00 | 378,00 | 4,00 | | | | | 299,75 | 39,12 | 38,000 | 774,500 | 35,24 | 1,076 | 1062,25 | 684,25 | 1777,1025 | BC | | | |
| Z-274X | 270,00 | 47,00 | 380,00 | 4,00 | | | | | 301,13 | 39,43 | 38,000 | 774,500 | 35,23 | 1,071 | 1067,45 | 687,45 | 1785,1729 | BC | | | |
| Z-275I | 180,00 | 51,00 | 422,00 | 6,33 | | | | | 343,75 | 39,12 | 38,000 | 774,500 | 34,89 | 0,936 | 1208,57 | 786,57 | 2034,4205 | BE | | | |
| Z-275X | 270,00 | 51,00 | 424,00 | 6,36 | | | | | 345,13 | 39,43 | 38,000 | 774,500 | 34,88 | 0,933 | 1213,76 | 789,76 | 2042,4909 | BE | | | |
| Z-276I | 180,00 | 54,00 | 466,00 | 6,99 | | | | | 387,75 | 39,12 | 38,000 | 774,500 | 34,57 | 0,829 | 1354,88 | 888,88 | 2291,7385 | BF | | | |
| Z-276X | 270,00 | 54,00 | 468,00 | 7,02 | | | | | 389,30 | 39,43 | 38,000 | 774,500 | 34,57 | 0,828 | 1360,08 | 892,08 | 2300,8031 | BF | | | |
| Z-276HI | 50,00 | 0,80 | 59,10 | 180,00 | | | | | 20,00 | 138,00 | 2,40 | 74,25 | 31,90 | 80,000 | 921,200 | 47,90 | 8,460 | 237,40 | 99,40 | 374,2472 | AK |
| Z-276HX | | | | 270,00 | | | | | 20,00 | 138,00 | 2,40 | 75,63 | 31,20 | 80,000 | 921,200 | 47,90 | 8,290 | 239,40 | 101,40 | 380,8368 | AK |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artice number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|---------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-------|----------|----|
| Z-276JI | 5,50 | 50,00 | 0,80 | 59,10 | 180,00 | 25,00 | 182,00 | 3,00 | 118,25 | 31,90 | 80,000 | 921,200 | 46,20 | 5,160 | 345,00 | 163,00 | 584,3509 | AN | | | |
| Z-276JX | | | | | 270,00 | 25,00 | 182,00 | 3,00 | 119,63 | 31,20 | 80,000 | 921,200 | 46,20 | 5,090 | 347,00 | 165,00 | 590,9405 | AN | | | |
| Z-277I | | | | | 180,00 | 30,00 | 220,00 | 3,00 | 156,75 | 31,62 | 80,000 | 921,200 | 45,40 | 3,847 | 438,69 | 218,69 | 768,1916 | AM | | | |
| Z-277X | | | | | 270,00 | 31,00 | 222,00 | 3,00 | 158,13 | 31,93 | 80,000 | 921,200 | 45,40 | 3,812 | 442,68 | 220,68 | 774,7812 | AM | | | |
| Z-278I | | | | | 180,00 | 34,00 | 252,00 | 4,00 | 189,75 | 31,12 | 80,000 | 921,200 | 45,00 | 3,158 | 518,41 | 266,41 | 925,7694 | AN | | | |
| Z-278X | | | | | 270,00 | 34,00 | 254,00 | 4,00 | 191,13 | 31,43 | 80,000 | 921,200 | 45,00 | 3,134 | 522,40 | 268,40 | 932,3590 | AN | | | |
| Z-279I | | | | | 180,00 | 37,00 | 290,00 | 4,00 | 228,25 | 30,87 | 80,000 | 921,200 | 44,90 | 2,612 | 612,08 | 322,08 | 1109,6101 | AQ | | | |
| Z-279X | | | | | 270,00 | 37,00 | 292,00 | 4,00 | 229,63 | 31,18 | 80,000 | 921,200 | 44,86 | 2,596 | 616,06 | 324,06 | 1116,1998 | AQ | | | |
| Z-280I | | | | | 180,00 | 40,00 | 324,00 | 4,00 | 261,25 | 31,37 | 80,000 | 921,200 | 44,01 | 2,275 | 693,79 | 369,79 | 1267,1879 | AW | | | |
| Z-280X | | | | | 270,00 | 40,00 | 326,00 | 4,00 | 262,63 | 31,68 | 80,000 | 921,200 | 43,98 | 2,263 | 697,78 | 371,78 | 1273,7775 | AW | | | |
| Z-281I | | | | | 180,00 | 42,00 | 362,00 | 4,00 | 299,75 | 31,12 | 80,000 | 921,200 | 43,33 | 1,977 | 787,46 | 425,46 | 1451,0286 | BA | | | |
| Z-281X | | | | | 270,00 | 43,00 | 364,00 | 4,00 | 301,13 | 31,43 | 80,000 | 921,200 | 43,31 | 1,968 | 791,45 | 427,45 | 1457,6183 | BA | | | |
| Z-282I | | | | | 180,00 | 46,00 | 406,00 | 6,06 | 343,75 | 31,12 | 80,000 | 921,200 | 42,88 | 1,720 | 895,08 | 489,08 | 1661,1323 | BD | | | |
| Z-282X | | | | | 270,00 | 46,00 | 408,00 | 6,12 | 345,13 | 31,43 | 80,000 | 921,200 | 42,87 | 1,713 | 899,07 | 491,07 | 1667,7219 | BD | | | |
| Z-283I | | | | | 180,00 | 48,00 | 450,00 | 6,75 | 387,75 | 31,12 | 80,000 | 921,200 | 42,49 | 1,522 | 1002,70 | 552,70 | 1871,2360 | BF | | | |
| Z-283X | | | | | 270,00 | 48,00 | 452,00 | 6,78 | 389,13 | 31,43 | 80,000 | 921,200 | 42,48 | 1,517 | 1006,69 | 554,69 | 1877,8256 | BF | | | |
| Z-283HI | | | | | 40,00 | 0,50 | 48,80 | 180,00 | 18,00 | 121,00 | 2,00 | 74,25 | 23,40 | 120,000 | 1134,000 | 69,60 | 18,160 | 176,80 | 55,80 | 290,1467 | AK |
| Z-283HX | | | | | | | | 270,00 | 18,00 | 121,00 | 2,00 | 75,63 | 22,70 | 120,000 | 1134,000 | 69,60 | 17,800 | 178,00 | 57,00 | 295,2555 | AK |
| Z-283JI | | | | | | | | 180,00 | 25,00 | 165,00 | 2,50 | 118,25 | 23,40 | 120,000 | 1134,000 | 66,80 | 11,070 | 256,60 | 91,60 | 453,0361 | AK |
| Z-283JX | | | | | | | | 270,00 | 25,00 | 165,00 | 2,50 | 119,63 | 22,70 | 120,000 | 1134,000 | 66,70 | 10,940 | 257,70 | 92,70 | 458,1449 | AK |
| Z-284I | 180,00 | 29,00 | 203,00 | 2,50 | | | | 156,75 | 23,12 | 120,000 | 1134,000 | 65,60 | 8,255 | 325,86 | 122,86 | 595,5643 | AL | | | | |
| Z-284X | 270,00 | 29,00 | 205,00 | 2,50 | | | | 158,13 | 23,43 | 120,000 | 1134,000 | 65,60 | 8,181 | 328,97 | 123,97 | 600,6731 | AL | | | | |
| Z-285I | 180,00 | 32,00 | 236,00 | 2,50 | | | | 189,75 | 23,12 | 120,000 | 1134,000 | 65,00 | 6,777 | 385,66 | 149,66 | 717,7313 | AM | | | | |
| Z-285X | 270,00 | 32,00 | 238,00 | 2,50 | | | | 191,13 | 23,43 | 120,000 | 1134,000 | 65,00 | 6,726 | 388,78 | 150,78 | 722,8401 | AM | | | | |
| Z-286I | 180,00 | 35,00 | 275,00 | 3,00 | | | | 228,25 | 23,37 | 120,000 | 1134,000 | 64,89 | 5,605 | 455,93 | 180,93 | 860,2595 | AO | | | | |
| Z-286X | 270,00 | 35,00 | 277,00 | 3,00 | | | | 229,63 | 23,68 | 120,000 | 1134,000 | 64,83 | 5,571 | 459,05 | 182,05 | 865,3683 | AO | | | | |
| Z-287I | 180,00 | 38,00 | 308,00 | 3,00 | | | | 261,25 | 23,37 | 120,000 | 1134,000 | 63,52 | 4,882 | 515,74 | 207,74 | 982,4266 | AQ | | | | |
| Z-287X | 270,00 | 38,00 | 310,00 | 3,00 | | | | 262,63 | 23,68 | 120,000 | 1134,000 | 63,46 | 4,856 | 518,85 | 208,85 | 987,5354 | AQ | | | | |
| Z-288I | 180,00 | 40,00 | 346,00 | 3,00 | | | | 299,75 | 23,12 | 120,000 | 1134,000 | 62,46 | 4,243 | 585,01 | 239,01 | 1124,9548 | BB | | | | |
| Z-288X | 270,00 | 40,00 | 348,00 | 3,00 | | | | 301,13 | 23,43 | 120,000 | 1134,000 | 62,44 | 4,224 | 588,13 | 240,13 | 1130,0636 | BB | | | | |
| Z-289I | 180,00 | 43,00 | 390,00 | 3,00 | | | | 343,75 | 23,12 | 120,000 | 1134,000 | 61,78 | 3,691 | 664,75 | 274,75 | 1287,8442 | BC | | | | |
| Z-289X | 270,00 | 43,00 | 392,00 | 3,00 | | | | 345,13 | 23,43 | 120,000 | 1134,000 | 61,76 | 3,676 | 667,87 | 275,87 | 1292,9530 | BC | | | | |
| Z-290I | 180,00 | 46,00 | 435,00 | 6,52 | | | | 387,75 | 23,62 | 120,000 | 1134,000 | 61,18 | 3,266 | 745,49 | 310,49 | 1450,7335 | BF | | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|-----------|----|
| Z-290X | 5,50 | 40,00 | 0,50 | 48,80 | 270,00 | 46,00 | 437,00 | 6,55 | 389,13 | 23,93 | 120,000 | 1134,000 | 61,16 | 3,255 | 748,61 | 311,61 | 1455,8424 | BF | | | |
| Z-298I | 6,30 | 70,00 | 1,20 | 80,00 | 180,00 | 22,00 | 178,00 | 3,00 | 85,05 | 46,50 | 45,000 | 968,500 | 48,40 | 4,960 | 363,90 | 185,90 | 702,9003 | AP | | | |
| Z-298X | | | | | 270,00 | 22,00 | 178,00 | 3,00 | 86,63 | 45,70 | 45,000 | 968,500 | 48,40 | 4,870 | 367,60 | 189,60 | 715,2710 | AP | | | |
| Z-299I | | | | | 180,00 | 28,00 | 228,00 | 3,00 | 135,45 | 46,30 | 45,000 | 968,500 | 46,60 | 3,020 | 532,90 | 304,90 | 1097,5109 | AP | | | |
| Z-299X | | | | | 270,00 | 28,00 | 228,00 | 3,00 | 137,03 | 45,50 | 45,000 | 968,500 | 46,60 | 2,990 | 536,60 | 308,60 | 1109,8817 | AP | | | |
| Z-300I | | | | | 180,00 | 34,00 | 272,00 | 4,00 | 179,55 | 46,22 | 45,000 | 968,500 | 45,90 | 2,258 | 681,20 | 409,20 | 1442,7953 | AR | | | |
| Z-300X | | | | | 270,00 | 34,00 | 274,00 | 4,00 | 181,13 | 46,43 | 45,000 | 968,500 | 45,90 | 2,237 | 686,79 | 412,79 | 1455,1660 | AR | | | |
| Z-301I | | | | | 180,00 | 38,00 | 310,00 | 4,00 | 217,35 | 46,32 | 45,000 | 968,500 | 45,60 | 1,853 | 808,32 | 498,32 | 1738,7533 | AY | | | |
| Z-301X | | | | | 270,00 | 38,00 | 312,00 | 4,00 | 218,93 | 46,53 | 45,000 | 968,500 | 45,60 | 1,840 | 814,04 | 502,04 | 1751,1240 | AY | | | |
| Z-302I | | | | | 180,00 | 41,00 | 354,00 | 4,00 | 261,45 | 46,27 | 45,000 | 968,500 | 45,20 | 1,533 | 956,44 | 602,44 | 2084,0376 | BA | | | |
| Z-302X | | | | | 270,00 | 42,00 | 356,00 | 4,00 | 263,03 | 46,48 | 45,000 | 968,500 | 45,20 | 1,524 | 962,16 | 606,16 | 2096,4084 | BA | | | |
| Z-303I | | | | | 180,00 | 44,00 | 392,00 | 4,00 | 299,25 | 46,37 | 45,000 | 968,500 | 44,50 | 1,335 | 1083,70 | 691,70 | 2379,9956 | BD | | | |
| Z-303X | | | | | 270,00 | 45,00 | 394,00 | 4,00 | 300,83 | 46,58 | 45,000 | 968,500 | 44,47 | 1,328 | 1089,41 | 695,41 | 2392,3664 | BD | | | |
| Z-304I | | | | | 180,00 | 48,00 | 436,00 | 6,54 | 343,35 | 46,32 | 45,000 | 968,500 | 43,82 | 1,161 | 1231,82 | 795,82 | 2725,2800 | BE | | | |
| Z-304X | | | | | 270,00 | 48,00 | 438,00 | 6,57 | 344,93 | 46,53 | 45,000 | 968,500 | 43,81 | 1,155 | 1237,54 | 799,54 | 2737,6507 | BE | | | |
| Z-305I | | | | | 180,00 | 51,00 | 486,00 | 7,29 | 393,75 | 46,12 | 45,000 | 968,500 | 43,38 | 1,010 | 1400,82 | 914,82 | 3119,8906 | BG | | | |
| Z-305X | | | | | 270,00 | 51,00 | 488,00 | 7,32 | 395,33 | 46,33 | 45,000 | 968,500 | 43,37 | 1,005 | 1406,54 | 918,54 | 3132,2614 | BG | | | |
| Z-306I | | | | | 180,00 | 54,00 | 536,00 | 8,04 | 444,15 | 45,92 | 45,000 | 968,500 | 43,00 | 0,893 | 1569,80 | 1033,80 | 3514,5013 | BG | | | |
| Z-306X | | | | | 270,00 | 54,00 | 538,00 | 8,07 | 445,73 | 46,13 | 45,000 | 968,500 | 42,99 | 0,890 | 1575,50 | 1037,50 | 3526,8721 | BG | | | |
| Z-306HI | | | | | 60,00 | 1,00 | 70,00 | 180,00 | 22,00 | 162,00 | 3,00 | 85,05 | 38,50 | 80,000 | 1122,000 | 56,90 | 8,290 | 287,70 | 125,70 | 592,5549 | AP |
| Z-306HX | | | | | | | | 270,00 | 22,00 | 162,00 | 3,00 | 86,63 | 37,70 | 80,000 | 1122,000 | 56,90 | 8,120 | 290,20 | 128,20 | 602,9836 | AP |
| Z-306JI | | | | | | | | 180,00 | 25,00 | 212,00 | 3,00 | 135,45 | 38,30 | 80,000 | 1122,000 | 54,80 | 5,050 | 418,10 | 206,10 | 925,2172 | AP |
| Z-306JX | | | | | | | | 270,00 | 25,00 | 212,00 | 3,00 | 137,03 | 37,50 | 80,000 | 1122,000 | 54,80 | 4,990 | 420,60 | 208,60 | 935,6459 | AP |
| Z-307I | | | | | | | | 180,00 | 31,00 | 256,00 | 4,00 | 179,55 | 38,22 | 80,000 | 1122,000 | 53,90 | 3,769 | 532,51 | 276,51 | 1216,2968 | AR |
| Z-307X | 270,00 | 31,00 | 258,00 | 4,00 | | | | 181,13 | 38,43 | 80,000 | 1122,000 | 53,90 | 3,735 | 537,03 | 279,03 | 1226,7255 | AR | | | | |
| Z-308I | 180,00 | 34,00 | 294,00 | 4,00 | | | | 217,35 | 38,32 | 80,000 | 1122,000 | 53,50 | 3,094 | 630,85 | 336,85 | 1465,7936 | AX | | | | |
| Z-308X | 270,00 | 35,00 | 296,00 | 4,00 | | | | 218,93 | 38,53 | 80,000 | 1122,000 | 53,50 | 3,071 | 635,36 | 339,36 | 1476,2223 | AX | | | | |
| Z-309I | 180,00 | 38,00 | 338,00 | 4,00 | | | | 261,45 | 38,27 | 80,000 | 1122,000 | 53,39 | 2,559 | 745,23 | 407,23 | 1756,8732 | BA | | | | |
| Z-309X | 270,00 | 38,00 | 340,00 | 4,00 | | | | 263,03 | 38,48 | 80,000 | 1122,000 | 53,34 | 2,543 | 749,74 | 409,74 | 1767,3019 | BA | | | | |
| Z-310I | 180,00 | 41,00 | 375,00 | 4,00 | | | | 299,25 | 37,87 | 80,000 | 1122,000 | 52,34 | 2,229 | 842,56 | 467,56 | 2006,3699 | BB | | | | |
| Z-310X | 270,00 | 41,00 | 377,00 | 4,00 | | | | 300,83 | 38,08 | 80,000 | 1122,000 | 52,30 | 2,217 | 847,07 | 470,07 | 2016,7986 | BB | | | | |
| Z-311I | 180,00 | 44,00 | 420,00 | 6,30 | | | | 343,35 | 38,32 | 80,000 | 1122,000 | 51,53 | 1,937 | 957,95 | 537,95 | 2297,4495 | BC | | | | |
| Z-311X | 270,00 | 44,00 | 422,00 | 6,33 | | | | 344,93 | 38,53 | 80,000 | 1122,000 | 51,52 | 1,928 | 962,46 | 540,46 | 2307,8782 | BC | | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-----------|----|
| Z-312I | 6,30 | 60,00 | 1,00 | 70,00 | 180,00 | 47,00 | 470,00 | 4,05 | 393,75 | 38,12 | 80,000 | 1122,000 | 51,01 | 1,685 | 1088,39 | 618,39 | 2630,1119 | BF | | |
| Z-312X | | | | | 270,00 | 47,00 | 472,00 | 7,08 | 395,33 | 38,33 | 80,000 | 1122,000 | 51,80 | 1,678 | 1092,90 | 620,90 | 2640,5406 | BF | | |
| Z-313I | | | | | 180,00 | 50,00 | 520,00 | 7,80 | 444,15 | 37,92 | 80,000 | 1122,000 | 50,56 | 1,491 | 1218,83 | 698,83 | 2962,7743 | BG | | |
| Z-313X | | | | | 270,00 | 50,00 | 522,00 | 7,83 | 445,73 | 38,13 | 80,000 | 1122,000 | 50,54 | 1,486 | 1223,34 | 701,34 | 2973,2030 | BG | | |
| Z-313HI | 50,00 | 0,60 | 60,00 | 180,00 | 18,00 | 146,00 | 2,00 | 85,05 | 30,50 | 120,000 | 1331,000 | 74,80 | 15,380 | 224,00 | 78,00 | 482,2094 | AO | | | |
| Z-313HX | | | | 270,00 | 18,00 | 145,00 | 2,00 | 86,63 | 29,20 | 120,000 | 1331,000 | 74,80 | 15,080 | 225,20 | 80,20 | 490,6961 | AO | | | |
| Z-313JI | | | | 180,00 | 25,00 | 196,00 | 2,50 | 135,45 | 30,30 | 120,000 | 1331,000 | 71,90 | 9,380 | 325,10 | 129,10 | 752,9235 | AP | | | |
| Z-313JX | | | | 270,00 | 25,00 | 195,00 | 2,50 | 137,03 | 29,00 | 120,000 | 1331,000 | 71,90 | 9,260 | 325,70 | 130,70 | 761,4102 | AP | | | |
| Z-314I | | | | 180,00 | 29,00 | 240,00 | 2,50 | 179,55 | 30,22 | 120,000 | 1331,000 | 70,80 | 6,993 | 413,27 | 173,27 | 989,7983 | AQ | | | |
| Z-314X | | | | 270,00 | 30,00 | 242,00 | 2,50 | 181,13 | 30,43 | 120,000 | 1331,000 | 70,80 | 6,930 | 416,85 | 174,85 | 998,2850 | AQ | | | |
| Z-315I | | | | 180,00 | 33,00 | 278,00 | 3,00 | 217,35 | 30,32 | 120,000 | 1331,000 | 70,20 | 5,740 | 489,08 | 211,08 | 1192,8339 | AW | | | |
| Z-315X | | | | 270,00 | 33,00 | 280,00 | 3,00 | 218,93 | 30,53 | 120,000 | 1331,000 | 70,20 | 5,698 | 492,65 | 212,65 | 1201,3206 | AW | | | |
| Z-316I | | | | 180,00 | 36,00 | 322,00 | 3,00 | 261,45 | 30,27 | 120,000 | 1331,000 | 69,98 | 4,748 | 577,19 | 255,19 | 1429,7087 | AZ | | | |
| Z-316X | | | | 270,00 | 36,00 | 324,00 | 3,00 | 263,03 | 30,48 | 120,000 | 1331,000 | 69,92 | 4,719 | 580,76 | 256,76 | 1438,1954 | AZ | | | |
| Z-317I | | | | 180,00 | 38,00 | 360,00 | 3,00 | 299,25 | 30,37 | 120,000 | 1331,000 | 68,55 | 4,136 | 652,99 | 292,99 | 1632,7443 | BA | | | |
| Z-317X | | | | 270,00 | 38,00 | 362,00 | 3,00 | 300,83 | 30,58 | 120,000 | 1331,000 | 68,49 | 4,113 | 656,57 | 294,57 | 1641,2309 | BA | | | |
| Z-318I | | | | 180,00 | 41,00 | 404,00 | 6,06 | 343,35 | 30,32 | 120,000 | 1331,000 | 67,45 | 3,594 | 741,10 | 337,10 | 1869,6191 | BD | | | |
| Z-318X | | | | 270,00 | 41,00 | 406,00 | 6,09 | 344,93 | 30,53 | 120,000 | 1331,000 | 67,42 | 3,578 | 744,67 | 338,67 | 1878,1057 | BD | | | |
| Z-319I | | | | 180,00 | 44,00 | 454,00 | 6,81 | 393,75 | 30,12 | 120,000 | 1331,000 | 66,73 | 3,127 | 841,50 | 387,50 | 2140,3331 | BF | | | |
| Z-319X | | | | 270,00 | 44,00 | 456,00 | 6,84 | 395,33 | 30,33 | 120,000 | 1331,000 | 66,71 | 3,114 | 845,08 | 389,08 | 2148,8198 | BF | | | |
| Z-320I | | | | 40,00 | 0,50 | 50,00 | 180,00 | 47,00 | 504,00 | 7,56 | 444,15 | 29,92 | 120,000 | 1331,000 | 66,11 | 2,767 | 941,91 | 437,91 | 2411,0472 | BG |
| Z-320X | | | | | | | 270,00 | 47,00 | 506,00 | 7,59 | 445,73 | 30,13 | 120,000 | 1331,000 | 66,09 | 2,757 | 945,49 | 439,49 | 2419,5339 | BG |
| Z-320HI | | | | | | | 180,00 | 17,00 | 130,00 | 2,00 | 85,05 | 22,50 | 200,000 | 1632,000 | 116,00 | 33,540 | 172,70 | 42,70 | 351,1531 | AN |
| Z-320HX | | | | | | | 270,00 | 17,00 | 130,00 | 2,00 | 86,63 | 21,70 | 200,000 | 1632,000 | 116,00 | 32,880 | 173,50 | 43,50 | 378,4087 | AN |
| Z-320JI | 180,00 | 25,00 | 180,00 | | | | 2,50 | 135,45 | 22,30 | 200,000 | 1632,000 | 113,50 | 20,450 | 250,00 | 70,00 | 580,6298 | AN | | | |
| Z-320JX | 270,00 | 25,00 | 180,00 | | | | 2,50 | 137,03 | 21,50 | 200,000 | 1632,000 | 113,50 | 20,200 | 250,90 | 70,90 | 587,1744 | AN | | | |
| Z-321I | 180,00 | 28,00 | 224,00 | | | | 2,50 | 179,55 | 22,22 | 200,000 | 1632,000 | 112,50 | 15,248 | 317,95 | 93,95 | 763,2999 | AP | | | |
| Z-321X | 270,00 | 28,00 | 226,00 | | | | 2,50 | 181,13 | 22,43 | 200,000 | 1632,000 | 112,50 | 15,110 | 320,80 | 94,80 | 769,8445 | AP | | | |
| Z-322I | 180,00 | 31,00 | 262,00 | | | | 3,00 | 217,35 | 22,32 | 200,000 | 1632,000 | 110,00 | 12,517 | 376,45 | 114,45 | 919,8742 | AY | | | |
| Z-322X | 270,00 | 31,00 | 264,00 | | | | 3,00 | 218,93 | 22,53 | 200,000 | 1632,000 | 110,00 | 12,424 | 379,30 | 115,30 | 926,4188 | AY | | | |
| Z-323I | 180,00 | 34,00 | 306,00 | | | | 3,00 | 261,45 | 22,27 | 200,000 | 1632,000 | 107,96 | 10,353 | 444,36 | 138,36 | 1102,5442 | AY | | | |
| Z-323X | 270,00 | 34,00 | 308,00 | | | | 3,00 | 263,03 | 22,48 | 200,000 | 1632,000 | 107,85 | 10,290 | 447,22 | 139,22 | 1109,0889 | AY | | | |
| Z-324I | 180,00 | 37,00 | 344,00 | | | | 3,00 | 299,25 | 22,37 | 200,000 | 1632,000 | 105,56 | 9,018 | 502,86 | 158,86 | 1259,1186 | AZ | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|-----------|----|
| Z-324X | 6,30 | 40,00 | 0,50 | 50,00 | 270,00 | 37,00 | 346,00 | 3,00 | 300,83 | 22,58 | 200,000 | 1632,000 | 105,47 | 8,969 | 505,71 | 159,71 | 1265,6632 | AZ | | | |
| Z-325I | | | | | 180,00 | 39,00 | 388,00 | 3,00 | 343,35 | 22,32 | 200,000 | 1632,000 | 103,73 | 7,838 | 570,77 | 182,77 | 1441,7886 | BD | | | |
| Z-325X | | | | | 270,00 | 40,00 | 390,00 | 3,00 | 344,93 | 22,53 | 200,000 | 1632,000 | 103,69 | 7,801 | 573,63 | 183,63 | 1448,3333 | BD | | | |
| Z-326I | | | | | 180,00 | 42,00 | 438,00 | 6,57 | 393,75 | 22,12 | 200,000 | 1632,000 | 102,54 | 6,818 | 648,10 | 210,10 | 1650,5544 | BF | | | |
| Z-326X | | | | | 270,00 | 42,00 | 440,00 | 6,60 | 395,33 | 22,33 | 200,000 | 1632,000 | 102,50 | 6,791 | 650,96 | 210,96 | 1657,0990 | BF | | | |
| Z-327I | | | | | 180,00 | 45,00 | 488,00 | 7,32 | 444,15 | 21,92 | 200,000 | 1632,000 | 101,49 | 6,033 | 725,44 | 237,44 | 1859,3202 | BG | | | |
| Z-327X | | | | | 270,00 | 45,00 | 490,00 | 7,35 | 445,73 | 22,13 | 200,000 | 1632,000 | 101,46 | 6,012 | 728,29 | 238,29 | 1865,8648 | BG | | | |
| Z-329I | 7,00 | 80,00 | 1,20 | 92,00 | 180,00 | 28,00 | 257,00 | 4,00 | 150,50 | 53,20 | 70,000 | 1132,000 | 54,50 | 3,060 | 603,30 | 346,30 | 1552,7705 | BA | | | |
| Z-329X | | | | | 270,00 | 28,00 | 257,00 | 4,00 | 152,25 | 52,40 | 70,000 | 1132,000 | 54,50 | 3,030 | 607,50 | 350,50 | 1570,2173 | BA | | | |
| Z-330I | | | | | 180,00 | 35,00 | 306,00 | 4,00 | 199,50 | 53,25 | 70,000 | 1132,000 | 56,28 | 2,286 | 770,83 | 464,83 | 2041,2825 | BB | | | |
| Z-330X | | | | | 270,00 | 35,00 | 308,00 | 4,00 | 201,25 | 53,37 | 70,000 | 1132,000 | 56,18 | 2,266 | 777,05 | 469,05 | 2058,7294 | BB | | | |
| Z-331I | | | | | 180,00 | 38,00 | 348,00 | 4,00 | 241,50 | 53,25 | 70,000 | 1132,000 | 54,53 | 1,877 | 914,24 | 566,24 | 2460,0072 | BD | | | |
| Z-331X | | | | | 270,00 | 39,00 | 350,00 | 4,00 | 243,25 | 53,37 | 70,000 | 1132,000 | 54,48 | 1,863 | 920,47 | 570,47 | 2477,4540 | BD | | | |
| Z-332I | | | | | 180,00 | 42,00 | 396,00 | 4,00 | 290,50 | 52,75 | 70,000 | 1132,000 | 53,11 | 1,553 | 1080,00 | 684,00 | 2948,5192 | BG | | | |
| Z-332X | | | | | 270,00 | 42,00 | 398,00 | 4,00 | 292,25 | 52,87 | 70,000 | 1132,000 | 53,06 | 1,543 | 1086,30 | 688,30 | 2965,9661 | BG | | | |
| Z-333I | | | | | 180,00 | 45,00 | 438,00 | 6,57 | 332,50 | 52,75 | 70,000 | 1132,000 | 52,07 | 1,352 | 1223,40 | 785,40 | 3367,2439 | BG | | | |
| Z-333X | | | | | 270,00 | 45,00 | 440,00 | 6,60 | 334,25 | 52,87 | 70,000 | 1132,000 | 52,03 | 1,345 | 1229,60 | 789,60 | 3384,6907 | BG | | | |
| Z-334I | | | | | 180,00 | 49,00 | 488,00 | 7,32 | 381,50 | 53,25 | 70,000 | 1132,000 | 51,28 | 1,175 | 1391,60 | 903,60 | 3855,7559 | BG | | | |
| Z-334X | | | | | 270,00 | 49,00 | 490,00 | 7,35 | 383,25 | 53,37 | 70,000 | 1132,000 | 51,26 | 1,170 | 1397,80 | 907,80 | 3873,2028 | BG | | | |
| Z-335I | | | | | 180,00 | 52,00 | 544,00 | 8,16 | 437,50 | 53,25 | 70,000 | 1132,000 | 50,76 | 1,022 | 1582,70 | 1038,70 | 4414,0554 | BG | | | |
| Z-335X | | | | | 270,00 | 52,00 | 546,00 | 8,19 | 439,25 | 53,37 | 70,000 | 1132,000 | 50,75 | 1,018 | 1589,00 | 1043,00 | 4431,5023 | BG | | | |
| Z-336I | | | | | 180,00 | 55,00 | 600,00 | 9,00 | 493,50 | 53,25 | 70,000 | 1132,000 | 50,31 | 0,905 | 1773,90 | 1173,90 | 4972,3549 | BG | | | |
| Z-336X | | | | | 270,00 | 55,00 | 602,00 | 9,03 | 495,25 | 53,37 | 70,000 | 1132,000 | 50,30 | 0,901 | 1780,10 | 1178,10 | 4989,8018 | BG | | | |
| Z-336HI | | | | | 70,00 | 1,00 | 82,00 | 180,00 | 30,00 | 242,00 | 3,00 | 150,50 | 45,80 | 95,000 | 1287,000 | 61,90 | 4,770 | 491,80 | 249,80 | 1340,0622 | AZ |
| Z-336HX | | | | | | | | 270,00 | 30,00 | 242,00 | 3,00 | 152,25 | 44,90 | 95,000 | 1287,000 | 61,90 | 4,710 | 494,90 | 252,90 | 1355,1191 | AZ |
| Z-337I | | | | | | | | 180,00 | 32,00 | 290,00 | 4,00 | 199,50 | 45,25 | 95,000 | 1287,000 | 61,50 | 3,557 | 625,16 | 335,16 | 1761,6548 | BA |
| Z-337X | | | | | | | | 270,00 | 32,00 | 292,00 | 4,00 | 201,25 | 45,37 | 95,000 | 1287,000 | 61,50 | 3,525 | 630,20 | 338,20 | 1776,7117 | BA |
| Z-338I | 180,00 | 35,00 | 332,00 | 4,00 | | | | 241,50 | 45,25 | 95,000 | 1287,000 | 60,50 | 2,920 | 740,28 | 408,28 | 2123,0199 | BB | | | | |
| Z-338X | 270,00 | 36,00 | 334,00 | 4,00 | | | | 243,25 | 45,37 | 95,000 | 1287,000 | 60,50 | 2,898 | 745,33 | 411,33 | 2138,0768 | BB | | | | |
| Z-339I | 180,00 | 39,00 | 380,00 | 4,00 | | | | 290,50 | 44,75 | 95,000 | 1287,000 | 60,36 | 2,415 | 873,59 | 493,59 | 2544,6125 | BF | | | | |
| Z-339X | 270,00 | 39,00 | 382,00 | 4,00 | | | | 292,25 | 44,87 | 95,000 | 1287,000 | 60,31 | 2,401 | 878,64 | 496,64 | 2559,6694 | BF | | | | |
| Z-340I | 180,00 | 42,00 | 422,00 | 6,33 | | | | 332,50 | 44,75 | 95,000 | 1287,000 | 59,18 | 2,104 | 988,72 | 566,72 | 2905,9776 | BG | | | | |
| Z-340X | 270,00 | 42,00 | 424,00 | 6,36 | | | | 334,25 | 44,87 | 95,000 | 1287,000 | 59,13 | 2,093 | 993,76 | 569,76 | 2921,0345 | BG | | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-----------|----|
| Z-341I | 7,00 | 70,00 | 1,00 | 82,00 | 180,00 | 45,00 | 472,00 | 7,08 | 381,50 | 45,25 | 95,000 | 1287,000 | 58,28 | 1,828 | 1124,03 | 652,03 | 3327,5702 | BG | | |
| Z-341X | | | | | 270,00 | 45,00 | 474,00 | 7,11 | 383,25 | 45,37 | 95,000 | 1287,000 | 58,26 | 1,820 | 1129,08 | 655,08 | 3342,6271 | BG | | |
| Z-342I | | | | | 180,00 | 48,00 | 528,00 | 7,92 | 437,50 | 45,25 | 95,000 | 1287,000 | 57,69 | 1,591 | 1277,53 | 749,53 | 3809,3903 | BG | | |
| Z-342X | | | | | 270,00 | 48,00 | 530,00 | 7,95 | 439,25 | 45,37 | 95,000 | 1287,000 | 57,67 | 1,584 | 1282,58 | 752,58 | 3824,4472 | BG | | |
| Z-343I | | | | | 180,00 | 51,00 | 584,00 | 8,76 | 493,50 | 45,25 | 95,000 | 1287,000 | 57,18 | 1,408 | 1431,03 | 847,03 | 4291,2104 | BG | | |
| Z-343X | | | | | 270,00 | 51,00 | 586,00 | 8,79 | 495,25 | 45,37 | 95,000 | 1287,000 | 57,16 | 1,402 | 1436,08 | 850,08 | 4306,2673 | BG | | |
| Z-343HI | 60,00 | 0,80 | 72,00 | 180,00 | 25,00 | 226,00 | 2,50 | 150,50 | 37,80 | 130,000 | 1489,000 | 76,10 | 8,010 | 395,60 | 169,60 | 1127,3539 | AZ | | | |
| Z-343HX | | | | 270,00 | 25,00 | 226,00 | 2,50 | 152,25 | 36,90 | 130,000 | 1489,000 | 76,10 | 7,910 | 397,70 | 171,70 | 1140,0208 | AZ | | | |
| Z-344I | | | | 180,00 | 30,00 | 274,00 | 3,00 | 199,50 | 37,25 | 130,000 | 1489,000 | 75,50 | 5,974 | 501,50 | 227,50 | 1482,0271 | BA | | | |
| Z-344X | | | | 270,00 | 30,00 | 276,00 | 3,00 | 201,25 | 37,37 | 130,000 | 1489,000 | 75,50 | 5,921 | 505,57 | 229,57 | 1494,6940 | BA | | | |
| Z-345I | | | | 180,00 | 33,00 | 316,00 | 3,00 | 241,50 | 37,25 | 130,000 | 1489,000 | 74,80 | 4,904 | 593,14 | 277,14 | 1786,0326 | BA | | | |
| Z-345X | | | | 270,00 | 33,00 | 318,00 | 3,00 | 243,50 | 37,37 | 130,000 | 1489,000 | 74,80 | 4,868 | 597,21 | 279,21 | 1800,5091 | BA | | | |
| Z-346I | | | | 180,00 | 36,00 | 364,00 | 3,00 | 290,50 | 36,75 | 130,000 | 1489,000 | 74,01 | 4,057 | 699,05 | 335,05 | 2140,7057 | BE | | | |
| Z-346X | | | | 270,00 | 36,00 | 366,00 | 3,00 | 292,25 | 36,87 | 130,000 | 1489,000 | 73,94 | 4,032 | 703,11 | 337,11 | 2153,3726 | BE | | | |
| Z-347I | | | | 180,00 | 39,00 | 406,00 | 6,09 | 332,50 | 36,75 | 130,000 | 1489,000 | 72,53 | 3,533 | 790,68 | 384,68 | 2444,7113 | BG | | | |
| Z-347X | | | | 270,00 | 39,00 | 408,00 | 6,12 | 334,25 | 36,87 | 130,000 | 1489,000 | 72,47 | 3,514 | 794,75 | 386,75 | 2457,3782 | BG | | | |
| Z-348I | | | | 180,00 | 42,00 | 456,00 | 6,84 | 381,50 | 37,25 | 130,000 | 1489,000 | 71,39 | 3,071 | 898,54 | 442,54 | 2799,3844 | BG | | | |
| Z-348X | | | | 270,00 | 42,00 | 458,00 | 6,87 | 383,25 | 37,37 | 130,000 | 1489,000 | 71,36 | 3,057 | 902,66 | 444,66 | 2812,0513 | BG | | | |
| Z-349I | | | | 180,00 | 45,00 | 512,00 | 7,68 | 437,50 | 37,25 | 130,000 | 1489,000 | 70,65 | 2,672 | 1019,77 | 507,77 | 3204,7252 | BG | | | |
| Z-349X | | | | 270,00 | 45,00 | 514,00 | 7,71 | 439,25 | 37,37 | 130,000 | 1489,000 | 70,63 | 2,661 | 1024,84 | 510,84 | 3217,3921 | BG | | | |
| Z-350I | | | | 180,00 | 48,00 | 568,00 | 8,52 | 493,50 | 37,25 | 130,000 | 1489,000 | 70,01 | 2,364 | 1142,96 | 574,96 | 3610,0659 | BG | | | |
| Z-350X | | | | 270,00 | 48,00 | 570,00 | 8,55 | 495,25 | 37,37 | 130,000 | 1489,000 | 69,99 | 2,356 | 1146,90 | 576,90 | 3622,7328 | BG | | | |
| Z-350HI | | | | 50,00 | 0,60 | 62,00 | 180,00 | 24,00 | 210,00 | 2,50 | 150,50 | 29,80 | 200,000 | 1763,000 | 104,60 | 15,000 | 314,20 | 104,20 | 914,6456 | AY |
| Z-350HX | | | | | | | 270,00 | 24,00 | 210,00 | 2,50 | 152,25 | 28,90 | 200,000 | 1763,000 | 104,60 | 14,830 | 315,40 | 105,40 | 924,9225 | AY |
| Z-351I | | | | | | | 180,00 | 29,00 | 258,00 | 3,00 | 199,50 | 29,25 | 200,000 | 1763,000 | 103,50 | 11,187 | 397,75 | 139,75 | 1202,3993 | AZ |
| Z-351X | | | | | | | 270,00 | 29,00 | 260,00 | 3,00 | 201,25 | 29,37 | 200,000 | 1763,000 | 103,50 | 11,086 | 401,02 | 141,02 | 1212,6762 | AZ |
| Z-352I | | | | | | | 180,00 | 32,00 | 300,00 | 3,00 | 241,50 | 29,25 | 200,000 | 1763,000 | 102,50 | 9,184 | 470,25 | 170,25 | 1449,0453 | BA |
| Z-352X | | | | | | | 270,00 | 32,00 | 302,00 | 3,00 | 243,25 | 29,37 | 200,000 | 1763,000 | 102,50 | 9,116 | 473,52 | 171,52 | 1459,3222 | BA |
| Z-353I | | | | | | | 180,00 | 35,00 | 349,00 | 3,00 | 290,50 | 29,25 | 200,000 | 1763,000 | 101,61 | 7,596 | 554,82 | 205,82 | 1736,7990 | BD |
| Z-353X | | | | | | | 270,00 | 35,00 | 351,00 | 3,00 | 292,25 | 29,37 | 200,000 | 1763,000 | 101,52 | 7,550 | 558,09 | 207,09 | 1747,0759 | BD |
| Z-354I | 180,00 | 38,00 | 391,00 | | | | 3,00 | 332,50 | 29,25 | 200,000 | 1763,000 | 99,45 | 6,616 | 627,31 | 236,31 | 1983,4450 | BF | | | |
| Z-354X | 270,00 | 38,00 | 393,00 | | | | 3,00 | 334,25 | 29,37 | 200,000 | 1763,000 | 99,37 | 6,581 | 630,58 | 237,58 | 1993,7219 | BF | | | |
| Z-355I | 180,00 | 40,00 | 440,00 | | | | 6,60 | 381,50 | 29,25 | 200,000 | 1763,000 | 97,80 | 5,750 | 711,88 | 271,88 | 2271,1987 | BG | | | |
| Z-355X | 270,00 | 40,00 | 442,00 | | | | 6,63 | 383,25 | 29,37 | 200,000 | 1763,000 | 97,77 | 5,724 | 715,16 | 273,16 | 2281,4756 | BG | | | |

Extension springs

| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|--------|-----------|----|
| Z-356I | 7,00 | 50,00 | 0,60 | 62,00 | 180,00 | 43,00 | 496,00 | 7,44 | 437,50 | 29,25 | 200,000 | 1763,000 | 96,73 | 5,002 | 808,54 | 312,54 | 2600,0600 | BG | | | |
| Z-356X | | | | | 270,00 | 43,00 | 498,00 | 7,47 | 439,25 | 29,37 | 200,000 | 1763,000 | 96,70 | 4,982 | 811,81 | 313,81 | 2610,3370 | BG | | | |
| Z-357I | | | | | 180,00 | 46,00 | 552,00 | 8,28 | 493,50 | 29,25 | 200,000 | 1763,000 | 95,79 | 4,427 | 905,20 | 353,20 | 2928,9214 | BG | | | |
| Z-357X | | | | | 270,00 | 46,00 | 554,00 | 8,31 | 495,25 | 29,37 | 200,000 | 1763,000 | 95,76 | 4,411 | 908,47 | 354,47 | 2939,1983 | BG | | | |
| Z-359I | 8,00 | 80,00 | 1,20 | 94,00 | 180,00 | 28,00 | 275,00 | 4,00 | 172,00 | 51,00 | 120,000 | 1627,000 | 79,50 | 5,450 | 551,30 | 276,30 | 2000,3261 | BF | | | |
| Z-359X | | | | | 270,00 | 28,00 | 275,00 | 4,00 | 174,00 | 51,00 | 120,000 | 1627,000 | 79,50 | 5,380 | 554,70 | 279,70 | 2022,8017 | BF | | | |
| Z-360I | | | | | 180,00 | 32,00 | 330,00 | 4,00 | 228,00 | 51,00 | 120,000 | 1627,000 | 77,80 | 4,065 | 700,91 | 370,91 | 2629,6421 | BG | | | |
| Z-360X | | | | | 270,00 | 32,00 | 332,00 | 4,00 | 230,00 | 51,00 | 120,000 | 1627,000 | 77,80 | 4,029 | 706,28 | 374,28 | 2652,1177 | BG | | | |
| Z-361I | | | | | 180,00 | 35,00 | 378,00 | 4,00 | 276,00 | 51,00 | 120,000 | 1627,000 | 76,90 | 3,337 | 829,84 | 451,84 | 3169,0559 | BG | | | |
| Z-361X | | | | | 270,00 | 36,00 | 380,00 | 4,00 | 278,00 | 51,00 | 120,000 | 1627,000 | 76,90 | 3,313 | 835,21 | 455,21 | 3191,5315 | BG | | | |
| Z-362I | | | | | 180,00 | 39,00 | 434,00 | 6,51 | 332,00 | 51,00 | 120,000 | 1627,000 | 75,93 | 2,760 | 980,25 | 546,25 | 3798,3720 | BG | | | |
| Z-362X | | | | | 270,00 | 39,00 | 436,00 | 6,54 | 334,00 | 51,00 | 120,000 | 1627,000 | 75,86 | 2,743 | 985,62 | 549,62 | 3820,8476 | BG | | | |
| Z-363I | | | | | 180,00 | 42,00 | 482,00 | 7,23 | 380,00 | 51,00 | 120,000 | 1627,000 | 74,45 | 2,404 | 1109,10 | 627,10 | 4337,7858 | BG | | | |
| Z-363X | | | | | 270,00 | 42,00 | 484,00 | 7,26 | 382,00 | 51,00 | 120,000 | 1627,000 | 74,39 | 2,391 | 1114,55 | 630,55 | 4360,2613 | BG | | | |
| Z-364I | | | | | 180,00 | 45,00 | 538,00 | 8,07 | 436,00 | 51,00 | 120,000 | 1627,000 | 73,32 | 2,090 | 1259,20 | 721,20 | 4967,1018 | BG | | | |
| Z-364X | | | | | 270,00 | 45,00 | 540,00 | 8,10 | 438,00 | 51,00 | 120,000 | 1627,000 | 73,29 | 2,080 | 1264,96 | 724,96 | 4989,5774 | BG | | | |
| Z-365I | | | | | 180,00 | 48,00 | 602,00 | 9,03 | 500,00 | 51,00 | 120,000 | 1627,000 | 72,58 | 1,818 | 1431,00 | 829,00 | 5686,3202 | BG | | | |
| Z-365X | | | | | 270,00 | 48,00 | 604,00 | 9,06 | 502,00 | 51,00 | 120,000 | 1627,000 | 72,56 | 1,810 | 1436,86 | 832,86 | 5708,7958 | BG | | | |
| Z-366I | | | | | 180,00 | 51,00 | 666,00 | 9,99 | 564,00 | 51,00 | 120,000 | 1627,000 | 71,94 | 1,609 | 1602,80 | 936,80 | 6405,5386 | BG | | | |
| Z-366X | | | | | 270,00 | 51,00 | 668,00 | 10,02 | 566,00 | 51,00 | 120,000 | 1627,000 | 71,92 | 1,603 | 1608,20 | 940,20 | 6428,0141 | BG | | | |
| Z-366HI | | | | | 70,00 | 0,80 | 83,00 | 180,00 | 25,00 | 258,00 | 3,00 | 172,00 | 43,00 | 180,000 | 1847,000 | 94,50 | 8,540 | 453,20 | 195,20 | 1722,5030 | BE |
| Z-366HX | | | | | | | | 270,00 | 25,00 | 258,00 | 3,00 | 174,00 | 43,00 | 180,000 | 1847,000 | 94,50 | 8,440 | 455,60 | 197,60 | 1741,8570 | BE |
| Z-367I | | | | | | | | 180,00 | 30,00 | 314,00 | 3,00 | 228,00 | 43,00 | 180,000 | 1847,000 | 93,50 | 6,367 | 575,86 | 261,86 | 2264,4141 | BG |
| Z-367X | | | | | | | | 270,00 | 30,00 | 316,00 | 3,00 | 230,00 | 43,00 | 180,000 | 1847,000 | 93,50 | 6,309 | 580,24 | 264,24 | 2283,7680 | BG |
| Z-368I | 180,00 | 33,00 | 362,00 | 3,00 | | | | 276,00 | 43,00 | 180,000 | 1847,000 | 92,73 | 5,226 | 680,99 | 318,99 | 2728,9093 | BG | | | | |
| Z-368X | 270,00 | 33,00 | 364,00 | 3,00 | | | | 278,00 | 43,00 | 180,000 | 1847,000 | 92,64 | 5,188 | 685,37 | 321,37 | 2748,2632 | BG | | | | |
| Z-369I | 180,00 | 37,00 | 418,00 | 6,27 | | | | 332,00 | 43,00 | 180,000 | 1847,000 | 90,27 | 4,323 | 803,65 | 385,65 | 3270,8203 | BG | | | | |
| Z-369X | 270,00 | 37,00 | 420,00 | 6,30 | | | | 334,00 | 43,00 | 180,000 | 1847,000 | 90,19 | 4,297 | 808,03 | 388,03 | 3290,1743 | BG | | | | |
| Z-370I | 180,00 | 39,00 | 466,00 | 6,99 | | | | 380,00 | 43,00 | 180,000 | 1847,000 | 88,47 | 3,765 | 908,78 | 442,78 | 3735,3155 | BG | | | | |
| Z-370X | 270,00 | 39,00 | 468,00 | 7,02 | | | | 382,00 | 43,00 | 180,000 | 1847,000 | 88,40 | 3,745 | 913,16 | 445,16 | 3754,6695 | BG | | | | |
| Z-371I | 180,00 | 42,00 | 522,00 | 7,83 | | | | 436,00 | 43,00 | 180,000 | 1847,000 | 87,09 | 3,273 | 1031,44 | 509,44 | 4277,2266 | BG | | | | |
| Z-371X | 270,00 | 42,00 | 524,00 | 7,86 | | | | 438,00 | 43,00 | 180,000 | 1847,000 | 87,06 | 3,257 | 1035,82 | 511,82 | 4296,5805 | BG | | | | |
| Z-372I | 180,00 | 45,00 | 586,00 | 8,79 | | | | 500,00 | 43,00 | 180,000 | 1847,000 | 86,20 | 2,847 | 1171,61 | 585,61 | 4896,5535 | BG | | | | |
| Z-372X | 270,00 | 45,00 | 588,00 | 8,82 | | | | 502,00 | 43,00 | 180,000 | 1847,000 | 86,17 | 2,835 | 1175,99 | 587,99 | 4915,9075 | BG | | | | |

Extension springs

Music wire EN 10270-1-SH (A228, BS 5216)

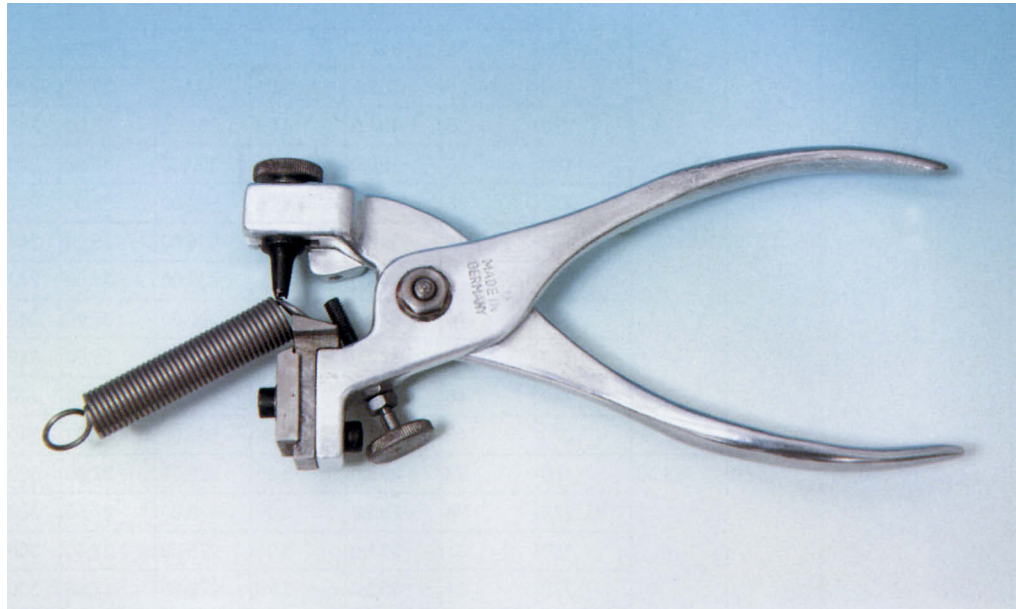
| artical number | d wire diameter | De outer coil diameter | Detol +/- tolerance De | Dh bush diameter from | loop position degree | +/- tolerance loop position | L0 free length | L0tol +/- tolerance L0 | Lk length spring body | Lh loop height | F0 initial tension | Fn maximum force at Ln | Fntol +/- tolerance Fn | R spring rate N/mm | Ln maximum spring length | sn maximum spring deflection | weight one spring in gram | price group | | |
|----------------|-----------------|------------------------|------------------------|-----------------------|----------------------|-----------------------------|----------------|------------------------|-----------------------|----------------|--------------------|------------------------|------------------------|--------------------|--------------------------|------------------------------|---------------------------|-------------|-----------|----|
| Z-373I | 8,00 | 70,00 | 0,80 | 83,00 | 180,00 | 48,00 | 650,00 | 9,75 | 564,00 | 43,00 | 180,000 | 1847,000 | 85,42 | 2,519 | 1311,79 | 661,79 | 5515,8804 | BG | | |
| Z-373X | | | | | 270,00 | 48,00 | 652,00 | 9,78 | 566,00 | 43,00 | 180,000 | 1847,000 | 85,40 | 2,510 | 1316,17 | 664,17 | 5535,2344 | BG | | |
| Z-373HI | 60,00 | 0,80 | 73,00 | 180,00 | 24,00 | 240,00 | 2,50 | 172,00 | 35,00 | 240,000 | 2132,000 | 122,50 | 14,470 | 370,70 | 130,70 | 1444,6799 | BF | | | |
| Z-373HX | | | | 270,00 | 24,00 | 240,00 | 2,50 | 174,00 | 35,00 | 240,000 | 2132,000 | 122,50 | 14,300 | 372,30 | 132,30 | 1460,9123 | BF | | | |
| Z-374I | | | | 180,00 | 29,00 | 298,00 | 3,00 | 228,00 | 35,00 | 240,000 | 2132,000 | 121,70 | 10,792 | 473,36 | 175,36 | 1899,1860 | BG | | | |
| Z-374X | | | | 270,00 | 29,00 | 300,00 | 3,00 | 230,00 | 35,00 | 240,000 | 2132,000 | 121,70 | 10,694 | 476,96 | 176,96 | 1915,4184 | BG | | | |
| Z-375I | | | | 180,00 | 32,00 | 346,00 | 3,00 | 276,00 | 35,00 | 240,000 | 2132,000 | 119,88 | 8,859 | 559,63 | 213,63 | 2288,7626 | BG | | | |
| Z-375X | | | | 270,00 | 32,00 | 348,00 | 3,00 | 278,00 | 35,00 | 240,000 | 2132,000 | 119,74 | 8,793 | 563,22 | 215,22 | 2304,9950 | BG | | | |
| Z-376I | | | | 180,00 | 35,00 | 402,00 | 6,03 | 332,00 | 35,00 | 240,000 | 2132,000 | 116,54 | 7,328 | 660,26 | 258,26 | 2743,2687 | BG | | | |
| Z-376X | | | | 270,00 | 35,00 | 404,00 | 6,06 | 334,00 | 35,00 | 240,000 | 2132,000 | 116,43 | 7,283 | 663,86 | 259,86 | 2759,5010 | BG | | | |
| Z-377I | | | | 180,00 | 38,00 | 450,00 | 6,75 | 380,00 | 35,00 | 240,000 | 2132,000 | 114,11 | 6,382 | 746,53 | 296,53 | 3132,8453 | BG | | | |
| Z-377X | | | | 270,00 | 38,00 | 452,00 | 6,78 | 382,00 | 35,00 | 240,000 | 2132,000 | 114,01 | 6,348 | 750,12 | 298,12 | 3149,0776 | BG | | | |
| Z-378I | | | | 180,00 | 41,00 | 506,00 | 7,59 | 436,00 | 35,00 | 240,000 | 2132,000 | 112,25 | 5,547 | 847,10 | 341,10 | 3587,3513 | BG | | | |
| Z-378X | | | | 270,00 | 41,00 | 508,00 | 7,62 | 438,00 | 35,00 | 240,000 | 2132,000 | 112,21 | 5,521 | 850,70 | 342,70 | 3603,5837 | BG | | | |
| Z-379I | | | | 180,00 | 44,00 | 570,00 | 8,55 | 500,00 | 35,00 | 240,000 | 2132,000 | 111,04 | 4,826 | 962,18 | 392,18 | 4106,7868 | BG | | | |
| Z-379X | | | | 270,00 | 44,00 | 572,00 | 8,58 | 502,00 | 35,00 | 240,000 | 2132,000 | 111,01 | 4,806 | 965,77 | 393,77 | 4123,0192 | BG | | | |
| Z-380I | | | | 180,00 | 46,00 | 634,00 | 9,51 | 564,00 | 35,00 | 240,000 | 2132,000 | 109,99 | 4,270 | 1077,19 | 443,19 | 4626,2223 | BG | | | |
| Z-380X | | | | 270,00 | 46,00 | 636,00 | 9,54 | 566,00 | 35,00 | 240,000 | 2132,000 | 109,96 | 4,255 | 1080,79 | 444,79 | 4642,4547 | BG | | | |
| Z-380HI | | | | 50,00 | 0,60 | 63,00 | 180,00 | 24,00 | 227,00 | 2,50 | 172,00 | 27,50 | 300,000 | 2515,000 | 173,00 | 27,470 | 307,60 | 80,60 | 1166,8569 | BF |
| Z-380HX | | | | | | | 270,00 | 24,00 | 227,00 | 2,50 | 174,00 | 27,50 | 300,000 | 2515,000 | 173,00 | 27,140 | 308,00 | 81,00 | 1179,9676 | BF |
| Z-381I | | | | | | | 180,00 | 28,00 | 283,00 | 3,00 | 228,00 | 27,50 | 300,000 | 2515,000 | 179,54 | 20,480 | 391,20 | 108,20 | 1533,9579 | BG |
| Z-381X | | | | | | | 270,00 | 28,00 | 285,00 | 3,00 | 230,00 | 27,50 | 300,000 | 2515,000 | 179,20 | 20,296 | 394,18 | 109,18 | 1547,0687 | BG |
| Z-382I | 180,00 | 31,00 | 331,00 | | | | 3,00 | 276,00 | 27,50 | 300,000 | 2515,000 | 173,25 | 16,813 | 462,80 | 131,80 | 1848,6160 | BG | | | |
| Z-382X | 270,00 | 31,00 | 333,00 | | | | 3,00 | 278,00 | 27,50 | 300,000 | 2515,000 | 173,05 | 16,688 | 465,78 | 132,78 | 1861,7267 | BG | | | |
| Z-383I | 180,00 | 34,00 | 387,00 | | | | 3,00 | 332,00 | 27,50 | 300,000 | 2515,000 | 168,10 | 13,907 | 546,34 | 159,34 | 2215,7170 | BG | | | |
| Z-383X | 270,00 | 34,00 | 389,00 | | | | 3,00 | 334,00 | 27,50 | 300,000 | 2515,000 | 167,91 | 13,821 | 549,33 | 160,33 | 2228,8277 | BG | | | |
| Z-384I | 180,00 | 37,00 | 435,00 | | | | 6,52 | 380,00 | 27,50 | 300,000 | 2515,000 | 164,36 | 12,112 | 617,95 | 182,95 | 2530,3750 | BG | | | |
| Z-384X | 270,00 | 37,00 | 437,00 | | | | 6,55 | 382,00 | 27,50 | 300,000 | 2515,000 | 164,21 | 12,048 | 620,93 | 183,93 | 2543,4858 | BG | | | |
| Z-385I | 180,00 | 39,00 | 491,00 | | | | 7,36 | 436,00 | 27,50 | 300,000 | 2515,000 | 161,49 | 10,528 | 701,49 | 210,49 | 2897,4761 | BG | | | |
| Z-385X | 270,00 | 39,00 | 493,00 | | | | 7,39 | 438,00 | 27,50 | 300,000 | 2515,000 | 161,43 | 10,479 | 704,47 | 211,47 | 2910,5868 | BG | | | |
| Z-386I | 180,00 | 42,00 | 555,00 | | | | 8,32 | 500,00 | 27,50 | 300,000 | 2515,000 | 159,63 | 9,158 | 796,96 | 241,96 | 3317,0201 | BG | | | |
| Z-386X | 270,00 | 42,00 | 557,00 | | | | 8,35 | 502,00 | 27,50 | 300,000 | 2515,000 | 159,58 | 9,121 | 799,95 | 242,95 | 3330,1309 | BG | | | |
| Z-387I | 180,00 | 45,00 | 619,00 | | | | 9,28 | 564,00 | 27,50 | 300,000 | 2515,000 | 158,00 | 8,104 | 892,44 | 273,44 | 3736,5642 | BG | | | |
| Z-387X | 270,00 | 45,00 | 621,00 | | | | 9,31 | 566,00 | 27,50 | 300,000 | 2515,000 | 157,96 | 8,075 | 895,42 | 274,42 | 3749,6749 | BG | | | |

Loop pliers

The loop pliers shown below ensure the quick and economical connection of loops to spring bodies.

They are suitable for:

1. English loops
2. lateral loops single and double, closed or open.
3. wire diameters from 0.3 to 1.5 mm
4. outer diameters of spring bodies from 3.0 to 15 mm.



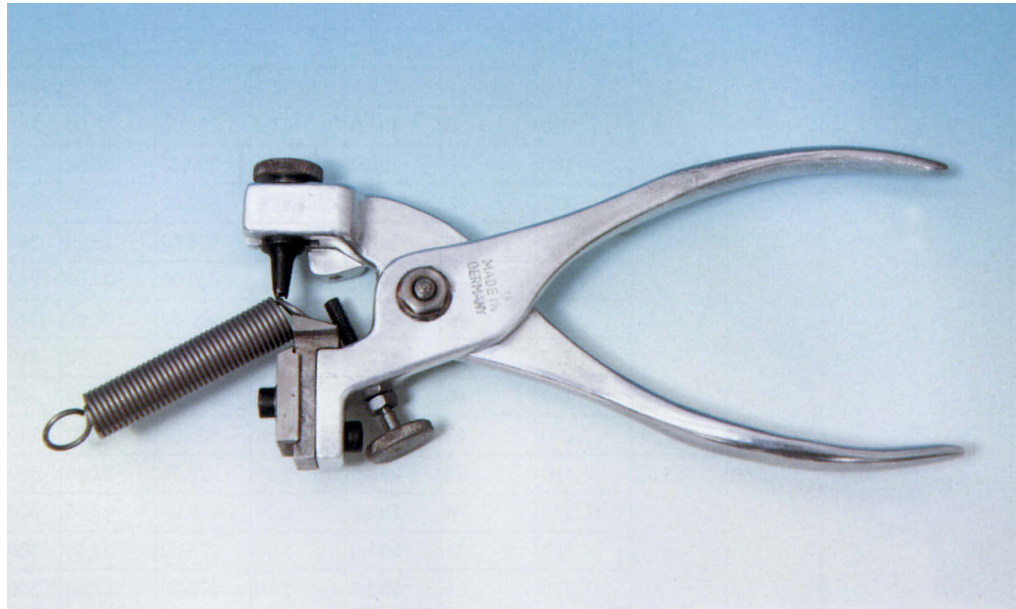
**The pliers come with all the necessary accessories, and are packed in a wooden box.
Ex-warehouse price group "ED"
Catalogue number – FZ-1.**

Loop pliers

The loop pliers shown below ensure the quick and economical connection of loops to spring bodies.

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4. outer diameters of spring bodies from 3.0 to 15 mm.



**The pliers come with all the necessary accessories, and are packed in a wooden box.
Ex-warehouse price group "ED"
Catalogue number – FZ-1.**

Endless extension springs

Material

Patented drawn spring steel wire in compliance with EN 10270 part 1 type DH for all wire diameters up to 1.9 mm. For diameters between 2.0 and 10.0 mm type SH will be used (A228 / BS 5216). Our stainless steel springs are manufactured using spring steel wire material no. 1.4310 in compliance with EN 10270 part 3 (A301 / BS 301S21). The tolerances of the wire diameters comply with EN 10270.

Data sheets at federnshop.com

Design

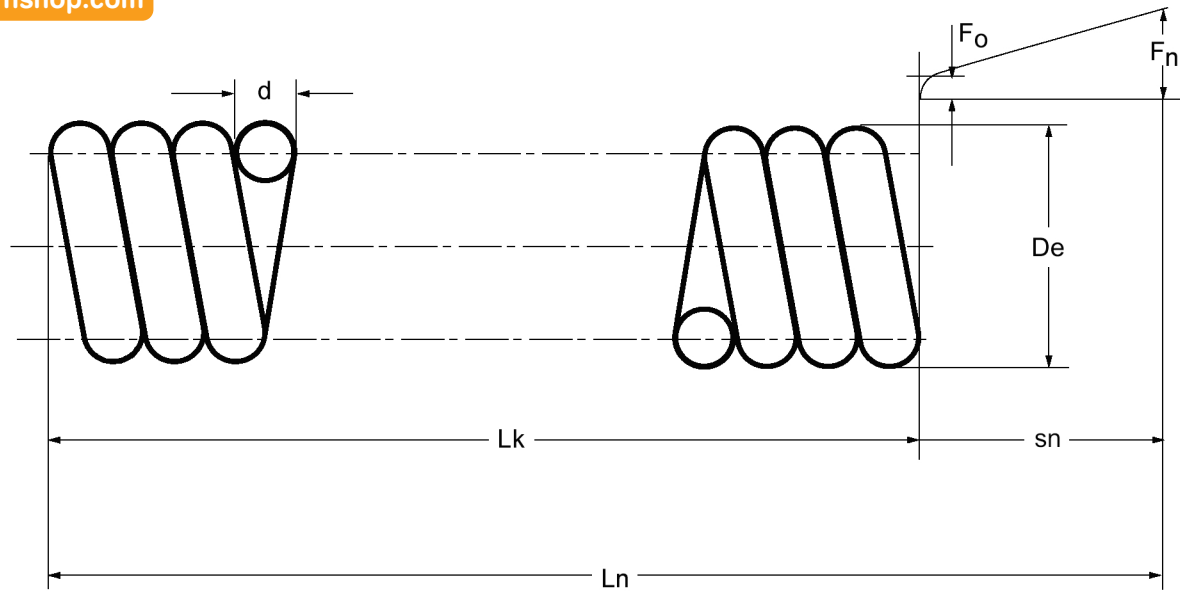
The springs are right-hand coiled (clockwise). The length of each spring is 1000mm. The spring bodies do not have any loops.

Thermal treatment

The endless extension springs are not thermally treated, in order to allow the loops to be bent accurately. The springs should be tempered before being employed as extension springs. **Thermal coating 30 minutes at 240° C. Cool down by air.**

Loads

The indicated maximum load (F_n) is the maximum load which that particular spring can withstand. The stated spring rate ($R1$) applies to the compression of one coil. If a spring has several coils the spring rate can be calculated by dividing ($R1$) by the number of active coils (n) [$R=R1/n$]. The maximum extended length is determined by multiplying the number of active coils with the maximum extension of one coil [$s_n=s_{n1} \cdot n$].



| formula | unit | technical term | inquiry | formula | unit | technical term | inquiry |
|---------|------|-------------------------------|---------|----------|------|---------------------------------------|---------|
| d | mm | wire diameter | | F_n | N | maximum spring force | |
| De | mm | outer coil diameter | | s_{n1} | mm | maximum spring deflection of one coil | |
| Lk | mm | length of relaxed spring body | | R1 | N/mm | spring rate of one coil | |
| F0 | N | initial tension | | n | pc. | number of active coils | |

Endless extension springs

Music wire EN 10270-1-DH (A228, BS 5216)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|
| M-220 | 0,10 | 1,60 | 0,302 | 0,008 | 0,301 | 2,907 | BG |
| M-215 | | 1,40 | 0,463 | 0,010 | 0,351 | 2,519 | BG |
| M-210 | | 1,20 | 0,765 | 0,020 | 0,401 | 2,132 | BG |
| M-205 | | 1,00 | 1,397 | 0,030 | 0,481 | 1,745 | BG |
| M-200 | | 0,80 | 2,970 | 0,050 | 0,591 | 1,359 | BG |
| M-250 | 0,12 | 1,80 | 0,445 | 0,010 | 0,461 | 3,907 | BA |
| M-245 | | 1,60 | 0,651 | 0,020 | 0,521 | 3,442 | BA |
| M-240 | | 1,40 | 1,006 | 0,030 | 0,591 | 2,978 | BA |
| M-235 | | 1,20 | 1,675 | 0,050 | 0,681 | 2,514 | BA |
| M-230 | | 1,00 | 3,097 | 0,075 | 0,811 | 2,050 | BA |
| M-280 | 0,16 | 2,00 | 1,071 | 0,040 | 0,971 | 5,707 | AX |
| M-275 | | 1,80 | 1,512 | 0,060 | 1,071 | 5,088 | AX |
| M-270 | | 1,60 | 2,234 | 0,080 | 1,201 | 4,469 | AX |
| M-265 | | 1,40 | 3,490 | 0,120 | 1,361 | 3,850 | AX |
| M-260 | | 1,20 | 5,930 | 0,150 | 1,571 | 3,232 | AX |
| M-285 | 0,20 | 4,00 | 0,297 | 0,010 | 0,951 | 14,720 | AY |
| M-290 | | 3,50 | 0,453 | 0,015 | 1,081 | 12,780 | AY |
| M-295 | | 3,00 | 0,742 | 0,061 | 1,261 | 10,850 | AY |
| M-001 | | 2,70 | 1,042 | 0,081 | 1,391 | 9,692 | AY |
| M-298 | | 2,40 | 1,529 | 0,080 | 1,561 | 8,531 | AY |
| M-002 | | 2,20 | 2,036 | 0,101 | 1,691 | 7,757 | AY |
| M-002AA | | 2,00 | 2,700 | 0,121 | 1,821 | 7,000 | AY |
| M-002AA | 0,25 | 5,00 | 0,371 | 0,031 | 1,461 | 23,000 | AW |
| M-002A | | 4,50 | 0,518 | 0,030 | 1,621 | 20,580 | AW |
| M-002B | | 4,20 | 0,645 | 0,041 | 1,731 | 19,130 | AW |
| M-002C | | 3,60 | 1,058 | 0,080 | 2,011 | 16,230 | AW |
| M-003 | | 3,40 | 1,272 | 0,101 | 2,131 | 15,260 | AW |
| M-003A | | 2,90 | 2,136 | 0,140 | 2,481 | 12,840 | AW |
| M-004 | | 2,70 | 2,703 | 0,180 | 2,651 | 11,870 | AW |
| M-005 | | 2,20 | 5,362 | 0,251 | 3,221 | 9,461 | AW |
| M-005AA | | 2,00 | 7,418 | 0,300 | 3,531 | 8,495 | AW |
| M-005A | | 0,32 | 5,50 | 0,760 | 0,081 | 2,711 | 32,120 |
| M-006 | 4,30 | | 1,693 | 0,181 | 3,451 | 24,680 | AW |
| M-007 | 3,50 | | 3,319 | 0,221 | 4,211 | 19,730 | AW |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|
| VM-220 | 0,10 | 1,60 | 0,265 | 0,010 | 0,241 | 2,925 | BH |
| VM-215 | | 1,40 | 0,407 | 0,001 | 0,271 | 2,535 | BH |
| VM-210 | | 1,20 | 0,673 | 0,020 | 0,311 | 2,146 | BH |
| VM-205 | | 1,00 | 1,228 | 0,030 | 0,371 | 1,757 | BH |
| VM-200 | | 0,80 | 2,610 | 0,050 | 0,461 | 1,368 | BH |
| VM-250 | 0,12 | 1,80 | 0,391 | 0,008 | 0,361 | 3,932 | BB |
| VM-245 | | 1,60 | 0,573 | 0,015 | 0,411 | 3,464 | BB |
| VM-240 | | 1,40 | 0,885 | 0,023 | 0,461 | 2,997 | BB |
| VM-235 | | 1,20 | 1,474 | 0,038 | 0,541 | 2,530 | BB |
| VM-230 | | 1,00 | 2,724 | 0,060 | 0,641 | 2,063 | BB |
| VM-280 | 0,16 | 2,00 | 0,942 | 0,038 | 0,761 | 5,744 | AY |
| VM-275 | | 1,80 | 1,330 | 0,053 | 0,840 | 5,120 | AY |
| VM-270 | | 1,60 | 1,965 | 0,068 | 0,941 | 4,498 | AY |
| VM-265 | | 1,40 | 3,077 | 0,090 | 1,071 | 3,875 | AY |
| VM-260 | | 1,20 | 5,215 | 0,128 | 1,241 | 3,253 | AY |
| VM-285 | 0,20 | 4,00 | 0,261 | 0,015 | 0,751 | 14,810 | AZ |
| VM-290 | | 3,50 | 0,399 | 0,018 | 0,851 | 12,870 | AZ |
| VM-295 | | 3,00 | 0,652 | 0,051 | 0,991 | 10,920 | AZ |
| VM-001 | | 2,70 | 0,917 | 0,061 | 1,101 | 9,754 | AZ |
| VM-298 | | 2,40 | 1,345 | 0,075 | 1,231 | 8,585 | AZ |
| VM-002 | | 2,20 | 1,790 | 0,081 | 1,341 | 7,806 | AZ |
| VM-002A | 0,25 | 5,00 | 0,326 | 0,016 | 1,151 | 23,150 | AX |
| VM-002AA | | 4,50 | 0,456 | 0,015 | 1,281 | 20,710 | AX |
| VM-002B | | 4,20 | 0,567 | 0,031 | 1,371 | 19,250 | AX |
| VM-002C | | 3,60 | 0,930 | 0,068 | 1,591 | 16,330 | AX |
| VM-003 | | 3,40 | 1,119 | 0,081 | 1,681 | 15,360 | AX |
| VM-003A | | 2,90 | 1,879 | 0,128 | 1,961 | 12,920 | AX |
| VM-004 | | 2,70 | 2,378 | 0,141 | 2,101 | 11,950 | AX |
| VM-005 | | 2,20 | 4,716 | 0,201 | 2,551 | 9,522 | AX |
| VM-005AA | | 2,00 | 6,525 | 0,270 | 2,791 | 8,549 | AX |
| VM-005A | 0,32 | 5,50 | 0,675 | 0,061 | 2,161 | 32,320 | AX |
| VM-006 | | 4,30 | 1,489 | 0,141 | 2,741 | 24,840 | AX |
| VM-007 | | 3,50 | 2,919 | 0,181 | 3,351 | 19,860 | AX |

Endless extension springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| VM-008 | 0,32 | 2,80 | 6,154 | 0,251 | 4,141 | 15,500 | AW | |
| VM-008A | | 2,20 | 14,126 | 0,351 | 5,171 | 11,760 | AW | |
| VM-008AA | | 2,00 | 19,796 | 0,660 | 5,631 | 10,520 | AW | |
| VM-008B | 0,36 | 6,00 | 0,838 | 0,070 | 2,791 | 39,590 | AW | |
| VM-008C | | 4,00 | 3,118 | 0,191 | 4,131 | 25,570 | AW | |
| VM-008D | | 2,50 | 15,342 | 0,611 | 6,421 | 15,070 | AW | |
| VM-008DA | | 2,20 | 24,136 | 0,870 | 7,201 | 12,970 | AW | |
| VM-008E | 0,40 | 7,00 | 0,797 | 0,060 | 3,251 | 51,480 | AW | |
| VM-009 | | 5,40 | 1,833 | 0,231 | 4,191 | 39,010 | AW | |
| VM-010 | | 4,40 | 3,581 | 0,271 | 5,111 | 31,220 | AW | |
| VM-010A | | 4,00 | 4,912 | 0,400 | 5,591 | 28,110 | AW | |
| VM-011 | | 3,60 | 6,993 | 0,441 | 6,181 | 24,990 | AW | |
| VM-012 | | 2,90 | 14,666 | 0,611 | 7,561 | 19,550 | AW | |
| VM-012AA | | 2,50 | 24,745 | 1,000 | 8,641 | 16,440 | AW | |
| VM-012A | | 0,45 | 7,50 | 1,048 | 0,120 | 4,271 | 61,870 | AX |
| VM-012B | | | 5,00 | 3,897 | 0,351 | 6,321 | 39,950 | AX |
| VM-012C | | | 3,20 | 17,650 | 0,881 | 9,621 | 24,200 | AX |
| VM-012F | 0,50 | 10,00 | 0,653 | 0,011 | 4,351 | 92,620 | AX | |
| VM-012G | | 9,00 | 0,911 | 0,083 | 4,831 | 82,870 | AX | |
| VM-012H | | 8,00 | 1,326 | 0,221 | 5,421 | 73,130 | AX | |
| VM-013 | | 6,80 | 2,237 | 0,311 | 6,341 | 61,440 | AX | |
| VM-013A | | 6,00 | 3,363 | 0,440 | 7,161 | 53,650 | AX | |
| VM-014 | | 5,50 | 4,476 | 0,511 | 7,791 | 48,790 | AX | |
| VM-014A | | 5,00 | 6,140 | 0,611 | 8,531 | 43,920 | AX | |
| VM-015 | | 4,50 | 8,742 | 0,711 | 9,421 | 39,060 | AX | |
| VM-015A | | 4,00 | 13,049 | 0,811 | 10,520 | 34,190 | AX | |
| VM-016 | | 3,70 | 17,074 | 0,881 | 11,310 | 31,280 | AX | |
| VM-017 | | 3,00 | 35,807 | 0,971 | 13,670 | 24,480 | AX | |
| VM-017AA | | 2,50 | 69,935 | 2,200 | 15,970 | 19,640 | AX | |
| VM-017AB | | 0,55 | 6,00 | 5,060 | 0,711 | 9,431 | 58,500 | AX |
| VM-017A | | | 4,00 | 19,948 | 1,251 | 13,810 | 37,100 | AX |
| VM-017B | 3,50 | | 31,907 | 1,511 | 15,590 | 31,760 | AX | |
| VM-017C | 2,80 | | 71,913 | 2,211 | 18,920 | 24,300 | AX | |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| M-008 | 0,32 | 2,80 | 6,997 | 0,311 | 5,201 | 15,400 | AW | |
| M-008A | | 2,20 | 16,061 | 0,441 | 6,501 | 11,690 | AW | |
| M-008AA | | 2,00 | 22,508 | 0,800 | 7,091 | 10,460 | AW | |
| M-008B | 0,36 | 6,00 | 0,953 | 0,100 | 3,501 | 19,340 | AW | |
| M-008C | | 4,00 | 3,545 | 0,241 | 5,181 | 25,410 | AW | |
| M-008D | | 2,50 | 17,443 | 0,791 | 8,051 | 14,970 | AW | |
| M-008DA | 0,40 | 2,20 | 27,442 | 1,000 | 9,031 | 12,890 | AW | |
| M-008E | | 7,00 | 0,906 | 0,161 | 4,061 | 51,150 | AW | |
| M-009 | | 5,40 | 2,084 | 0,291 | 5,241 | 38,760 | AW | |
| M-010 | | 4,40 | 4,071 | 0,341 | 6,381 | 31,020 | AW | |
| M-010A | | 4,00 | 5,585 | 0,450 | 6,991 | 27,930 | AW | |
| M-011 | | 3,60 | 7,951 | 0,551 | 7,721 | 24,840 | AW | |
| M-012 | | 2,90 | 16,675 | 0,771 | 9,441 | 19,430 | AW | |
| M-012AA | | 2,50 | 28,134 | 1,400 | 10,800 | 16,340 | AW | |
| M-012A | | 0,45 | 7,50 | 1,191 | 0,150 | 5,311 | 61,480 | AW |
| M-012B | | | 5,00 | 4,431 | 0,441 | 7,871 | 39,700 | AW |
| M-012C | 3,20 | | 20,068 | 1,111 | 11,970 | 24,040 | AW | |
| M-012F | 0,50 | 10,00 | 0,018 | 0,021 | 5,401 | 92,030 | AW | |
| M-012G | | 9,00 | 1,036 | 0,100 | 5,991 | 82,350 | AW | |
| M-012H | | 8,00 | 1,508 | 0,281 | 6,721 | 72,670 | AW | |
| M-013 | | 6,80 | 2,544 | 0,391 | 7,871 | 61,060 | AW | |
| M-013A | | 6,00 | 3,823 | 0,600 | 8,881 | 53,320 | AW | |
| M-014 | | 5,50 | 5,089 | 0,661 | 9,661 | 48,480 | AW | |
| M-014A | | 5,00 | 6,981 | 0,771 | 10,580 | 43,640 | AW | |
| M-015 | | 4,50 | 9,939 | 0,881 | 11,690 | 38,810 | AW | |
| M-015A | | 4,00 | 14,837 | 1,001 | 13,050 | 33,980 | AW | |
| M-016 | | 3,70 | 19,413 | 1,111 | 14,030 | 31,080 | AW | |
| M-017 | | 3,00 | 40,712 | 1,221 | 16,950 | 24,330 | AW | |
| M-017AA | | 2,50 | 79,515 | 1,771 | 19,810 | 19,510 | AW | |
| M-017AB | | 0,55 | 6,00 | 5,753 | 0,881 | 11,660 | 58,130 | AW |
| M-017A | | | 4,00 | 22,680 | 1,571 | 17,070 | 36,860 | AW |
| M-017B | | | 3,50 | 36,278 | 1,881 | 19,270 | 31,560 | AW |
| M-017C | | | 2,80 | 81,764 | 2,771 | 23,380 | 24,140 | AW |

Endless extension springs

Music wire EN 10270-1-DH (A228, BS 5216)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|
| M-017CD | 0,63 | 10,00 | 1,949 | 0,400 | 10,480 | 114,400 | AX |
| M-018 | | 8,60 | 3,167 | 0,791 | 12,130 | 97,330 | AX |
| M-019 | | 6,90 | 6,505 | 0,981 | 15,010 | 76,600 | AX |
| M-019A | | 6,30 | 8,796 | 1,181 | 16,370 | 69,290 | AX |
| M-019B | | 6,00 | 10,354 | 1,331 | 17,150 | 65,640 | AX |
| M-020 | | 5,60 | 13,060 | 1,371 | 18,300 | 60,760 | AX |
| M-020A | | 5,00 | 19,212 | 1,571 | 20,350 | 53,460 | AX |
| M-021 | | 4,60 | 25,624 | 1,771 | 21,980 | 48,590 | AX |
| M-022 | | 3,80 | 50,332 | 1,991 | 26,110 | 38,870 | AX |
| M-022AA | | 3,00 | 120,441 | 3,111 | 31,900 | 29,170 | AX |
| M-022AC | | 0,70 | 10,00 | 3,038 | 0,831 | 14,130 | 126,100 |
| M-022AB | 9,00 | | 4,274 | 1,000 | 15,660 | 112,600 | AY |
| M-022A | 8,00 | | 6,282 | 1,181 | 17,540 | 99,090 | AY |
| M-022B | 7,50 | | 7,772 | 1,441 | 18,660 | 92,310 | AY |
| M-022BC | 7,00 | | 9,773 | 1,600 | 19,930 | 85,540 | AY |
| M-022C | 6,00 | | 16,414 | 2,200 | 23,060 | 72,010 | AY |
| M-022D | 5,00 | | 30,736 | 2,771 | 27,300 | 58,490 | AY |
| M-022E | 3,50 | | 111,321 | 4,800 | 37,380 | 38,250 | AY |
| M-023 | 0,80 | 10,80 | 4,169 | 1,221 | 19,100 | 155,000 | AY |
| M-024 | | 8,80 | 8,142 | 1,551 | 23,280 | 124,100 | AY |
| M-024A | | 8,00 | 11,169 | 1,771 | 25,500 | 111,700 | AY |
| M-025 | | 7,10 | 16,672 | 2,331 | 28,550 | 97,810 | AY |
| M-025A | | 6,40 | 23,738 | 2,881 | 31,460 | 86,990 | AY |
| M-025B | | 6,00 | 29,649 | 3,111 | 33,400 | 80,810 | AY |
| M-026 | | 5,80 | 33,351 | 3,221 | 34,460 | 77,720 | AY |
| M-027 | | 4,80 | 65,138 | 3,661 | 40,860 | 62,290 | AY |
| M-027AA | | 4,20 | 106,067 | 6,000 | 45,850 | 53,040 | AY |
| M-027A | 0,90 | 10,00 | 8,861 | 1,991 | 28,600 | 158,800 | AY |
| M-027B | | 8,50 | 15,212 | 2,771 | 33,390 | 132,700 | AY |
| M-027E | | 6,30 | 42,408 | 4,221 | 44,130 | 94,460 | AY |
| M-027C | | 4,50 | 143,126 | 5,881 | 59,230 | 63,240 | AY |
| M-027G | 1,00 | 15,00 | 3,709 | 1,000 | 25,840 | 271,300 | AY |
| M-028 | | 13,50 | 5,211 | 1,771 | 28,630 | 242,300 | AY |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|
| VM-017CD | 0,63 | 10,00 | 1,714 | 0,270 | 8,511 | 115,100 | AY |
| VM-018 | | 8,60 | 2,785 | 0,631 | 9,861 | 97,950 | AY |
| VM-019 | | 6,90 | 5,721 | 0,781 | 12,190 | 77,090 | AY |
| VM-019A | | 6,30 | 7,736 | 0,941 | 13,300 | 69,730 | AY |
| VM-019B | | 6,00 | 9,106 | 1,111 | 13,930 | 66,050 | AY |
| VM-020 | | 5,60 | 11,487 | 1,111 | 14,870 | 61,150 | AY |
| VM-020A | | 5,00 | 16,897 | 1,620 | 16,530 | 53,800 | AY |
| VM-021 | | 4,60 | 22,537 | 1,411 | 17,860 | 48,900 | AY |
| VM-022 | | 3,80 | 44,268 | 1,611 | 21,210 | 39,120 | AY |
| VM-022AA | | 3,00 | 105,930 | 3,760 | 25,920 | 29,360 | AY |
| VM-022AC | | 0,70 | 10,00 | 2,672 | 0,661 | 11,530 | 126,900 |
| VM-022AB | 9,00 | | 3,759 | 0,700 | 12,770 | 113,300 | AZ |
| VM-022A | 8,00 | | 5,525 | 0,951 | 14,300 | 99,720 | AZ |
| VM-022B | 7,50 | | 6,835 | 1,151 | 15,220 | 92,900 | AZ |
| VM-022BC | 7,00 | | 8,596 | 1,300 | 16,250 | 86,090 | AZ |
| VM-022C | 6,00 | | 14,437 | 1,700 | 18,800 | 72,470 | AZ |
| VM-022D | 5,00 | | 27,033 | 2,221 | 22,270 | 58,860 | AZ |
| VM-022E | 3,50 | | 97,908 | 2,751 | 30,440 | 38,500 | AZ |
| VM-023 | 0,80 | 10,80 | 3,667 | 0,971 | 15,670 | 156,000 | AZ |
| VM-024 | | 8,80 | 7,161 | 1,211 | 19,090 | 124,900 | AZ |
| VM-024A | | 8,00 | 9,823 | 1,411 | 20,910 | 112,400 | AZ |
| VM-025 | | 7,10 | 14,664 | 1,851 | 23,420 | 98,440 | AZ |
| VM-025A | | 6,40 | 20,878 | 2,331 | 25,810 | 87,540 | AZ |
| VM-025B | | 6,00 | 26,077 | 2,511 | 27,390 | 81,320 | AZ |
| VM-026 | | 5,80 | 29,333 | 2,551 | 28,260 | 78,210 | AZ |
| VM-027 | | 4,80 | 57,290 | 2,911 | 33,510 | 62,680 | AZ |
| VM-027AA | | 4,20 | 93,288 | 5,070 | 37,600 | 53,380 | AZ |
| VM-027A | 0,90 | 10,00 | 7,794 | 1,611 | 23,600 | 159,800 | AZ |
| VM-027B | | 8,50 | 13,379 | 2,221 | 27,560 | 133,500 | AZ |
| VM-027E | | 6,30 | 37,298 | 3,331 | 36,420 | 95,060 | AZ |
| VM-027C | | 4,50 | 125,882 | 4,711 | 48,880 | 63,640 | AZ |
| VM-027G | 1,00 | 15,00 | 3,262 | 0,833 | 21,460 | 273,000 | AZ |
| VM-028 | | 13,50 | 4,583 | 1,411 | 23,770 | 243,800 | AZ |

Endless extension springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| VM-028AA | 1,00 | 12,00 | 6,725 | 1,700 | 26,640 | 214,600 | AZ | |
| VM-028A | | 11,30 | 8,192 | 1,900 | 28,230 | 201,000 | AZ | |
| VM-029 | | 11,00 | 8,952 | 2,411 | 28,970 | 195,100 | AZ | |
| VM-029A | | 10,00 | 12,279 | 2,551 | 31,730 | 175,700 | AZ | |
| VM-030 | | 9,40 | 15,103 | 2,751 | 33,650 | 164,000 | AZ | |
| VM-031 | | 9,00 | 17,484 | 3,101 | 35,060 | 156,200 | AZ | |
| VM-031A | | 8,50 | 21,219 | 3,300 | 37,000 | 146,500 | AZ | |
| VM-032 | | 8,00 | 26,098 | 3,371 | 39,150 | 136,700 | AZ | |
| VM-032A | | 7,50 | 32,596 | 3,600 | 41,560 | 127,000 | AZ | |
| VM-033 | | 7,30 | 35,800 | 3,711 | 42,610 | 123,100 | AZ | |
| VM-033A | | 6,80 | 45,879 | 5,060 | 45,460 | 113,400 | AZ | |
| VM-034 | | 6,00 | 71,613 | 4,251 | 50,840 | 97,940 | AZ | |
| VM-034A | | 1,10 | 12,00 | 10,120 | 2,411 | 34,950 | 234,000 | AZ |
| VM-034B | 7,50 | | 49,996 | 4,441 | 54,280 | 137,700 | AZ | |
| VM-034C | 5,50 | | 153,856 | 7,101 | 71,130 | 95,070 | AZ | |
| VM-034D | 1,20 | 17,20 | 4,532 | 1,380 | 31,600 | 374,500 | AZ | |
| VM-035 | 1,25 | 17,20 | 5,386 | 2,211 | 35,510 | 388,900 | AZ | |
| VM-035AA | | 16,00 | 6,810 | 2,100 | 38,080 | 359,700 | AZ | |
| VM-035A | | 15,00 | 8,407 | 2,500 | 40,530 | 335,300 | AZ | |
| VM-036 | | 13,70 | 11,325 | 3,101 | 44,220 | 303,700 | AZ | |
| VM-036A | | 12,70 | 14,559 | 3,711 | 47,550 | 279,400 | AZ | |
| VM-037 | | 11,20 | 22,186 | 3,991 | 53,570 | 242,900 | AZ | |
| VM-037A | | 10,00 | 32,623 | 4,521 | 59,570 | 213,700 | AZ | |
| VM-038 | | 9,20 | 43,495 | 5,411 | 64,340 | 194,300 | AZ | |
| VM-039 | | 7,50 | 89,516 | 6,661 | 77,350 | 153,000 | AZ | |
| VM-039AA | | 6,00 | 203,921 | 13,500 | 93,480 | 116,700 | AZ | |
| VM-039AB | | 5,50 | 284,692 | 9,001 | 100,100 | 104,600 | AZ | |
| VM-039A | | 5,00 | 414,427 | 17,250 | 107,400 | 92,620 | AZ | |
| VM-039B | | 1,30 | 11,30 | 25,567 | 4,611 | 59,250 | 253,900 | AZ |
| VM-039C | | 1,40 | 15,00 | 13,671 | 4,351 | 55,720 | 371,600 | AZ |
| VM-039C-01 | | | 13,60 | 18,938 | 4,973 | 61,180 | 333,400 | AZ |
| VM-039D | 10,00 | | 64,065 | 7,911 | 81,530 | 235,400 | AZ | |
| VM-039E | 7,00 | | 195,817 | 14,200 | 111,400 | 154,000 | AZ | |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| M-028AA | 1,00 | 12,00 | 7,647 | 2,000 | 32,080 | 213,200 | AY | |
| M-028A | | 11,30 | 9,314 | 2,600 | 33,990 | 199,700 | AY | |
| M-029 | | 11,00 | 10,178 | 2,991 | 34,880 | 193,900 | AY | |
| M-029A | | 10,00 | 13,961 | 3,221 | 38,210 | 174,500 | AY | |
| M-030 | | 9,40 | 17,172 | 3,441 | 40,520 | 162,900 | AY | |
| M-031 | | 9,00 | 19,879 | 3,881 | 42,220 | 155,200 | AY | |
| M-031A | | 8,50 | 24,125 | 4,000 | 44,550 | 145,500 | AY | |
| M-032 | | 8,00 | 29,673 | 4,221 | 47,150 | 135,900 | AY | |
| M-032A | | 7,50 | 37,061 | 4,600 | 50,050 | 126,200 | AY | |
| M-033 | | 7,30 | 40,704 | 4,661 | 51,310 | 122,400 | AY | |
| M-033A | | 6,80 | 52,164 | 6,500 | 54,750 | 112,700 | AY | |
| M-034 | | 6,00 | 81,423 | 5,331 | 61,230 | 97,320 | AY | |
| M-034A | | 1,10 | 12,00 | 11,507 | 2,991 | 41,960 | 232,500 | AY |
| M-034B | 7,50 | | 56,844 | 5,551 | 65,160 | 136,800 | AY | |
| M-034C | 5,50 | | 174,932 | 8,881 | 85,390 | 94,470 | AY | |
| M-034D | 1,20 | 17,20 | 5,153 | 1,800 | 37,780 | 372,100 | AY | |
| M-035 | 1,25 | 17,20 | 6,124 | 2,200 | 42,340 | 386,400 | AY | |
| M-035AA | | 16,00 | 7,743 | 2,800 | 45,420 | 357,400 | AY | |
| M-035A | | 15,00 | 9,550 | 3,000 | 48,340 | 333,200 | AY | |
| M-036 | | 13,70 | 12,876 | 3,881 | 52,740 | 301,800 | AY | |
| M-036A | | 12,70 | 16,553 | 4,661 | 56,710 | 277,600 | AY | |
| M-037 | | 11,20 | 25,225 | 4,991 | 63,890 | 241,300 | AY | |
| M-037A | | 10,00 | 37,091 | 5,661 | 71,004 | 212,300 | AY | |
| M-038 | | 9,20 | 49,453 | 6,771 | 76,740 | 193,000 | AY | |
| M-039 | | 7,50 | 101,779 | 8,331 | 92,250 | 152,000 | AY | |
| M-039AA | | 6,00 | 231,855 | 16,000 | 111,400 | 115,900 | AY | |
| M-039AB | | 5,50 | 323,691 | 11,330 | 119,400 | 104,000 | AY | |
| M-039A | | 5,00 | 471,198 | 14,000 | 128,100 | 92,040 | AY | |
| M-039B | | 1,30 | 11,30 | 29,069 | 5,771 | 70,160 | 252,300 | AY |
| M-039C | | 1,40 | 15,00 | 15,544 | 5,441 | 66,080 | 369,200 | AY |
| M-039C-01 | | | 13,60 | 21,532 | 6,500 | 72,560 | 331,300 | AY |
| M-039D | | | 10,00 | 61,472 | 9,881 | 96,700 | 233,900 | AY |
| M-039E | 7,00 | | 222,641 | 17,770 | 132,100 | 153,000 | AY | |

Endless extension springs

Music wire EN 10270-1-SH (A228, BS 5216)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|
| M-039F | 1,50 | 20,00 | 8,138 | 3,991 | 60,540 | 537,900 | AY |
| M-039FA | | 18,00 | 11,470 | 4,500 | 67,030 | 479,800 | AY |
| M-039G | | 15,00 | 20,942 | 6,441 | 79,830 | 392,800 | AY |
| M-039GA | | 14,00 | 26,381 | 8,000 | 85,240 | 363,800 | AY |
| M-039H | | 12,00 | 44,510 | 7,221 | 98,510 | 305,800 | AY |
| M-039HA | | 11,00 | 60,097 | 11,000 | 106,700 | 276,800 | AY |
| M-039J | | 10,00 | 83,901 | 10,550 | 116,400 | 247,900 | AY |
| M-039K | | 9,00 | 122,135 | 14,000 | 127,900 | 218,900 | AY |
| M-039KA | | 8,00 | 187,621 | 14,550 | 141,600 | 190,100 | AY |
| M-039L | | 7,00 | 309,695 | 24,000 | 158,100 | 161,200 | AY |
| M-040 | | 1,60 | 21,60 | 8,338 | 3,991 | 67,400 | 620,300 |
| M-041 | 17,60 | | 16,285 | 6,221 | 82,130 | 496,400 | AY |
| M-041A | 15,50 | | 24,837 | 7,331 | 92,720 | 431,400 | AY |
| M-042 | 14,10 | | 34,151 | 7,881 | 101,400 | 388,100 | AY |
| M-042A | 12,70 | | 48,772 | 8,331 | 111,800 | 344,800 | AY |
| M-043 | 11,60 | | 66,702 | 9,881 | 121,500 | 310,800 | AY |
| M-044 | 9,60 | | 130,277 | 11,880 | 144,100 | 249,100 | AY |
| M-044A | 8,00 | | 254,447 | 17,770 | 168,400 | 199,800 | AY |
| M-044A-01 | 1,80 | 20,00 | 17,723 | 6,881 | 100,900 | 635,300 | AY |
| M-044A-02 | | 16,00 | 37,315 | 9,881 | 124,800 | 496,000 | AY |
| M-044B | | 12,00 | 100,681 | 13,771 | 162,800 | 356,900 | AY |
| M-044C | | 9,00 | 286,253 | 28,440 | 209,000 | 252,900 | AY |
| M-045 | 2,00 | 27,00 | 10,422 | 6,881 | 101,200 | 969,200 | AY |
| M-045A | | 25,00 | 13,384 | 6,000 | 109,000 | 891,800 | AY |
| M-046 | | 22,00 | 20,356 | 8,881 | 123,300 | 775,700 | AY |
| M-046A | | 20,00 | 27,923 | 9,500 | 135,100 | 6983,300 | AY |
| M-047 | | 18,60 | 35,600 | 10,810 | 144,700 | 644,200 | AY |
| M-048 | | 18,00 | 39,757 | 11,810 | 149,200 | 621,000 | AY |
| M-048A | | 16,50 | 53,416 | 15,000 | 161,900 | 563,000 | AY |
| M-048B | | 16,00 | 59,346 | 14,500 | 166,700 | 543,700 | AY |
| M-049 | | 14,50 | 83,377 | 16,700 | 182,500 | 485,700 | AY |
| M-050 | | 12,00 | 162,846 | 19,710 | 216,400 | 389,300 | AY |
| M-050AA | | 10,00 | 318,059 | 29,510 | 253,000 | 312,300 | AY |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|
| VM-039F | 1,50 | 20,00 | 7,157 | 3,211 | 51,230 | 541,300 | AZ |
| VM-039FA | | 18,00 | 10,088 | 3,500 | 56,720 | 482,900 | AZ |
| VM-039G | | 15,00 | 18,419 | 5,151 | 67,550 | 395,300 | AZ |
| VM-039GA | | 14,00 | 23,203 | 6,100 | 72,120 | 366,100 | AZ |
| VM-039H | | 12,00 | 39,147 | 5,771 | 83,350 | 307,700 | AZ |
| VM-039HA | | 11,00 | 52,856 | 9,500 | 90,340 | 278,600 | AZ |
| VM-039J | | 10,00 | 73,792 | 8,441 | 98,530 | 249,400 | AZ |
| VM-039K | | 9,00 | 107,420 | 12,700 | 108,200 | 220,300 | AZ |
| VM-039KA | | 8,00 | 165,016 | 11,600 | 128,500 | 195,200 | AZ |
| VM-039L | | 7,00 | 272,382 | 19,500 | 133,800 | 162,200 | AZ |
| VM-040 | | 1,60 | 21,60 | 7,333 | 3,211 | 56,930 | 624,200 |
| VM-041 | 17,60 | | 14,323 | 4,991 | 69,370 | 499,600 | AZ |
| VM-041A | 15,50 | | 21,844 | 5,811 | 78,310 | 434,200 | AZ |
| VM-042 | 14,10 | | 30,037 | 6,311 | 85,650 | 390,600 | AZ |
| VM-042A | 12,70 | | 42,896 | 6,661 | 94,450 | 347,000 | AZ |
| VM-043 | 11,60 | | 58,665 | 7,911 | 102,600 | 312,800 | AZ |
| VM-044 | 9,60 | | 114,581 | 9,511 | 121,700 | 250,700 | AZ |
| VM-044A | 8,00 | | 223,791 | 14,200 | 142,300 | 201,100 | AZ |
| VM-044A-01 | 1,80 | 20,00 | 15,588 | 5,511 | 84,950 | 639,300 | AZ |
| VM-044A-02 | | 16,00 | 32,819 | 7,911 | 105,000 | 499,200 | AZ |
| VM-044B | | 12,00 | 88,551 | 11,000 | 137,000 | 359,200 | AZ |
| VM-044C | | 9,00 | 251,764 | 22,700 | 175,900 | 254,500 | AZ |
| VM-045 | 2,00 | 27,00 | 9,166 | 5,501 | 84,870 | 975,400 | AZ |
| VM-045A | | 25,00 | 11,772 | 5,300 | 91,430 | 897,500 | AZ |
| VM-046 | | 22,00 | 17,903 | 7,101 | 103,400 | 780,600 | AZ |
| VM-046A | | 20,00 | 24,559 | 8,200 | 113,200 | 702,800 | AZ |
| VM-047 | | 18,60 | 31,311 | 8,551 | 121,300 | 648,300 | AZ |
| VM-048 | | 18,00 | 34,967 | 9,441 | 125,100 | 624,900 | AZ |
| VM-048A | | 16,50 | 46,981 | 12,700 | 135,800 | 566,600 | AZ |
| VM-048B | | 16,00 | 52,196 | 11,600 | 139,700 | 547,100 | AZ |
| VM-049 | | 14,50 | 73,332 | 13,300 | 153,000 | 488,800 | AZ |
| VM-050 | | 12,00 | 143,226 | 15,700 | 181,500 | 391,700 | AZ |
| VM-050AA | | 10,00 | 279,730 | 23,600 | 212,100 | 314,300 | AZ |

Endless extension springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| VM-050A | 2,20 | 24,00 | 20,241 | 7,851 | 123,700 | 936,000 | AZ | |
| VM-050A-01 | | 20,00 | 37,182 | 11,700 | 147,200 | 764,700 | AZ | |
| VM-050B | | 15,00 | 99,991 | 16,600 | 192,200 | 550,900 | AZ | |
| VM-050C | | 11,00 | 307,712 | 25,000 | 251,800 | 380,300 | AZ | |
| VM-051 | 2,50 | 34,50 | 10,671 | 6,200 | 123,500 | 1560,000 | AZ | |
| VM-051A | | 30,00 | 16,814 | 8,200 | 141,400 | 1341,000 | AZ | |
| VM-052 | | 27,50 | 22,379 | 11,000 | 153,700 | 1219,000 | AZ | |
| VM-052A | | 25,00 | 30,690 | 12,700 | 168,400 | 1098,000 | AZ | |
| VM-053 | | 22,50 | 43,709 | 15,700 | 186,100 | 976,500 | AZ | |
| VM-053A | | 20,50 | 59,958 | 16,000 | 203,100 | 879,200 | AZ | |
| VM-054 | | 18,50 | 85,369 | 18,000 | 223,400 | 782,000 | AZ | |
| VM-055 | | 15,00 | 179,033 | 23,500 | 269,900 | 612,100 | AZ | |
| VM-055A-01 | | 13,00 | 302,061 | 41,200 | 305,300 | 515,200 | AZ | |
| VM-055A | | 2,80 | 30,00 | 27,342 | 14,000 | 193,300 | 1486,000 | AZ |
| VM-055AA | | | 25,00 | 50,209 | 17,300 | 229,900 | 1214,000 | AZ |
| VM-055B | 20,00 | | 108,131 | 22,000 | 282,900 | 941,800 | AZ | |
| VM-055C | 14,00 | | 391,634 | 36,800 | 386,800 | 616,000 | AZ | |
| VM-055XA | 3,00 | 40,00 | 14,315 | 9,200 | 176,900 | 2165,000 | AZ | |
| VM-055XB | | 38,00 | 16,912 | 10,500 | 185,900 | 2048,000 | AZ | |
| VM-055XC | | 34,00 | 24,339 | 16,400 | 207,000 | 1814,000 | AZ | |
| VM-055XD | | 30,00 | 36,838 | 18,000 | 233,300 | 1581,000 | AZ | |
| VM-055XE | | 26,00 | 59,594 | 22,000 | 267,100 | 1347,000 | AZ | |
| VM-055XF | | 24,00 | 78,294 | 27,700 | 287,900 | 1231,000 | AZ | |
| VM-055XG | | 22,00 | 105,712 | 32,200 | 312,000 | 1114,000 | AZ | |
| VM-055XH | | 20,00 | 147,584 | 38,200 | 340,300 | 997,200 | AZ | |
| VM-055XJ | | 18,00 | 214,039 | 35,000 | 373,900 | 881,500 | AZ | |
| VM-055XK | | 15,00 | 419,607 | 60,700 | 437,000 | 707,100 | AZ | |
| VM-056 | 3,20 | 43,20 | 14,666 | 9,511 | 197,700 | 2497,000 | AZ | |
| VM-057 | | 35,20 | 28,645 | 15,000 | 240,900 | 1998,000 | AZ | |
| VM-058 | | 28,20 | 60,073 | 18,800 | 297,500 | 1562,000 | AZ | |
| VM-058A | | 25,00 | 90,601 | 33,000 | 332,900 | 1363,000 | AZ | |
| VM-059 | | 23,20 | 117,331 | 24,300 | 356,700 | 1251,000 | AZ | |
| VM-060 | | 19,20 | 229,162 | 36,400 | 422,900 | 1002,000 | AZ | |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| M-050A | 2,20 | 24,00 | 23,013 | 9,811 | 148,000 | 930,100 | AY | |
| M-050A-01 | | 20,00 | 42,275 | 14,710 | 176,100 | 759,900 | AY | |
| M-050B | | 15,00 | 113,689 | 19,600 | 229,900 | 547,400 | AY | |
| M-050C | | 11,00 | 349,864 | 31,410 | 301,300 | 377,800 | AY | |
| M-051 | 2,50 | 34,50 | 12,133 | 9,881 | 148,500 | 1550,000 | AY | |
| M-051A | | 30,00 | 19,117 | 10,000 | 170,000 | 1333,000 | AY | |
| M-052 | | 27,50 | 25,445 | 13,710 | 184,900 | 1212,000 | AY | |
| M-052A | | 25,00 | 34,904 | 15,000 | 202,500 | 1091,000 | AY | |
| M-053 | | 22,50 | 49,697 | 17,710 | 223,800 | 970,300 | AY | |
| M-053A | | 20,50 | 68,171 | 20,200 | 244,200 | 873,700 | AY | |
| M-054 | | 18,50 | 97,064 | 22,610 | 268,600 | 777,100 | AY | |
| M-055 | | 15,00 | 203,558 | 29,410 | 324,500 | 608,200 | AY | |
| M-055A-01 | | 13,00 | 343,439 | 45,000 | 367,100 | 512,000 | AY | |
| M-055A | | 2,80 | 30,00 | 31,087 | 17,770 | 233,400 | 1477,000 | AY |
| M-055AA | | | 25,00 | 57,178 | 21,660 | 277,600 | 1206,000 | AY |
| M-055B | | | 20,00 | 122,943 | 27,550 | 341,600 | 935,800 | AY |
| M-055C | 14,00 | | 445,282 | 46,110 | 466,900 | 612,100 | AY | |
| M-055XA | 3,00 | 40,00 | 16,276 | 11,500 | 214,200 | 2151,000 | AY | |
| M-055XB | | 38,00 | 19,228 | 12,000 | 225,100 | 2035,000 | AY | |
| M-055XC | | 34,00 | 27,580 | 15,000 | 250,600 | 1803,000 | AY | |
| M-055XD | | 30,00 | 41,884 | 20,500 | 282,400 | 1571,000 | AY | |
| M-055XE | | 26,00 | 66,460 | 30,000 | 323,400 | 1339,000 | AY | |
| M-055XF | | 24,00 | 89,019 | 27,500 | 348,500 | 1223,000 | AY | |
| M-055XG | | 22,00 | 120,194 | 38,000 | 377,700 | 1107,000 | AY | |
| M-055XH | | 20,00 | 167,801 | 40,000 | 412,000 | 991,600 | AY | |
| M-055XJ | | 18,00 | 244,269 | 43,800 | 452,600 | 875,900 | AY | |
| M-055XK | | 15,00 | 477,088 | 60,000 | 529,000 | 702,700 | AY | |
| M-056 | 3,20 | 43,20 | 16,675 | 11,880 | 238,400 | 2481,000 | AY | |
| M-057 | | 35,20 | 32,569 | 18,770 | 290,500 | 1985,000 | AY | |
| M-058 | | 28,20 | 68,303 | 23,500 | 358,700 | 1552,000 | AY | |
| M-058A | | 25,00 | 103,012 | 28,000 | 401,500 | 1354,000 | AY | |
| M-059 | | 23,20 | 133,403 | 30,400 | 430,100 | 1243,000 | AY | |
| M-060 | | 19,20 | 260,554 | 45,500 | 510,000 | 996,600 | AY | |

Endless extension springs

Music wire EN 10270-1-SH (A228, BS 5216)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| M-060A | 3,20 | 18,80 | 281,114 | 60,000 | 519,500 | 971,900 | AY | |
| M-061 | 3,60 | 40,00 | 35,446 | 19,600 | 357,140 | 2541,000 | AY | |
| M-061AA | | 35,00 | 55,218 | 32,000 | 405,700 | 2193,000 | AY | |
| M-061A | | 32,00 | 74,360 | 35,300 | 441,600 | 1984,000 | AY | |
| M-062 | | 25,00 | 174,432 | 36,800 | 555,200 | 1497,000 | AY | |
| M-062A | | 21,40 | 303,115 | 50,000 | 638,100 | 1247,000 | AY | |
| M-063 | | 18,00 | 572,505 | 72,000 | 739,700 | 1011,000 | AY | |
| M-064 | 4,00 | 44,00 | 40,712 | 24,500 | 436,300 | 3102,000 | AY | |
| M-064A | | 40,00 | 55,846 | 40,000 | 477,900 | 2793,000 | AY | |
| M-065 | | 36,00 | 79,515 | 34,300 | 528,100 | 2484,000 | AY | |
| M-065A | | 32,00 | 118,692 | 50,000 | 589,700 | 2174,000 | AY | |
| M-066 | | 29,00 | 166,754 | 44,000 | 645,900 | 1943,000 | AY | |
| M-066A | | 26,00 | 244,697 | 80,000 | 713,200 | 1711,000 | AY | |
| M-067 | | 24,00 | 325,692 | 68,800 | 765,800 | 1557,000 | AY | |
| M-067A | | 20,00 | 636,117 | 120,000 | 895,100 | 1249,000 | AY | |
| M-070 | | 4,50 | 50,00 | 44,307 | 28,000 | 532,300 | 3970,000 | AY |
| M-075 | | | 40,00 | 93,287 | 56,500 | 658,200 | 3100,000 | AY |
| M-078 | 30,00 | | 251,702 | 72,000 | 858,700 | 2231,000 | AY | |
| M-080 | 25,00 | | 484,446 | 110,000 | 1008,000 | 1797,000 | AY | |
| M-071 | 5,00 | 50,00 | 69,807 | 60,000 | 707,900 | 4364,000 | BF | |
| M-072 | | 45,00 | 99,393 | 70,000 | 782,200 | 3881,000 | BF | |
| M-087 | | 40,00 | 148,366 | 75,000 | 873,500 | 3398,000 | BF | |
| M-074 | | 40,00 | 148,366 | 80,000 | 873,500 | 3398,000 | BF | |
| M-076 | | 35,00 | 235,599 | 100,000 | 987,800 | 2915,000 | BF | |
| M-079 | | 30,00 | 407,115 | 120,000 | 1134,000 | 2433,000 | BF | |
| M-081 | | 25,00 | 795,146 | 180,000 | 1325,000 | 1951,000 | BF | |
| M-091 | | 5,50 | 60,00 | 57,533 | 38,000 | 774,500 | 5813,000 | BF |
| M-092 | 50,00 | | 105,689 | 80,000 | 921,200 | 4749,000 | BF | |
| M-093 | 40,00 | | 226,804 | 120,000 | 1134,000 | 3686,000 | BF | |
| M-095 | 6,30 | 70,00 | 62,030 | 45,000 | 968,500 | 7782,000 | BF | |
| M-086 | | 60,00 | 103,537 | 80,000 | 1122,000 | 6563,000 | BF | |
| M-088 | | 50,00 | 192,121 | 130,000 | 1331,000 | 5346,000 | BF | |
| M-098 | | 40,00 | 418,919 | 200,000 | 1632,000 | 4130,000 | BF | |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|----|
| VM-060A | 3,20 | 18,80 | 247,245 | 53,200 | 430,800 | 978,100 | AZ | |
| VM-061 | 3,60 | 40,00 | 31,175 | 15,600 | 298,000 | 2557,000 | AZ | |
| VM-061AA | | 35,00 | 48,565 | 27,000 | 338,600 | 2207,000 | AZ | |
| VM-061A | | 32,00 | 65,368 | 28,200 | 368,500 | 1996,000 | AZ | |
| VM-062 | | 25,00 | 153,416 | 29,400 | 463,300 | 1506,000 | AZ | |
| VM-062A | | 21,40 | 266,595 | 65,200 | 532,500 | 1255,000 | AZ | |
| VM-063 | | 18,00 | 503,529 | 57,600 | 617,400 | 1018,000 | AZ | |
| VM-064 | | 4,00 | 44,00 | 35,807 | 19,600 | 366,500 | 3122,000 | AZ |
| VM-064A | 40,00 | | 49,117 | 31,500 | 401,500 | 2811,000 | AZ | |
| VM-065 | 36,00 | | 69,935 | 27,500 | 443,600 | 2499,000 | AZ | |
| VM-065A | 32,00 | | 104,392 | 48,000 | 495,400 | 2188,000 | AZ | |
| VM-066 | 29,00 | | 146,663 | 35,200 | 542,600 | 1955,000 | AZ | |
| VM-066A | 26,00 | | 215,216 | 69,000 | 599,100 | 1722,000 | AZ | |
| VM-067 | 24,00 | | 286,452 | 55,000 | 643,300 | 1567,000 | AZ | |
| VM-067A | 20,00 | | 559,477 | 105,000 | 751,900 | 1257,000 | AZ | |
| VM-070 | 4,50 | | 50,00 | 38,969 | 30,700 | 451,100 | 3995,000 | AZ |
| VM-075 | | | 40,00 | 82,048 | 49,500 | 557,800 | 3120,000 | AZ |
| VM-078 | | 30,00 | 221,376 | 81,700 | 727,700 | 2245,000 | AZ | |
| VM-080 | | 25,00 | 426,079 | 110,200 | 854,900 | 1808,000 | AZ | |
| VM-071 | 5,00 | 50,00 | 61,397 | 47,200 | 605,500 | 4392,000 | BG | |
| VM-072 | | 45,00 | 87,418 | 58,500 | 669,100 | 3906,000 | BG | |
| VM-087 | | 40,00 | 130,490 | 72,700 | 747,200 | 3419,000 | BG | |
| VM-074 | | 40,00 | 130,490 | 72,700 | 747,200 | 3419,000 | BG | |
| VM-076 | | 35,00 | 207,214 | 91,500 | 845,000 | 2933,600 | BG | |
| VM-079 | | 30,00 | 358,065 | 118,500 | 970,300 | 2448,000 | BG | |
| VM-081 | | 25,00 | 699,346 | 158,000 | 1134,000 | 1964,000 | BG | |
| VM-091 | | 5,50 | 60,00 | 50,601 | 46,500 | 662,600 | 5850,000 | BG |
| VM-092 | 50,00 | | 92,955 | 88,200 | 788,200 | 4779,000 | BG | |
| VM-093 | 40,00 | | 199,478 | 102,000 | 970,400 | 3710,000 | BG | |
| VM-095 | 6,30 | 70,00 | 54,556 | 57,000 | 829,800 | 7832,000 | BG | |
| VM-086 | | 60,00 | 91,063 | 79,500 | 961,300 | 6605,000 | BG | |
| VM-088 | | 50,00 | 168,974 | 111,700 | 1140,000 | 5380,000 | BG | |
| VM-098 | | 40,00 | 368,446 | 163,500 | 1398,000 | 4156,000 | BG | |

Endless extension springs

Stainless steel no. 1.4310 (A301, BS 301S21)
Length 1000 mm

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|-----------|
| VM-102 | 6,50 | 34,00 | 768,347 | 236,000 | 1747,000 | 3508,000 | BG | |
| VM-110 | 7,00 | 80,00 | 55,249 | 64,500 | 970,900 | 9972,000 | BG | |
| VM-111 | | 70,00 | 85,955 | 86,200 | 1103,000 | 8609,000 | BG | |
| VM-112 | | 60,00 | 144,367 | 117,000 | 1276,000 | 7247,000 | BG | |
| VM-114 | | 50,00 | 270,327 | 162,000 | 1511,000 | 5886,000 | BG | |
| VM-119 | | 8,00 | 80,00 | 98,235 | 111,000 | 1409,000 | 11244,000 | BH |
| VM-120 | 70,00 | | 153,846 | 144,000 | 1599,000 | 9688,000 | BH | |
| VM-121 | 60,00 | | 260,766 | 190,000 | 1846,000 | 8132,000 | BH | |
| VM-122 | 50,00 | | 494,896 | 258,000 | 2178,000 | 6578,000 | BH | |
| VM-123 | 40,00 | | 1357,994 | 369,000 | 263,900 | 5028,000 | BH | |
| VM-124 | 30,00 | | 3443,450 | 580,000 | 3281,000 | 3486,000 | BH | |
| VM-132 | 9,00 | | 50,00 | 852,158 | 386,000 | 2983,000 | 7235,000 | BH |
| VM-140 | | | 10,00 | 80,00 | 260,980 | 257,200 | 2628,000 | 13679,000 |
| VM-142 | | 70,00 | | 414,427 | 324,000 | 2978,000 | 11735,000 | BH |
| VM-143 | | 60,00 | | 716,130 | 418,000 | 3419,000 | 9794,000 | BH |
| VM-144 | | 50,00 | | 1398,691 | 560,000 | 3997,000 | 7857,000 | BH |

Endless extension springs

| article number | d wire diameter | De outer oil diameter | R1 spring rate from one active coil N/mm | F0 initial tension | Fn maximum possible force | weight one spring in gram | price group | |
|----------------|-----------------|-----------------------|--|--------------------|---------------------------|---------------------------|-------------|-----------|
| M-102 | 6,50 | 34,00 | 873,600 | 200,000 | 2042,000 | 3486,000 | BF | |
| M-110 | 7,00 | 80,00 | 62,818 | 70,000 | 1132,000 | 9908,000 | BF | |
| M-111 | | 70,00 | 97,730 | 95,000 | 1287,000 | 8554,000 | BF | |
| M-112 | | 60,00 | 164,143 | 130,000 | 1489,000 | 7201,000 | BF | |
| M-114 | | 50,00 | 307,350 | 180,000 | 1763,000 | 5849,000 | BF | |
| M-119 | | 8,00 | 80,00 | 111,691 | 120,000 | 1627,000 | 11173,000 | BG |
| M-120 | 70,00 | | 174,921 | 180,000 | 1847,000 | 9626,000 | BG | |
| M-121 | 60,00 | | 296,488 | 220,000 | 2132,000 | 8081,000 | BG | |
| M-122 | 50,00 | | 562,690 | 280,000 | 2515,000 | 6537,000 | BG | |
| M-123 | 40,00 | | 1544,021 | 400,000 | 3048,000 | 4996,000 | BG | |
| M-124 | 30,00 | | 3915,156 | 700,000 | 3789,000 | 3464,000 | BG | |
| M-132 | 9,00 | | 50,00 | 968,892 | 400,000 | 3409,000 | 7189,000 | BG |
| M-140 | | | 10,00 | 80,00 | 296,731 | 250,000 | 2970,000 | 13592,000 |
| M-142 | | 70,00 | | 471,198 | 350,000 | 3359,000 | 11661,000 | BG |
| M-143 | | 60,00 | | 814,230 | 400,000 | 3857,000 | 9732,000 | BG |
| M-144 | 50,00 | 1590,123 | | 600,000 | 4508,000 | 7807,000 | BG | |

Torsion springs

Material

Torsion springs are manufactured from stainless steel spring wire material no. 1.4310 in compliance with EN 10270 part 3 (A301 / BS 301S21). The tolerances of the wire diameters comply with EN 10270.

Design

Torsion springs are available from stock with either right (clockwise) or left (anti-clockwise) hand coiling. An catalogue number ending with the letter "R" in the tables indicates a right-hand coiled spring, and a number ending with the letter "L" indicates a left-hand coiled spring.

Torsion springs should always be loaded in the direction of coiling. It is therefore necessary to state the direction of coiling by using the corresponding catalogue number for each spring. Both coiling directions are shown in the diagrams for guidance.

The spring bodies are coiled without pitch.

Legs

The legs extend at a tangent from the spring body.

Standard legs are straight, we also supply torsion springs with any form of leg for an extra charge.

Mandrel

Torsion springs are usually operated in conjunction with a mandrel which holds the spring in position. We have provided a range of possible mandrel diameters for each respective torsion spring, as the spring body tends to contract when bending if the mandrel is too large, and to tilt if the mandrel is

too small. The smallest possible mandrel diameter in the table is represented by "Ddmin", and the largest by "Ddmax".

Loads

We have stated the maximum possible torque in the column "Mn", as the length of leverage is different in every application.

The maximum possible spring load can be determined by dividing "Mn" by leverage "RH":

$$F_n = \frac{M_n}{RH}$$

To calculate the load at a particular angle " α " the following formula must be used:

$$F_x = \frac{F_n}{\alpha n} \cdot \alpha x$$

Here, αn is the largest possible rotation angle given in the table.

Production compensation

The spring manufacturers require a production compensation, in order to retain the default parameters (DIN 2194). Normally our springs are compensated through the spring's unloaded leg position (α).

Calculation

The calculation of torsion springs is carried out according to EN specification 13906 section 3. DIN 2194 Grade 2 is taken as the basic standard for the tolerances.

Please contact our service department in Metzingen and Cunewalde if you have any questions about torsion springs.

Metzingen

Phone 0049 (0)7123 960-119, Fax -195,

Cunewalde

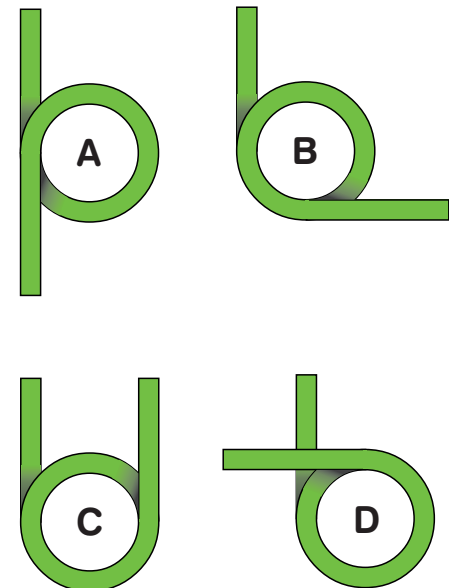
Phone 0049 (0)35877 227-11, Fax -14

technik@gutekunst-co.com

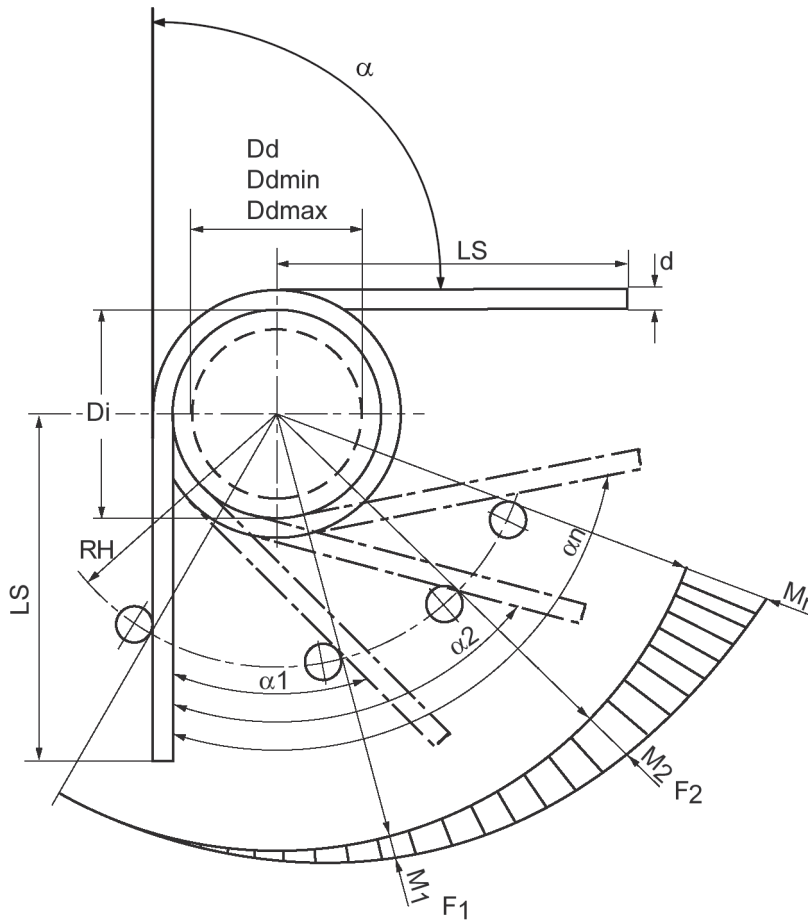
Leg position

Torsion springs are available in stock with leg positions 0 degrees (A), 90 degrees (B), 180 degrees (C), and 270 degrees (D).

The springs in the diagrams are all right-hand coiled.



Torsion springs



Note

The stress coefficient "k" is integrated for the values " αn " and " M_n ". The stress coefficient takes approximately the maximum calculated tension of the spring body into account.

Torsion springs are not tempered, since the bending stress is in the direction of coil. This means that leg bending and shortening can be carried out later on torsion springs.

Data sheets at
federnshop.com

| formula | unit | technical term | inquiry | formula | unit | technical term | inquiry |
|---------|------|-----------------------------------|---------|------------|---------|---------------------------|---------|
| d | mm | wire diameter | | α | degrees | leg position when relaxed | |
| Di | mm | inner coil diameter | | αn | degrees | maximum rotational angle | |
| Dd | mm | diameter of mandrel | | M_n | Nmm | maximum torque | |
| Ddmin | mm | minimum possible mandrel diameter | | RH | mm | leverage | |
| Ddmax | mm | maximum possible mandrel diameter | | n | pc. | total number of coils | |
| LS | mm | leg length | | | | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16000L | 0,40 | 1,60 | 0,08 | 1,00 | 1,30 | 2,00 | A | 0 | 20,00 | 23,35 | 7,54 | 2,84 | 0,0522 | J | | |
| T-16000R | | | 0,08 | 1,00 | 1,30 | 2,00 | A | 0 | 20,00 | 23,35 | 7,54 | 2,84 | 0,0522 | J | | |
| T-16001L | | | 0,08 | 1,00 | 1,30 | 3,25 | B | 90 | 20,00 | 37,95 | 7,54 | 2,52 | 0,0600 | J | | |
| T-16001R | | | 0,08 | 1,00 | 1,30 | 3,25 | B | 90 | 20,00 | 37,95 | 7,54 | 2,52 | 0,0600 | J | | |
| T-16002L | | | 0,08 | 1,00 | 1,30 | 4,50 | C | 180 | 20,00 | 52,54 | 7,54 | 2,33 | 0,0678 | J | | |
| T-16002R | | | 0,08 | 1,00 | 1,30 | 4,50 | C | 180 | 20,00 | 52,54 | 7,54 | 2,33 | 0,0678 | J | | |
| T-16003L | | | 0,08 | 1,00 | 1,30 | 5,75 | D | 270 | 20,00 | 67,14 | 7,54 | 2,20 | 0,0756 | J | | |
| T-16003R | | | 0,08 | 1,00 | 1,30 | 5,75 | D | 270 | 20,00 | 67,14 | 7,54 | 2,20 | 0,0756 | J | | |
| T-16004L | | | 0,08 | 1,00 | 1,30 | 7,00 | A | 0 | 20,00 | 81,73 | 7,54 | 2,10 | 0,0834 | J | | |
| T-16004R | | | 0,08 | 1,00 | 1,30 | 7,00 | A | 0 | 20,00 | 81,73 | 7,54 | 2,10 | 0,0834 | J | | |
| T-16005L | | | 0,08 | 1,00 | 1,30 | 8,25 | B | 90 | 20,00 | 96,33 | 7,54 | 2,02 | 0,0912 | J | | |
| T-16005R | | | 0,08 | 1,00 | 1,30 | 8,25 | B | 90 | 20,00 | 96,33 | 7,54 | 2,02 | 0,0912 | J | | |
| T-16006L | | | 0,08 | 1,00 | 1,30 | 9,50 | C | 180 | 20,00 | 110,92 | 7,54 | 1,95 | 0,0990 | J | | |
| T-16006R | | | 0,08 | 1,00 | 1,30 | 9,50 | C | 180 | 20,00 | 110,92 | 7,54 | 1,95 | 0,0990 | J | | |
| T-16007L | | | 0,08 | 1,00 | 1,30 | 10,75 | D | 270 | 20,00 | 125,52 | 7,54 | 1,89 | 0,1068 | J | | |
| T-16007R | | | 0,08 | 1,00 | 1,30 | 10,75 | D | 270 | 20,00 | 125,52 | 7,54 | 1,89 | 0,1068 | J | | |
| T-16020L | | | 2,40 | 2,40 | 0,08 | 1,50 | 2,00 | 2,00 | A | 0 | 20,00 | 34,48 | 7,95 | 2,40 | 0,0572 | J |
| T-16020R | | | | | 0,08 | 1,50 | 2,00 | 2,00 | A | 0 | 20,00 | 34,48 | 7,95 | 2,40 | 0,0572 | J |
| T-16021L | | | | | 0,08 | 1,50 | 2,00 | 3,25 | B | 90 | 20,00 | 56,03 | 7,95 | 2,13 | 0,0681 | J |
| T-16021R | | | | | 0,08 | 1,50 | 2,00 | 3,25 | B | 90 | 20,00 | 56,03 | 7,95 | 2,13 | 0,0681 | J |
| T-16022L | 0,08 | 1,50 | | | 2,00 | 4,50 | C | 180 | 20,00 | 77,57 | 7,95 | 1,97 | 0,0790 | J | | |
| T-16022R | 0,08 | 1,50 | | | 2,00 | 4,50 | C | 180 | 20,00 | 77,57 | 7,95 | 1,97 | 0,0790 | J | | |
| T-16023L | 0,08 | 1,50 | | | 2,00 | 5,75 | D | 270 | 20,00 | 99,12 | 7,95 | 1,86 | 0,0900 | J | | |
| T-16023R | 0,08 | 1,50 | | | 2,00 | 5,75 | D | 270 | 20,00 | 99,12 | 7,95 | 1,86 | 0,0900 | J | | |
| T-16024L | 0,08 | 1,50 | | | 2,00 | 7,00 | A | 0 | 20,00 | 120,67 | 7,95 | 1,77 | 0,1009 | J | | |
| T-16024R | 0,08 | 1,50 | | | 2,00 | 7,00 | A | 0 | 20,00 | 120,67 | 7,95 | 1,77 | 0,1009 | J | | |
| T-16025L | 0,08 | 1,50 | | | 2,00 | 8,25 | B | 90 | 20,00 | 142,22 | 7,95 | 1,71 | 0,1118 | J | | |
| T-16025R | 0,08 | 1,50 | | | 2,00 | 8,25 | B | 90 | 20,00 | 142,22 | 7,95 | 1,71 | 0,1118 | J | | |
| T-16026L | 0,08 | 1,50 | | | 2,00 | 9,50 | C | 180 | 20,00 | 163,77 | 7,95 | 1,65 | 0,1227 | J | | |
| T-16026R | 0,08 | 1,50 | | | 2,00 | 9,50 | C | 180 | 20,00 | 163,77 | 7,95 | 1,65 | 0,1227 | J | | |
| T-16027L | 0,08 | 1,50 | | | 2,00 | 10,75 | D | 270 | 20,00 | 185,32 | 7,95 | 1,60 | 0,1337 | J | | |
| T-16027R | 0,08 | 1,50 | | | 2,00 | 10,75 | D | 270 | 20,00 | 185,32 | 7,95 | 1,60 | 0,1337 | J | | |
| T-16040L | 3,20 | 0,10 | | | 2,00 | 2,70 | 2,00 | A | 0 | 20,00 | 45,61 | 8,18 | 2,11 | 0,0622 | J | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16040R | 0,40 | 3,20 | 0,10 | 2,00 | 2,70 | 2,00 | A | 0 | 20,00 | 45,61 | 8,18 | 2,11 | 0,0622 | J | | |
| T-16041L | | | 0,10 | 2,00 | 2,70 | 3,25 | B | 90 | 20,00 | 74,12 | 8,18 | 1,88 | 0,0762 | J | | |
| T-16041R | | | 0,10 | 2,00 | 2,70 | 3,25 | B | 90 | 20,00 | 74,12 | 8,18 | 1,88 | 0,0762 | J | | |
| T-16042L | | | 0,10 | 2,00 | 2,70 | 4,50 | C | 180 | 20,00 | 102,62 | 8,18 | 1,74 | 0,0903 | J | | |
| T-16042R | | | 0,10 | 2,00 | 2,70 | 4,50 | C | 180 | 20,00 | 102,62 | 8,18 | 1,74 | 0,0903 | J | | |
| T-16043L | | | 0,10 | 2,00 | 2,70 | 5,75 | D | 270 | 20,00 | 131,13 | 8,18 | 1,64 | 0,1043 | J | | |
| T-16043R | | | 0,10 | 2,00 | 2,70 | 5,75 | D | 270 | 20,00 | 131,13 | 8,18 | 1,64 | 0,1043 | J | | |
| T-16044L | | | 0,10 | 2,00 | 2,70 | 7,00 | A | 0 | 20,00 | 159,64 | 8,18 | 1,56 | 0,1184 | J | | |
| T-16044R | | | 0,10 | 2,00 | 2,70 | 7,00 | A | 0 | 20,00 | 159,64 | 8,18 | 1,56 | 0,1184 | J | | |
| T-16045L | | | 0,10 | 2,00 | 2,70 | 8,25 | B | 90 | 20,00 | 188,14 | 8,18 | 1,50 | 0,1324 | J | | |
| T-16045R | | | 0,10 | 2,00 | 2,70 | 8,25 | B | 90 | 20,00 | 188,14 | 8,18 | 1,50 | 0,1324 | J | | |
| T-16046L | | | 0,10 | 2,00 | 2,70 | 9,50 | C | 180 | 20,00 | 216,65 | 8,18 | 1,45 | 0,1465 | J | | |
| T-16046R | | | 0,10 | 2,00 | 2,70 | 9,50 | C | 180 | 20,00 | 216,65 | 8,18 | 1,45 | 0,1465 | J | | |
| T-16047L | | | 0,10 | 2,00 | 2,70 | 10,75 | D | 270 | 20,00 | 245,16 | 8,18 | 1,41 | 0,1605 | J | | |
| T-16047R | | | 0,10 | 2,00 | 2,70 | 10,75 | D | 270 | 20,00 | 245,16 | 8,18 | 1,41 | 0,1605 | J | | |
| T-16060L | | | 4,00 | 4,00 | 0,10 | 2,50 | 3,30 | 2,00 | A | 0 | 20,00 | 56,75 | 8,33 | 1,91 | 0,0672 | J |
| T-16060R | | | | | 0,10 | 2,50 | 3,30 | 2,00 | A | 0 | 20,00 | 56,75 | 8,33 | 1,91 | 0,0672 | J |
| T-16061L | | | | | 0,10 | 2,50 | 3,30 | 3,25 | B | 90 | 20,00 | 92,21 | 8,33 | 1,70 | 0,0843 | J |
| T-16061R | | | | | 0,10 | 2,50 | 3,30 | 3,25 | B | 90 | 20,00 | 92,21 | 8,33 | 1,70 | 0,0843 | J |
| T-16062L | | | | | 0,10 | 2,50 | 3,30 | 4,50 | C | 180 | 20,00 | 127,68 | 8,33 | 1,57 | 0,1015 | J |
| T-16062R | 0,10 | 2,50 | | | 3,30 | 4,50 | C | 180 | 20,00 | 127,68 | 8,33 | 1,57 | 0,1015 | J | | |
| T-16063L | 0,10 | 2,50 | | | 3,30 | 5,75 | D | 270 | 20,00 | 163,15 | 8,33 | 1,48 | 0,1187 | J | | |
| T-16063R | 0,10 | 2,50 | | | 3,30 | 5,75 | D | 270 | 20,00 | 163,15 | 8,33 | 1,48 | 0,1187 | J | | |
| T-16064L | 0,10 | 2,50 | | | 3,30 | 7,00 | A | 0 | 20,00 | 198,62 | 8,33 | 1,42 | 0,1358 | J | | |
| T-16064R | 0,10 | 2,50 | | | 3,30 | 7,00 | A | 0 | 20,00 | 198,62 | 8,33 | 1,42 | 0,1358 | J | | |
| T-16065L | 0,10 | 2,50 | | | 3,30 | 8,25 | B | 90 | 20,00 | 234,08 | 8,33 | 1,36 | 0,1530 | J | | |
| T-16065R | 0,10 | 2,50 | | | 3,30 | 8,25 | B | 90 | 20,00 | 234,08 | 8,33 | 1,36 | 0,1530 | J | | |
| T-16066L | 0,10 | 2,50 | | | 3,30 | 9,50 | C | 180 | 20,00 | 269,55 | 8,33 | 1,32 | 0,1702 | J | | |
| T-16066R | 0,10 | 2,50 | | | 3,30 | 9,50 | C | 180 | 20,00 | 269,55 | 8,33 | 1,32 | 0,1702 | J | | |
| T-16067L | 0,10 | 2,50 | | | 3,30 | 10,75 | D | 270 | 20,00 | 305,02 | 8,33 | 1,28 | 0,1874 | J | | |
| T-16067R | 0,10 | 2,50 | | | 3,30 | 10,75 | D | 270 | 20,00 | 305,02 | 8,33 | 1,28 | 0,1874 | J | | |
| T-16100L | 0,50 | 2,50 | | | 0,08 | 2,00 | 2,25 | 2,00 | A | 0 | 25,00 | 28,28 | 14,86 | 5,06 | 0,1066 | J |
| T-16100R | | | | | 0,08 | 2,00 | 2,25 | 2,00 | A | 0 | 25,00 | 28,28 | 14,86 | 5,06 | 0,1066 | J |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16101L | 0,50 | 2,50 | 0,08 | 2,00 | 2,25 | 3,25 | B | 90 | 25,00 | 46,01 | 14,86 | 4,50 | 0,1248 | J | | |
| T-16101R | | | 0,08 | 2,00 | 2,25 | 3,25 | B | 90 | 25,00 | 46,01 | 14,86 | 4,50 | 0,1248 | J | | |
| T-16102L | | | 0,08 | 2,00 | 2,25 | 4,50 | C | 180 | 25,00 | 63,74 | 14,86 | 4,16 | 0,1431 | J | | |
| T-16102R | | | 0,08 | 2,00 | 2,25 | 4,50 | C | 180 | 25,00 | 63,74 | 14,86 | 4,16 | 0,1431 | J | | |
| T-16103L | | | 0,08 | 2,00 | 2,25 | 5,75 | D | 270 | 25,00 | 81,39 | 14,86 | 3,92 | 0,1613 | J | | |
| T-16103R | | | 0,08 | 2,00 | 2,25 | 5,75 | D | 270 | 25,00 | 81,39 | 14,86 | 3,92 | 0,1613 | J | | |
| T-16105L | | | 0,08 | 2,00 | 2,25 | 7,00 | A | 0 | 25,00 | 100,95 | 14,86 | 3,74 | 0,1795 | J | | |
| T-16105R | | | 0,08 | 2,00 | 2,25 | 7,00 | A | 0 | 25,00 | 100,95 | 14,86 | 3,74 | 0,1795 | J | | |
| T-16106L | | | 0,08 | 2,00 | 2,25 | 8,25 | B | 90 | 25,00 | 116,76 | 14,86 | 3,60 | 0,1978 | J | | |
| T-16106R | | | 0,08 | 2,00 | 2,25 | 8,25 | B | 90 | 25,00 | 116,76 | 14,86 | 3,60 | 0,1978 | J | | |
| T-16107L | | | 0,08 | 2,00 | 2,25 | 9,50 | C | 180 | 25,00 | 134,49 | 14,86 | 3,48 | 0,2160 | J | | |
| T-16107R | | | 0,08 | 2,00 | 2,25 | 9,50 | C | 180 | 25,00 | 134,49 | 14,86 | 3,48 | 0,2160 | J | | |
| T-16108L | | | 0,08 | 2,00 | 2,25 | 10,75 | D | 270 | 25,00 | 152,22 | 14,86 | 3,38 | 0,2342 | J | | |
| T-16108R | | | 0,08 | 2,00 | 2,25 | 10,75 | D | 270 | 25,00 | 152,22 | 14,86 | 3,38 | 0,2342 | J | | |
| T-16120L | | | 3,50 | 3,50 | 0,11 | 2,80 | 3,15 | 2,00 | A | 0 | 25,00 | 39,17 | 15,43 | 4,38 | 0,1163 | J |
| T-16120R | | | | | 0,11 | 2,80 | 3,15 | 2,00 | A | 0 | 25,00 | 39,17 | 15,43 | 4,38 | 0,1163 | J |
| T-16121L | | | | | 0,11 | 2,80 | 3,15 | 3,25 | B | 90 | 25,00 | 63,70 | 15,43 | 3,90 | 0,1406 | J |
| T-16121R | | | | | 0,11 | 2,80 | 3,15 | 3,25 | B | 90 | 25,00 | 63,70 | 15,43 | 3,90 | 0,1406 | J |
| T-16122L | 0,11 | 2,80 | | | 3,15 | 4,50 | C | 180 | 25,00 | 88,22 | 15,43 | 3,60 | 0,1649 | J | | |
| T-16122R | 0,11 | 2,80 | | | 3,15 | 4,50 | C | 180 | 25,00 | 88,22 | 15,43 | 3,60 | 0,1649 | J | | |
| T-16123L | 0,11 | 2,80 | | | 3,15 | 4,75 | D | 270 | 25,00 | 112,66 | 15,43 | 3,56 | 0,1698 | J | | |
| T-16123R | 0,11 | 2,80 | | | 3,15 | 4,75 | D | 270 | 25,00 | 112,66 | 15,43 | 3,56 | 0,1698 | J | | |
| T-16124L | 0,11 | 2,80 | | | 3,15 | 7,00 | A | 0 | 25,00 | 137,18 | 15,43 | 3,24 | 0,2136 | J | | |
| T-16124R | 0,11 | 2,80 | | | 3,15 | 7,00 | A | 0 | 25,00 | 137,18 | 15,43 | 3,24 | 0,2136 | J | | |
| T-16125L | 0,11 | 2,80 | | | 3,15 | 8,25 | B | 90 | 25,00 | 161,62 | 15,43 | 3,12 | 0,2379 | J | | |
| T-16125R | 0,11 | 2,80 | | | 3,15 | 8,25 | B | 90 | 25,00 | 161,62 | 15,43 | 3,12 | 0,2379 | J | | |
| T-16126L | 0,11 | 2,80 | | | 3,15 | 9,50 | C | 180 | 25,00 | 186,15 | 15,43 | 3,01 | 0,2622 | J | | |
| T-16126R | 0,11 | 2,80 | | | 3,15 | 9,50 | C | 180 | 25,00 | 186,15 | 15,43 | 3,01 | 0,2622 | J | | |
| T-16127L | 0,11 | 2,80 | | | 3,15 | 10,75 | D | 270 | 25,00 | 210,67 | 15,43 | 2,92 | 0,2865 | J | | |
| T-16127R | 0,11 | 2,80 | | | 3,15 | 10,75 | D | 270 | 25,00 | 210,67 | 15,43 | 2,92 | 0,2865 | J | | |
| T-16140L | 4,50 | 4,50 | | | 0,14 | 3,60 | 4,00 | 2,00 | A | 0 | 25,00 | 50,06 | 15,78 | 3,92 | 0,1260 | J |
| T-16140R | | | | | 0,14 | 3,60 | 4,00 | 2,00 | A | 0 | 25,00 | 50,06 | 15,78 | 3,92 | 0,1260 | J |
| T-16141L | | | 0,14 | 3,60 | 4,00 | 3,25 | B | 90 | 25,00 | 81,39 | 15,78 | 3,49 | 0,1564 | J | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16141R | 0,50 | 4,50 | 0,14 | 3,60 | 4,00 | 3,25 | B | 90 | 25,00 | 81,39 | 15,78 | 3,49 | 0,1564 | J | | |
| T-16142L | | | 0,14 | 3,60 | 4,00 | 4,50 | C | 180 | 25,00 | 112,71 | 15,78 | 3,22 | 0,1868 | J | | |
| T-16142R | | | 0,14 | 3,60 | 4,00 | 4,50 | C | 180 | 25,00 | 112,71 | 15,78 | 3,22 | 0,1868 | J | | |
| T-16143L | | | 0,14 | 3,60 | 4,00 | 5,75 | D | 270 | 25,00 | 143,94 | 15,78 | 3,04 | 0,2172 | J | | |
| T-16143R | | | 0,14 | 3,60 | 4,00 | 5,75 | D | 270 | 25,00 | 143,94 | 15,78 | 3,04 | 0,2172 | J | | |
| T-16144L | | | 0,14 | 3,60 | 4,00 | 7,00 | A | 0 | 25,00 | 175,26 | 15,78 | 2,90 | 0,2476 | J | | |
| T-16144R | | | 0,14 | 3,60 | 4,00 | 7,00 | A | 0 | 25,00 | 175,26 | 15,78 | 2,90 | 0,2476 | J | | |
| T-16145L | | | 0,14 | 3,60 | 4,00 | 8,25 | B | 90 | 25,00 | 206,59 | 15,78 | 2,79 | 0,2780 | J | | |
| T-16145R | | | 0,14 | 3,60 | 4,00 | 8,25 | B | 90 | 25,00 | 206,59 | 15,78 | 2,79 | 0,2780 | J | | |
| T-16146L | | | 0,14 | 3,60 | 4,00 | 9,50 | C | 180 | 25,00 | 242,21 | 15,78 | 2,69 | 0,3084 | J | | |
| T-16146R | | | 0,14 | 3,60 | 4,00 | 9,50 | C | 180 | 25,00 | 242,21 | 15,78 | 2,69 | 0,3084 | J | | |
| T-16147L | | | 0,14 | 3,60 | 4,00 | 10,75 | D | 270 | 25,00 | 269,14 | 15,78 | 2,62 | 0,3388 | J | | |
| T-16147R | | | 0,14 | 3,60 | 4,00 | 10,75 | D | 270 | 25,00 | 269,14 | 15,78 | 2,62 | 0,3388 | J | | |
| T-16160L | | | 5,50 | 5,50 | 0,17 | 4,40 | 5,00 | 2,00 | A | 0 | 25,00 | 60,96 | 16,01 | 3,57 | 0,1358 | J |
| T-16160R | 0,17 | 4,40 | | | 5,00 | 2,00 | A | 0 | 25,00 | 60,96 | 16,01 | 3,57 | 0,1358 | J | | |
| T-16161L | 0,17 | 4,40 | | | 5,00 | 3,25 | B | 90 | 25,00 | 99,08 | 16,01 | 3,18 | 0,1722 | J | | |
| T-16161R | 0,17 | 4,40 | | | 5,00 | 3,25 | B | 90 | 25,00 | 99,08 | 16,01 | 3,18 | 0,1722 | J | | |
| T-16162L | 0,17 | 4,40 | | | 5,00 | 4,50 | C | 180 | 25,00 | 137,20 | 16,01 | 2,94 | 0,2087 | J | | |
| T-16162R | 0,17 | 4,40 | | | 5,00 | 4,50 | C | 180 | 25,00 | 137,20 | 16,01 | 2,94 | 0,2087 | J | | |
| T-16163L | 0,17 | 4,40 | | | 5,00 | 5,75 | D | 270 | 25,00 | 175,23 | 16,01 | 2,77 | 0,2452 | J | | |
| T-16163R | 0,17 | 4,40 | | | 5,00 | 5,75 | D | 270 | 25,00 | 175,23 | 16,01 | 2,77 | 0,2452 | J | | |
| T-16164L | 0,17 | 4,40 | | | 5,00 | 7,00 | A | 0 | 25,00 | 213,35 | 16,01 | 2,65 | 0,2816 | J | | |
| T-16164R | 0,17 | 4,40 | | | 5,00 | 7,00 | A | 0 | 25,00 | 213,35 | 16,01 | 2,65 | 0,2816 | J | | |
| T-16165L | 0,17 | 4,40 | | | 5,00 | 8,25 | B | 90 | 25,00 | 251,47 | 16,01 | 2,54 | 0,3181 | J | | |
| T-16165R | 0,17 | 4,40 | | | 5,00 | 8,25 | B | 90 | 25,00 | 251,47 | 16,01 | 2,54 | 0,3181 | J | | |
| T-16166L | 0,17 | 4,40 | | | 5,00 | 9,50 | C | 180 | 25,00 | 294,87 | 16,01 | 2,46 | 0,3546 | J | | |
| T-16166R | 0,17 | 4,40 | | | 5,00 | 9,50 | C | 180 | 25,00 | 294,87 | 16,01 | 2,46 | 0,3546 | J | | |
| T-16167L | 0,17 | 4,40 | | | 5,00 | 10,75 | D | 270 | 25,00 | 327,71 | 16,01 | 2,39 | 0,3910 | J | | |
| T-16167R | 0,17 | 4,40 | | | 5,00 | 10,75 | D | 270 | 25,00 | 327,71 | 16,01 | 2,39 | 0,3910 | J | | |
| T-16200L | 0,63 | 3,37 | | | 0,11 | 2,70 | 3,00 | 2,00 | A | 0 | 30,00 | 29,66 | 29,44 | 9,83 | 0,2092 | H |
| T-16200R | | | | | 0,11 | 2,70 | 3,00 | 2,00 | A | 0 | 30,00 | 29,66 | 29,44 | 9,83 | 0,2092 | H |
| T-16201L | | | 0,11 | 2,70 | 3,00 | 3,25 | B | 90 | 30,00 | 48,24 | 29,44 | 8,75 | 0,2478 | H | | |
| T-16201R | | | 0,11 | 2,70 | 3,00 | 3,25 | B | 90 | 30,00 | 48,24 | 29,44 | 8,75 | 0,2478 | H | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16202L | 0,63 | 3,37 | 0,11 | 2,70 | 3,00 | 4,50 | C | 180 | 30,00 | 66,73 | 29,44 | 8,09 | 0,2864 | H | | |
| T-16202R | | | 0,11 | 2,70 | 3,00 | 4,50 | C | 180 | 30,00 | 66,73 | 29,44 | 8,09 | 0,2864 | H | | |
| T-16203L | | | 0,11 | 2,70 | 3,00 | 5,75 | D | 270 | 30,00 | 85,31 | 29,44 | 7,63 | 0,3250 | H | | |
| T-16203R | | | 0,11 | 2,70 | 3,00 | 5,75 | D | 270 | 30,00 | 85,31 | 29,44 | 7,63 | 0,3250 | H | | |
| T-16204L | | | 0,11 | 2,70 | 3,00 | 7,00 | A | 0 | 30,00 | 103,89 | 29,44 | 7,28 | 0,3636 | H | | |
| T-16204R | | | 0,11 | 2,70 | 3,00 | 7,00 | A | 0 | 30,00 | 103,89 | 29,44 | 7,28 | 0,3636 | H | | |
| T-16205L | | | 0,11 | 2,70 | 3,00 | 8,25 | B | 90 | 30,00 | 122,38 | 29,44 | 7,00 | 0,4022 | H | | |
| T-16205R | | | 0,11 | 2,70 | 3,00 | 8,25 | B | 90 | 30,00 | 122,38 | 29,44 | 7,00 | 0,4022 | H | | |
| T-16206L | | | 0,11 | 2,70 | 3,00 | 9,50 | C | 180 | 30,00 | 140,96 | 29,44 | 6,76 | 0,4408 | H | | |
| T-16206R | | | 0,11 | 2,70 | 3,00 | 9,50 | C | 180 | 30,00 | 140,96 | 29,44 | 6,76 | 0,4408 | H | | |
| T-16207L | | | 0,11 | 2,70 | 3,00 | 10,75 | D | 270 | 30,00 | 159,54 | 29,44 | 6,57 | 0,4794 | H | | |
| T-16207R | | | 0,11 | 2,70 | 3,00 | 10,75 | D | 270 | 30,00 | 159,54 | 29,44 | 6,57 | 0,4794 | H | | |
| T-16220L | 4,37 | 4,37 | 0,14 | 3,50 | 3,90 | 2,00 | A | 0 | 30,00 | 38,15 | 30,29 | 8,79 | 0,2247 | H | | |
| T-16220R | | | 0,14 | 3,50 | 3,90 | 2,00 | A | 0 | 30,00 | 38,15 | 30,29 | 8,79 | 0,2247 | H | | |
| T-16221L | | | 0,14 | 3,50 | 3,90 | 3,25 | B | 90 | 30,00 | 62,02 | 30,29 | 7,83 | 0,2729 | H | | |
| T-16221R | | | 0,14 | 3,50 | 3,90 | 3,25 | B | 90 | 30,00 | 62,02 | 30,29 | 7,83 | 0,2729 | H | | |
| T-16222L | | | 0,14 | 3,50 | 3,90 | 4,50 | C | 180 | 30,00 | 85,81 | 30,29 | 7,24 | 0,3212 | H | | |
| T-16222R | | | 0,14 | 3,50 | 3,90 | 4,50 | C | 180 | 30,00 | 85,81 | 30,29 | 7,24 | 0,3212 | H | | |
| T-16223L | | | 0,14 | 3,50 | 3,90 | 5,75 | D | 270 | 30,00 | 109,68 | 30,29 | 6,82 | 0,3694 | H | | |
| T-16223R | | | 0,14 | 3,50 | 3,90 | 5,75 | D | 270 | 30,00 | 109,68 | 30,29 | 6,82 | 0,3694 | H | | |
| T-16224L | | | 0,14 | 3,50 | 3,90 | 7,00 | A | 0 | 30,00 | 133,56 | 30,29 | 6,51 | 0,4177 | H | | |
| T-16224R | | | 0,14 | 3,50 | 3,90 | 7,00 | A | 0 | 30,00 | 133,56 | 30,29 | 6,51 | 0,4177 | H | | |
| T-16225L | | | 0,14 | 3,50 | 3,90 | 8,25 | B | 90 | 30,00 | 157,53 | 30,29 | 6,26 | 0,4659 | H | | |
| T-16225R | | | 0,14 | 3,50 | 3,90 | 8,25 | B | 90 | 30,00 | 157,53 | 30,29 | 6,26 | 0,4659 | H | | |
| T-16226L | | | 0,14 | 3,50 | 3,90 | 9,50 | C | 180 | 30,00 | 181,22 | 30,29 | 6,05 | 0,5141 | H | | |
| T-16226R | | | 0,14 | 3,50 | 3,90 | 9,50 | C | 180 | 30,00 | 181,22 | 30,29 | 6,05 | 0,5141 | H | | |
| T-16227L | | | 0,14 | 3,50 | 3,90 | 10,75 | D | 270 | 30,00 | 205,10 | 30,29 | 5,87 | 0,5624 | H | | |
| T-16227R | | | 0,14 | 3,50 | 3,90 | 10,75 | D | 270 | 30,00 | 205,10 | 30,29 | 5,87 | 0,5624 | H | | |
| T-16240L | | | 5,37 | 5,37 | 0,16 | 4,30 | 4,80 | 2,00 | A | 0 | 30,00 | 46,64 | 30,87 | 8,03 | 0,2401 | H |
| T-16240R | | | | | 0,16 | 4,30 | 4,80 | 2,00 | A | 0 | 30,00 | 46,64 | 30,87 | 8,03 | 0,2401 | H |
| T-16241L | | | | | 0,16 | 4,30 | 4,80 | 3,25 | B | 90 | 30,00 | 75,81 | 30,87 | 7,14 | 0,2980 | H |
| T-16241R | | | | | 0,16 | 4,30 | 4,80 | 3,25 | B | 90 | 30,00 | 75,81 | 30,87 | 7,14 | 0,2980 | H |
| T-16242L | 0,16 | 4,30 | | | 4,80 | 4,50 | C | 180 | 30,00 | 104,90 | 30,87 | 6,61 | 0,3559 | H | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|--------|---|
| T-16242R | 0,63 | 5,37 | 0,16 | 4,30 | 4,80 | 4,50 | C | 180 | 30,00 | 104,90 | 30,87 | 6,61 | 0,3559 | H | | | |
| T-16243L | | | 0,16 | 4,30 | 4,80 | 5,75 | D | 270 | 30,00 | 134,07 | 30,87 | 6,23 | 0,4138 | H | | | |
| T-16243R | | | 0,16 | 4,30 | 4,80 | 5,75 | D | 270 | 30,00 | 30,00 | 134,07 | 30,87 | 6,23 | 0,4138 | H | | |
| T-16244L | | | 0,16 | 4,30 | 4,80 | 7,00 | A | 0 | 30,00 | 30,00 | 163,52 | 30,87 | 5,94 | 0,4717 | H | | |
| T-16244R | | | 0,16 | 4,30 | 4,80 | 7,00 | A | 0 | 30,00 | 30,00 | 163,52 | 30,87 | 5,94 | 0,4717 | H | | |
| T-16245L | | | 0,16 | 4,30 | 4,80 | 8,25 | B | 90 | 30,00 | 30,00 | 192,33 | 30,87 | 5,71 | 0,5296 | H | | |
| T-16245R | | | 0,16 | 4,30 | 4,80 | 8,25 | B | 90 | 30,00 | 30,00 | 192,33 | 30,87 | 5,71 | 0,5296 | H | | |
| T-16246L | | | 0,16 | 4,30 | 4,80 | 9,50 | C | 180 | 30,00 | 30,00 | 221,50 | 30,87 | 5,52 | 0,5875 | H | | |
| T-16246R | | | 0,16 | 4,30 | 4,80 | 9,50 | C | 180 | 30,00 | 30,00 | 221,50 | 30,87 | 5,52 | 0,5875 | H | | |
| T-16247L | | | 0,16 | 4,30 | 4,80 | 10,75 | D | 270 | 30,00 | 30,00 | 250,71 | 30,87 | 5,36 | 0,6454 | H | | |
| T-16247R | | | 0,16 | 4,30 | 4,80 | 10,75 | D | 270 | 30,00 | 30,00 | 250,71 | 30,87 | 5,36 | 0,6454 | H | | |
| T-16260L | | | 6,37 | 6,37 | 0,19 | 5,10 | 5,70 | 2,00 | A | 0 | 30,00 | 55,14 | 31,27 | 7,43 | 0,2556 | H | |
| T-16260R | | | | | 0,19 | 5,10 | 5,70 | 2,00 | A | 0 | 30,00 | 30,00 | 55,14 | 31,27 | 7,43 | 0,2556 | H |
| T-16261L | | | | | 0,19 | 5,10 | 5,70 | 3,25 | B | 90 | 30,00 | 30,00 | 89,61 | 31,27 | 6,61 | 0,3231 | H |
| T-16261R | | | | | 0,19 | 5,10 | 5,70 | 3,25 | B | 90 | 30,00 | 30,00 | 89,61 | 31,27 | 6,61 | 0,3231 | H |
| T-16262L | | | | | 0,19 | 5,10 | 5,70 | 4,50 | C | 180 | 30,00 | 30,00 | 123,99 | 31,27 | 6,12 | 0,3906 | H |
| T-16262R | | | | | 0,19 | 5,10 | 5,70 | 4,50 | C | 180 | 30,00 | 30,00 | 123,99 | 31,27 | 6,12 | 0,3906 | H |
| T-16263L | | | | | 0,19 | 5,10 | 5,70 | 5,75 | D | 270 | 30,00 | 30,00 | 158,46 | 31,27 | 5,77 | 0,4582 | H |
| T-16263R | | | | | 0,19 | 5,10 | 5,70 | 5,75 | D | 270 | 30,00 | 30,00 | 158,46 | 31,27 | 5,77 | 0,4582 | H |
| T-16264L | | | | | 0,19 | 5,10 | 5,70 | 7,00 | A | 0 | 30,00 | 30,00 | 192,93 | 31,27 | 5,50 | 0,5257 | H |
| T-16264R | | | | | 0,19 | 5,10 | 5,70 | 7,00 | A | 0 | 30,00 | 30,00 | 192,93 | 31,27 | 5,50 | 0,5257 | H |
| T-16265L | | | | | 0,19 | 5,10 | 5,70 | 8,25 | B | 90 | 30,00 | 30,00 | 227,40 | 31,27 | 5,29 | 0,5933 | H |
| T-16265R | 0,19 | 5,10 | | | 5,70 | 8,25 | B | 90 | 30,00 | 30,00 | 227,40 | 31,27 | 5,29 | 0,5933 | H | | |
| T-16266L | 0,19 | 5,10 | | | 5,70 | 9,50 | C | 180 | 30,00 | 30,00 | 261,78 | 31,27 | 5,11 | 0,6608 | H | | |
| T-16266R | 0,19 | 5,10 | | | 5,70 | 9,50 | C | 180 | 30,00 | 30,00 | 261,78 | 31,27 | 5,11 | 0,6608 | H | | |
| T-16267L | 0,19 | 5,10 | | | 5,70 | 10,75 | D | 270 | 30,00 | 30,00 | 296,25 | 31,27 | 4,96 | 0,7283 | H | | |
| T-16267R | 0,19 | 5,10 | | | 5,70 | 10,75 | D | 270 | 30,00 | 30,00 | 296,25 | 31,27 | 4,96 | 0,7283 | H | | |
| T-16300L | 0,70 | 4,30 | | | 0,13 | 3,50 | 3,80 | 2,00 | A | 0 | 35,00 | 33,59 | 40,62 | 12,71 | 0,3077 | H | |
| T-16300R | | | | | 0,13 | 3,50 | 3,80 | 2,00 | A | 0 | 35,00 | 35,00 | 33,59 | 40,62 | 12,71 | 0,3077 | H |
| T-16301L | | | | | 0,13 | 3,50 | 3,80 | 3,25 | B | 90 | 35,00 | 35,00 | 54,51 | 40,62 | 11,32 | 0,3673 | H |
| T-16301R | | | | | 0,13 | 3,50 | 3,80 | 3,25 | B | 90 | 35,00 | 35,00 | 54,51 | 40,62 | 11,32 | 0,3673 | H |
| T-16302L | | | | | 0,13 | 3,50 | 3,80 | 4,50 | C | 180 | 35,00 | 35,00 | 75,51 | 40,62 | 10,47 | 0,4269 | H |
| T-16302R | | | | | 0,13 | 3,50 | 3,80 | 4,50 | C | 180 | 35,00 | 35,00 | 75,51 | 40,62 | 10,47 | 0,4269 | H |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16303L | 0,70 | 4,30 | 0,13 | 3,50 | 3,80 | 5,75 | D | 270 | 35,00 | 96,52 | 40,62 | 9,87 | 0,4864 | H | | |
| T-16303R | | | 0,13 | 3,50 | 3,80 | 5,75 | D | 270 | 35,00 | 96,52 | 40,62 | 9,87 | 0,4864 | H | | |
| T-16304L | | | 0,13 | 3,50 | 3,80 | 7,00 | A | 0 | 35,00 | 117,53 | 40,62 | 9,41 | 0,5460 | H | | |
| T-16304R | | | 0,13 | 3,50 | 3,80 | 7,00 | A | 0 | 35,00 | 117,53 | 40,62 | 9,41 | 0,5460 | H | | |
| T-16305L | | | 0,13 | 3,50 | 3,80 | 8,25 | B | 90 | 35,00 | 138,44 | 40,62 | 9,05 | 0,6055 | H | | |
| T-16305R | | | 0,13 | 3,50 | 3,80 | 8,25 | B | 90 | 35,00 | 138,44 | 40,62 | 9,05 | 0,6055 | H | | |
| T-16306L | | | 0,13 | 3,50 | 3,80 | 9,50 | C | 180 | 35,00 | 168,31 | 40,62 | 8,75 | 0,6651 | H | | |
| T-16306R | | | 0,13 | 3,50 | 3,80 | 9,50 | C | 180 | 35,00 | 168,31 | 40,62 | 8,75 | 0,6651 | H | | |
| T-16307L | | | 0,13 | 3,50 | 3,80 | 10,75 | D | 270 | 35,00 | 180,45 | 40,62 | 8,49 | 0,7247 | H | | |
| T-16307R | | | 0,13 | 3,50 | 3,80 | 10,75 | D | 270 | 35,00 | 180,45 | 40,62 | 8,49 | 0,7247 | H | | |
| T-16320L | | | 5,30 | 5,30 | 0,16 | 4,30 | 4,70 | 2,00 | A | 0 | 35,00 | 41,09 | 41,48 | 11,61 | 0,3268 | H |
| T-16320R | | | | | 0,16 | 4,30 | 4,70 | 2,00 | A | 0 | 35,00 | 41,09 | 41,48 | 11,61 | 0,3268 | H |
| T-16321L | 0,16 | 4,30 | | | 4,70 | 3,25 | B | 90 | 35,00 | 66,80 | 41,48 | 10,33 | 0,3983 | H | | |
| T-16321R | 0,16 | 4,30 | | | 4,70 | 3,25 | B | 90 | 35,00 | 66,80 | 41,48 | 10,33 | 0,3983 | H | | |
| T-16322L | 0,16 | 4,30 | | | 4,70 | 4,50 | C | 180 | 35,00 | 92,50 | 41,48 | 9,55 | 0,4697 | H | | |
| T-16322R | 0,16 | 4,30 | | | 4,70 | 4,50 | C | 180 | 35,00 | 92,50 | 41,48 | 9,55 | 0,4697 | H | | |
| T-16323L | 0,16 | 4,30 | | | 4,70 | 5,75 | D | 270 | 35,00 | 118,21 | 41,48 | 9,01 | 0,5412 | H | | |
| T-16323R | 0,16 | 4,30 | | | 4,70 | 5,75 | D | 270 | 35,00 | 118,21 | 41,48 | 9,01 | 0,5412 | H | | |
| T-16324L | 0,16 | 4,30 | | | 4,70 | 7,00 | A | 0 | 35,00 | 143,91 | 41,48 | 8,59 | 0,6127 | H | | |
| T-16324R | 0,16 | 4,30 | | | 4,70 | 7,00 | A | 0 | 35,00 | 143,91 | 41,48 | 8,59 | 0,6127 | H | | |
| T-16325L | 0,16 | 4,30 | | | 4,70 | 8,25 | B | 90 | 35,00 | 169,62 | 41,48 | 8,26 | 0,6842 | H | | |
| T-16325R | 0,16 | 4,30 | | | 4,70 | 8,25 | B | 90 | 35,00 | 169,62 | 41,48 | 8,26 | 0,6842 | H | | |
| T-16326L | 0,16 | 4,30 | | | 4,70 | 9,50 | C | 180 | 35,00 | 195,32 | 41,48 | 7,99 | 0,7556 | H | | |
| T-16326R | 0,16 | 4,30 | | | 4,70 | 9,50 | C | 180 | 35,00 | 195,32 | 41,48 | 7,99 | 0,7556 | H | | |
| T-16327L | 0,16 | 4,30 | | | 4,70 | 10,75 | D | 270 | 35,00 | 221,03 | 41,48 | 7,75 | 0,8271 | H | | |
| T-16327R | 0,16 | 4,30 | | | 4,70 | 10,75 | D | 270 | 35,00 | 221,03 | 41,48 | 7,75 | 0,8271 | H | | |
| T-16340L | 6,30 | 6,30 | | | 0,19 | 5,00 | 5,60 | 2,00 | A | 0 | 35,00 | 48,68 | 42,10 | 10,75 | 0,3459 | H |
| T-16340R | | | | | 0,19 | 5,00 | 5,60 | 2,00 | A | 0 | 35,00 | 48,68 | 42,10 | 10,75 | 0,3459 | H |
| T-16341L | | | 0,19 | 5,00 | 5,60 | 3,25 | B | 90 | 35,00 | 79,09 | 42,10 | 9,56 | 0,4292 | H | | |
| T-16341R | | | 0,19 | 5,00 | 5,60 | 3,25 | B | 90 | 35,00 | 79,09 | 42,10 | 9,56 | 0,4292 | H | | |
| T-16342L | | | 0,19 | 5,00 | 5,60 | 4,50 | C | 180 | 35,00 | 109,49 | 42,10 | 8,85 | 0,5126 | H | | |
| T-16342R | | | 0,19 | 5,00 | 5,60 | 4,50 | C | 180 | 35,00 | 109,49 | 42,10 | 8,85 | 0,5126 | H | | |
| T-16343L | | | 0,19 | 5,00 | 5,60 | 5,75 | D | 270 | 35,00 | 139,99 | 42,10 | 8,34 | 0,5960 | H | | |
| T-16343R | | | 0,19 | 5,00 | 5,60 | 5,75 | D | 270 | 35,00 | 139,99 | 42,10 | 8,34 | 0,5960 | H | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16343R | 0,70 | 6,30 | 0,19 | 5,00 | 5,60 | 5,75 | D | 270 | 35,00 | 139,99 | 42,10 | 8,34 | 0,5960 | H | | |
| T-16344L | | | 0,19 | 5,00 | 5,60 | 7,00 | A | 0 | 35,00 | 170,39 | 42,10 | 7,96 | 0,6794 | H | | |
| T-16344R | | | 0,19 | 5,00 | 5,60 | 7,00 | A | 0 | 35,00 | 170,39 | 42,10 | 7,96 | 0,6794 | H | | |
| T-16345L | | | 0,19 | 5,00 | 5,60 | 8,25 | B | 90 | 35,00 | 200,80 | 42,10 | 7,65 | 0,7628 | H | | |
| T-16345R | | | 0,19 | 5,00 | 5,60 | 8,25 | B | 90 | 35,00 | 200,80 | 42,10 | 7,65 | 0,7628 | H | | |
| T-16346L | | | 0,19 | 5,00 | 5,60 | 9,50 | C | 180 | 35,00 | 231,20 | 42,10 | 7,39 | 0,8462 | H | | |
| T-16346R | | | 0,19 | 5,00 | 5,60 | 9,50 | C | 180 | 35,00 | 231,20 | 42,10 | 7,39 | 0,8462 | H | | |
| T-16347L | | | 0,19 | 5,00 | 5,60 | 10,75 | D | 270 | 35,00 | 261,70 | 42,10 | 7,18 | 0,9295 | H | | |
| T-16347R | | | 0,19 | 5,00 | 5,60 | 10,75 | D | 270 | 35,00 | 261,70 | 42,10 | 7,18 | 0,9295 | H | | |
| T-16360L | | | 7,30 | 7,30 | 0,21 | 5,90 | 6,50 | 2,00 | A | 0 | 35,00 | 56,28 | 42,56 | 10,05 | 0,3649 | H |
| T-16360R | 0,21 | 5,90 | | | 6,50 | 2,00 | A | 0 | 35,00 | 56,28 | 42,56 | 10,05 | 0,3649 | H | | |
| T-16361L | 0,21 | 5,90 | | | 6,50 | 3,25 | B | 90 | 35,00 | 91,38 | 42,56 | 8,95 | 0,4602 | H | | |
| T-16361R | 0,21 | 5,90 | | | 6,50 | 3,25 | B | 90 | 35,00 | 91,38 | 42,56 | 8,95 | 0,4602 | H | | |
| T-16362L | 0,21 | 5,90 | | | 6,50 | 4,50 | C | 180 | 35,00 | 126,58 | 42,56 | 8,27 | 0,5555 | H | | |
| T-16362R | 0,21 | 5,90 | | | 6,50 | 4,50 | C | 180 | 35,00 | 126,58 | 42,56 | 8,27 | 0,5555 | H | | |
| T-16363L | 0,21 | 5,90 | | | 6,50 | 5,75 | D | 270 | 35,00 | 161,68 | 42,56 | 7,80 | 0,6508 | H | | |
| T-16363R | 0,21 | 5,90 | | | 6,50 | 5,75 | D | 270 | 35,00 | 161,68 | 42,56 | 7,80 | 0,6508 | H | | |
| T-16364L | 0,21 | 5,90 | | | 6,50 | 7,00 | A | 0 | 35,00 | 196,88 | 42,56 | 7,44 | 0,7461 | H | | |
| T-16364R | 0,21 | 5,90 | | | 6,50 | 7,00 | A | 0 | 35,00 | 196,88 | 42,56 | 7,44 | 0,7461 | H | | |
| T-16365L | 0,21 | 5,90 | | | 6,50 | 8,25 | B | 90 | 35,00 | 231,99 | 42,56 | 7,15 | 0,8414 | H | | |
| T-16365R | 0,21 | 5,90 | | | 6,50 | 8,25 | B | 90 | 35,00 | 231,99 | 42,56 | 7,15 | 0,8414 | H | | |
| T-16366L | 0,21 | 5,90 | | | 6,50 | 9,50 | C | 180 | 35,00 | 267,18 | 42,56 | 6,92 | 0,9367 | H | | |
| T-16366R | 0,21 | 5,90 | | | 6,50 | 9,50 | C | 180 | 35,00 | 267,18 | 42,56 | 6,92 | 0,9367 | H | | |
| T-16367L | 0,21 | 5,90 | | | 6,50 | 10,75 | D | 270 | 35,00 | 302,29 | 42,56 | 6,71 | 1,0320 | H | | |
| T-16367R | 0,21 | 5,90 | | | 6,50 | 10,75 | D | 270 | 35,00 | 302,29 | 42,56 | 6,71 | 1,0320 | H | | |
| T-18400L | 0,80 | 4,40 | | | 0,14 | 3,50 | 4,00 | 2,00 | A | 0 | 40,00 | 29,76 | 59,00 | 19,90 | 0,4466 | H |
| T-18400R | | | | | 0,14 | 3,50 | 4,00 | 2,00 | A | 0 | 40,00 | 29,76 | 59,00 | 19,90 | 0,4466 | H |
| T-18401L | | | | | 0,14 | 3,50 | 4,00 | 2,25 | B | 90 | 40,00 | 33,43 | 59,00 | 19,34 | 0,4627 | H |
| T-18401R | | | | | 0,14 | 3,50 | 4,00 | 2,25 | B | 90 | 40,00 | 33,43 | 59,00 | 19,34 | 0,4627 | H |
| T-18402L | | | 0,14 | 3,50 | 4,00 | 2,50 | C | 180 | 40,00 | 37,20 | 59,00 | 18,86 | 0,4789 | H | | |
| T-18402R | | | 0,14 | 3,50 | 4,00 | 2,50 | C | 180 | 40,00 | 37,20 | 59,00 | 18,86 | 0,4789 | H | | |
| T-18403L | | | 0,14 | 3,50 | 4,00 | 2,75 | D | 270 | 40,00 | 40,87 | 59,00 | 18,43 | 0,4951 | H | | |
| T-18403R | | | 0,14 | 3,50 | 4,00 | 2,75 | D | 270 | 40,00 | 40,87 | 59,00 | 18,43 | 0,4951 | H | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18404L | 0,80 | 4,40 | 0,14 | 3,50 | 4,00 | 3,00 | A | 0 | 40,00 | 44,55 | 59,00 | 18,05 | 0,5113 | H | | |
| T-18404R | | | 0,14 | 3,50 | 4,00 | 3,00 | A | 0 | 40,00 | 44,55 | 59,00 | 18,05 | 0,5113 | H | | |
| T-18405L | | | 0,14 | 3,50 | 4,00 | 3,25 | B | 90 | 40,00 | 48,31 | 59,00 | 17,71 | 0,5275 | H | | |
| T-18405R | | | 0,14 | 3,50 | 4,00 | 3,25 | B | 90 | 40,00 | 48,31 | 59,00 | 17,71 | 0,5275 | H | | |
| T-18406L | | | 0,14 | 3,50 | 4,00 | 3,50 | C | 180 | 40,00 | 51,99 | 59,00 | 17,39 | 0,5436 | H | | |
| T-18406R | | | 0,14 | 3,50 | 4,00 | 3,50 | C | 180 | 40,00 | 51,99 | 59,00 | 17,39 | 0,5436 | H | | |
| T-18407L | | | 0,14 | 3,50 | 4,00 | 3,75 | D | 270 | 40,00 | 55,75 | 59,00 | 17,11 | 0,5598 | H | | |
| T-18407R | | | 0,14 | 3,50 | 4,00 | 3,75 | D | 270 | 40,00 | 55,75 | 59,00 | 17,11 | 0,5598 | H | | |
| T-18408L | | | 0,14 | 3,50 | 4,00 | 4,00 | A | 0 | 40,00 | 59,43 | 59,00 | 16,85 | 0,5760 | H | | |
| T-18408R | | | 0,14 | 3,50 | 4,00 | 4,00 | A | 0 | 40,00 | 59,43 | 59,00 | 16,85 | 0,5760 | H | | |
| T-18409L | | | 0,14 | 3,50 | 4,00 | 5,25 | B | 90 | 40,00 | 78,07 | 59,00 | 15,78 | 0,6569 | H | | |
| T-18409R | | | 0,14 | 3,50 | 4,00 | 5,25 | B | 90 | 40,00 | 78,07 | 59,00 | 15,78 | 0,6569 | H | | |
| T-18410L | | | 0,14 | 3,50 | 4,00 | 6,50 | C | 180 | 40,00 | 96,62 | 59,00 | 14,99 | 0,7378 | H | | |
| T-18410R | | | 0,14 | 3,50 | 4,00 | 6,50 | C | 180 | 40,00 | 96,62 | 59,00 | 14,99 | 0,7378 | H | | |
| T-18411L | | | 0,14 | 3,50 | 4,00 | 7,75 | D | 270 | 40,00 | 115,18 | 59,00 | 14,37 | 0,8187 | H | | |
| T-18411R | | | 0,14 | 3,50 | 4,00 | 7,75 | D | 270 | 40,00 | 115,18 | 59,00 | 14,37 | 0,8187 | H | | |
| T-18425L | | | 6,00 | 6,00 | 0,18 | 4,80 | 5,40 | 2,00 | A | 0 | 40,00 | 40,15 | 60,96 | 17,40 | 0,4864 | H |
| T-18425R | | | | | 0,18 | 4,80 | 5,40 | 2,00 | A | 0 | 40,00 | 40,15 | 60,96 | 17,40 | 0,4864 | H |
| T-18426L | | | | | 0,18 | 4,80 | 5,40 | 2,25 | B | 90 | 40,00 | 45,13 | 60,96 | 16,91 | 0,5076 | H |
| T-18426R | | | | | 0,18 | 4,80 | 5,40 | 2,25 | B | 90 | 40,00 | 45,13 | 60,96 | 16,91 | 0,5076 | H |
| T-18427L | 0,18 | 4,80 | | | 5,40 | 2,50 | C | 180 | 40,00 | 50,19 | 60,96 | 16,49 | 0,5287 | H | | |
| T-18427R | 0,18 | 4,80 | | | 5,40 | 2,50 | C | 180 | 40,00 | 50,19 | 60,96 | 16,49 | 0,5287 | H | | |
| T-18428L | 0,18 | 4,80 | | | 5,40 | 2,75 | D | 270 | 40,00 | 55,16 | 60,96 | 16,12 | 0,5499 | H | | |
| T-18428R | 0,18 | 4,80 | | | 5,40 | 2,75 | D | 270 | 40,00 | 55,16 | 60,96 | 16,12 | 0,5499 | H | | |
| T-18429L | 0,18 | 4,80 | | | 5,40 | 3,00 | A | 0 | 40,00 | 60,23 | 60,96 | 15,78 | 0,5710 | H | | |
| T-18429R | 0,18 | 4,80 | | | 5,40 | 3,00 | A | 0 | 40,00 | 60,23 | 60,96 | 15,78 | 0,5710 | H | | |
| T-18430L | 0,18 | 4,80 | | | 5,40 | 3,25 | B | 90 | 40,00 | 65,20 | 60,96 | 15,48 | 0,5922 | H | | |
| T-18430R | 0,18 | 4,80 | | | 5,40 | 3,25 | B | 90 | 40,00 | 65,20 | 60,96 | 15,48 | 0,5922 | H | | |
| T-18431L | 0,18 | 4,80 | | | 5,40 | 3,50 | C | 180 | 40,00 | 70,27 | 60,96 | 15,21 | 0,6133 | H | | |
| T-18431R | 0,18 | 4,80 | | | 5,40 | 3,50 | C | 180 | 40,00 | 70,27 | 60,96 | 15,21 | 0,6133 | H | | |
| T-18432L | 0,18 | 4,80 | | | 5,40 | 3,75 | D | 270 | 40,00 | 75,24 | 60,96 | 14,96 | 0,6345 | H | | |
| T-18432R | 0,18 | 4,80 | | | 5,40 | 3,75 | D | 270 | 40,00 | 75,24 | 60,96 | 14,96 | 0,6345 | H | | |
| T-18433L | 0,18 | 4,80 | | | 5,40 | 4,00 | A | 0 | 40,00 | 80,30 | 60,96 | 14,73 | 0,6557 | H | | |

Torsion springs

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18433R | 0,80 | 6,00 | 0,18 | 4,80 | 5,40 | 4,00 | A | 0 | 40,00 | 80,30 | 60,96 | 14,73 | 0,6557 | H | | |
| T-18434L | | | 0,18 | 4,80 | 5,40 | 5,25 | B | 90 | 40,00 | 105,35 | 60,96 | 13,80 | 0,7615 | H | | |
| T-18434R | | | 0,18 | 4,80 | 5,40 | 5,25 | B | 90 | 40,00 | 105,35 | 60,96 | 13,80 | 0,7615 | H | | |
| T-18435L | | | 0,18 | 4,80 | 5,40 | 6,50 | C | 180 | 40,00 | 130,49 | 60,96 | 13,11 | 0,8673 | H | | |
| T-18435R | | | 0,18 | 4,80 | 5,40 | 6,50 | C | 180 | 40,00 | 130,49 | 60,96 | 13,11 | 0,8673 | H | | |
| T-18436L | | | 0,18 | 4,80 | 5,40 | 7,75 | D | 270 | 40,00 | 155,54 | 60,96 | 12,57 | 0,9731 | H | | |
| T-18436R | | | 0,18 | 4,80 | 5,40 | 7,75 | D | 270 | 40,00 | 155,54 | 60,96 | 12,57 | 0,9731 | H | | |
| T-18450L | | | 7,20 | 7,20 | 0,21 | 5,80 | 6,50 | 2,00 | A | 0 | 45,00 | 47,95 | 61,92 | 16,04 | 0,5559 | H |
| T-18450R | 0,21 | 5,80 | | | 6,50 | 2,00 | A | 0 | 45,00 | 47,95 | 61,92 | 16,04 | 0,5559 | H | | |
| T-18451L | 0,21 | 5,80 | | | 6,50 | 2,25 | B | 90 | 45,00 | 53,92 | 61,92 | 15,59 | 0,5808 | H | | |
| T-18451R | 0,21 | 5,80 | | | 6,50 | 2,25 | B | 90 | 45,00 | 53,92 | 61,92 | 15,59 | 0,5808 | H | | |
| T-18452L | 0,21 | 5,80 | | | 6,50 | 2,50 | C | 180 | 45,00 | 59,98 | 61,92 | 15,20 | 0,6057 | H | | |
| T-18452R | 0,21 | 5,80 | | | 6,50 | 2,50 | C | 180 | 45,00 | 59,98 | 61,92 | 15,20 | 0,6057 | H | | |
| T-18453L | 0,21 | 5,80 | | | 6,50 | 2,75 | D | 270 | 45,00 | 65,95 | 61,92 | 14,86 | 0,6306 | H | | |
| T-18453R | 0,21 | 5,80 | | | 6,50 | 2,75 | D | 270 | 45,00 | 65,95 | 61,92 | 14,86 | 0,6306 | H | | |
| T-18454L | 0,21 | 5,80 | | | 6,50 | 3,00 | A | 0 | 45,00 | 71,92 | 61,92 | 14,55 | 0,6555 | H | | |
| T-18454R | 0,21 | 5,80 | | | 6,50 | 3,00 | A | 0 | 45,00 | 71,92 | 61,92 | 14,55 | 0,6555 | H | | |
| T-18455L | 0,21 | 5,80 | | | 6,50 | 3,25 | B | 90 | 45,00 | 77,99 | 61,92 | 14,28 | 0,6804 | H | | |
| T-18455R | 0,21 | 5,80 | | | 6,50 | 3,25 | B | 90 | 45,00 | 77,99 | 61,92 | 14,28 | 0,6804 | H | | |
| T-18456L | 0,21 | 5,80 | | | 6,50 | 3,50 | C | 180 | 45,00 | 83,96 | 61,92 | 14,02 | 0,7053 | H | | |
| T-18456R | 0,21 | 5,80 | | | 6,50 | 3,50 | C | 180 | 45,00 | 83,96 | 61,92 | 14,02 | 0,7053 | H | | |
| T-18457L | 0,21 | 5,80 | | | 6,50 | 3,75 | D | 270 | 45,00 | 89,93 | 61,92 | 13,79 | 0,7302 | H | | |
| T-18457R | 0,21 | 5,80 | | | 6,50 | 3,75 | D | 270 | 45,00 | 89,93 | 61,92 | 13,79 | 0,7302 | H | | |
| T-18458L | 0,21 | 5,80 | | | 6,50 | 4,00 | A | 0 | 45,00 | 95,90 | 61,92 | 13,58 | 0,7551 | H | | |
| T-18458R | 0,21 | 5,80 | | | 6,50 | 4,00 | A | 0 | 45,00 | 95,90 | 61,92 | 13,58 | 0,7551 | H | | |
| T-18459L | 0,21 | 5,80 | | | 6,50 | 5,25 | B | 90 | 45,00 | 125,94 | 61,92 | 12,72 | 0,8795 | H | | |
| T-18459R | 0,21 | 5,80 | | | 6,50 | 5,25 | B | 90 | 45,00 | 125,94 | 61,92 | 12,72 | 0,8795 | H | | |
| T-18460L | 0,21 | 5,80 | | | 6,50 | 6,50 | C | 180 | 45,00 | 155,88 | 61,92 | 12,09 | 1,0040 | H | | |
| T-18460R | 0,21 | 5,80 | | | 6,50 | 6,50 | C | 180 | 45,00 | 155,88 | 61,92 | 12,09 | 1,0040 | H | | |
| T-18461L | 0,21 | 5,80 | | | 6,50 | 7,75 | D | 270 | 45,00 | 185,83 | 61,92 | 11,59 | 1,1285 | H | | |
| T-18461R | 0,21 | 5,80 | | | 6,50 | 7,75 | D | 270 | 45,00 | 185,83 | 61,92 | 11,59 | 1,1285 | H | | |
| T-18476L | 9,20 | 9,20 | | | 0,26 | 7,40 | 8,30 | 2,00 | A | 0 | 45,00 | 61,04 | 63,01 | 14,35 | 0,6057 | H |
| T-18476R | | | | | 0,26 | 7,40 | 8,30 | 2,00 | A | 0 | 45,00 | 61,04 | 63,01 | 14,35 | 0,6057 | H |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|
| T-18477L | 0,80 | 9,20 | 0,26 | 7,40 | 8,30 | 2,25 | B | 90 | 45,00 | 68,61 | 63,01 | 13,95 | 0,6368 | H |
| T-18477R | | | 0,26 | 7,40 | 8,30 | 2,25 | B | 90 | 45,00 | 68,61 | 63,01 | 13,95 | 0,6368 | H |
| T-18478L | | | 0,26 | 7,40 | 8,30 | 2,50 | C | 180 | 45,00 | 76,28 | 63,01 | 13,60 | 0,6679 | H |
| T-18478R | | | 0,26 | 7,40 | 8,30 | 2,50 | C | 180 | 45,00 | 76,28 | 63,01 | 13,60 | 0,6679 | H |
| T-18479L | | | 0,26 | 7,40 | 8,30 | 2,75 | D | 270 | 45,00 | 83,85 | 63,01 | 13,29 | 0,6990 | H |
| T-18479R | | | 0,26 | 7,40 | 8,30 | 2,75 | D | 270 | 45,00 | 83,85 | 63,01 | 13,29 | 0,6990 | H |
| T-18480L | | | 0,26 | 7,40 | 8,30 | 3,00 | A | 0 | 45,00 | 91,51 | 63,01 | 13,02 | 0,7302 | H |
| T-18480R | | | 0,26 | 7,40 | 8,30 | 3,00 | A | 0 | 45,00 | 91,51 | 63,01 | 13,02 | 0,7302 | H |
| T-18481L | | | 0,26 | 7,40 | 8,30 | 3,25 | B | 90 | 45,00 | 99,09 | 63,01 | 12,77 | 0,7613 | H |
| T-18481R | | | 0,26 | 7,40 | 8,30 | 3,25 | B | 90 | 45,00 | 99,09 | 63,01 | 12,77 | 0,7613 | H |
| T-18482L | | | 0,26 | 7,40 | 8,30 | 3,50 | C | 180 | 45,00 | 106,75 | 63,01 | 12,54 | 0,7924 | H |
| T-18482R | | | 0,26 | 7,40 | 8,30 | 3,50 | C | 180 | 45,00 | 106,75 | 63,01 | 12,54 | 0,7924 | H |
| T-18483L | | | 0,26 | 7,40 | 8,30 | 3,75 | D | 270 | 45,00 | 114,42 | 63,01 | 12,34 | 0,8235 | H |
| T-18483R | | | 0,26 | 7,40 | 8,30 | 3,75 | D | 270 | 45,00 | 114,42 | 63,01 | 12,34 | 0,8235 | H |
| T-18484L | | | 0,26 | 7,40 | 8,30 | 4,00 | A | 0 | 45,00 | 121,99 | 63,01 | 12,15 | 0,8546 | H |
| T-18484R | | | 0,26 | 7,40 | 8,30 | 4,00 | A | 0 | 45,00 | 121,99 | 63,01 | 12,15 | 0,8546 | H |
| T-18485L | | | 0,26 | 7,40 | 8,30 | 5,25 | B | 90 | 45,00 | 160,13 | 63,01 | 11,38 | 1,0102 | H |
| T-18485R | | | 0,26 | 7,40 | 8,30 | 5,25 | B | 90 | 45,00 | 160,13 | 63,01 | 11,38 | 1,0102 | H |
| T-18486L | | | 0,26 | 7,40 | 8,30 | 6,50 | C | 180 | 45,00 | 198,26 | 63,01 | 10,81 | 1,1658 | H |
| T-18486R | | | 0,26 | 7,40 | 8,30 | 6,50 | C | 180 | 45,00 | 198,26 | 63,01 | 10,81 | 1,1658 | H |
| T-18487L | 0,26 | 7,40 | 8,30 | 7,75 | D | 270 | 45,00 | 236,41 | 63,01 | 10,36 | 1,3214 | H | | |
| T-18487R | 0,26 | 7,40 | 8,30 | 7,75 | D | 270 | 45,00 | 236,41 | 63,01 | 10,36 | 1,3214 | H | | |
| T-18500L | 1,00 | 5,50 | 0,16 | 4,40 | 5,00 | 2,00 | A | 0 | 45,00 | 28,88 | 111,87 | 38,86 | 0,8103 | H |
| T-18500R | | | 0,16 | 4,40 | 5,00 | 2,00 | A | 0 | 45,00 | 28,88 | 111,87 | 38,86 | 0,8103 | H |
| T-18501L | | | 0,16 | 4,40 | 5,00 | 2,25 | B | 90 | 45,00 | 32,47 | 111,87 | 37,78 | 0,8419 | H |
| T-18501R | | | 0,16 | 4,40 | 5,00 | 2,25 | B | 90 | 45,00 | 32,47 | 111,87 | 37,78 | 0,8419 | H |
| T-18502L | | | 0,16 | 4,40 | 5,00 | 2,50 | C | 180 | 45,00 | 36,06 | 111,87 | 36,83 | 0,8735 | H |
| T-18502R | | | 0,16 | 4,40 | 5,00 | 2,50 | C | 180 | 45,00 | 36,06 | 111,87 | 36,83 | 0,8735 | H |
| T-18503L | | | 0,16 | 4,40 | 5,00 | 2,75 | D | 270 | 45,00 | 39,65 | 111,87 | 36,00 | 0,9051 | H |
| T-18503R | | | 0,16 | 4,40 | 5,00 | 2,75 | D | 270 | 45,00 | 39,65 | 111,87 | 36,00 | 0,9051 | H |
| T-18504L | | | 0,16 | 4,40 | 5,00 | 3,00 | A | 0 | 45,00 | 43,32 | 111,87 | 35,25 | 0,9367 | H |
| T-18504R | | | 0,16 | 4,40 | 5,00 | 3,00 | A | 0 | 45,00 | 43,32 | 111,87 | 35,25 | 0,9367 | H |
| T-18505L | | | 0,16 | 4,40 | 5,00 | 3,25 | B | 90 | 45,00 | 46,91 | 111,87 | 34,58 | 0,9683 | H |

Torsion springs

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|
| T-18505R | 1,00 | 5,50 | 0,16 | 4,40 | 5,00 | 3,25 | B | 90 | 45,00 | 46,91 | 111,87 | 34,58 | 0,9683 | H |
| T-18506L | | | 0,16 | 4,40 | 5,00 | 3,50 | C | 180 | 45,00 | 50,50 | 111,87 | 33,97 | 0,9999 | H |
| T-18506R | | | 0,16 | 4,40 | 5,00 | 3,50 | C | 180 | 45,00 | 50,50 | 111,87 | 33,97 | 0,9999 | H |
| T-18507L | | | 0,16 | 4,40 | 5,00 | 3,75 | D | 270 | 45,00 | 54,09 | 111,87 | 33,42 | 1,0315 | H |
| T-18507R | | | 0,16 | 4,40 | 5,00 | 3,75 | D | 270 | 45,00 | 54,09 | 111,87 | 33,42 | 1,0315 | H |
| T-18508L | | | 0,16 | 4,40 | 5,00 | 4,00 | A | 0 | 45,00 | 57,76 | 111,87 | 32,90 | 1,0631 | H |
| T-18508R | | | 0,16 | 4,40 | 5,00 | 4,00 | A | 0 | 45,00 | 57,76 | 111,87 | 32,90 | 1,0631 | H |
| T-18509L | | | 0,16 | 4,40 | 5,00 | 5,25 | B | 90 | 45,00 | 75,79 | 111,87 | 30,82 | 1,2211 | H |
| T-18509R | | | 0,16 | 4,40 | 5,00 | 5,25 | B | 90 | 45,00 | 75,79 | 111,87 | 30,82 | 1,2211 | H |
| T-18510L | | | 0,16 | 4,40 | 5,00 | 6,50 | C | 180 | 45,00 | 93,82 | 111,87 | 29,28 | 1,3791 | H |
| T-18510R | | | 0,16 | 4,40 | 5,00 | 6,50 | C | 180 | 45,00 | 93,82 | 111,87 | 29,28 | 1,3791 | H |
| T-18511L | | | 0,16 | 4,40 | 5,00 | 7,75 | D | 270 | 45,00 | 111,85 | 111,87 | 28,07 | 1,5371 | H |
| T-18511R | | | 0,16 | 4,40 | 5,00 | 7,75 | D | 270 | 45,00 | 111,85 | 111,87 | 28,07 | 1,5371 | H |
| T-18525L | | | 7,50 | 7,50 | 0,21 | 6,00 | 6,70 | 2,00 | A | 0 | 45,00 | 38,98 | 115,59 | 33,98 |
| T-18525R | 0,21 | 6,00 | | | 6,70 | 2,00 | A | 0 | 45,00 | 38,98 | 115,59 | 33,98 | 0,8880 | H |
| T-18526L | 0,21 | 6,00 | | | 6,70 | 2,25 | B | 90 | 45,00 | 43,86 | 115,59 | 33,03 | 0,9294 | H |
| T-18526R | 0,21 | 6,00 | | | 6,70 | 2,25 | B | 90 | 45,00 | 43,86 | 115,59 | 33,03 | 0,9294 | H |
| T-18527L | 0,21 | 6,00 | | | 6,70 | 2,50 | C | 180 | 45,00 | 48,74 | 115,59 | 32,21 | 0,9707 | H |
| T-18527R | 0,21 | 6,00 | | | 6,70 | 2,50 | C | 180 | 45,00 | 48,74 | 115,59 | 32,21 | 0,9707 | H |
| T-18528L | 0,21 | 6,00 | | | 6,70 | 2,75 | D | 270 | 45,00 | 53,63 | 115,59 | 31,48 | 1,0120 | H |
| T-18528R | 0,21 | 6,00 | | | 6,70 | 2,75 | D | 270 | 45,00 | 53,63 | 115,59 | 31,48 | 1,0120 | H |
| T-18529L | 0,21 | 6,00 | | | 6,70 | 3,00 | A | 0 | 45,00 | 58,51 | 115,59 | 30,83 | 1,0534 | H |
| T-18529R | 0,21 | 6,00 | | | 6,70 | 3,00 | A | 0 | 45,00 | 58,51 | 115,59 | 30,83 | 1,0534 | H |
| T-18530L | 0,21 | 6,00 | | | 6,70 | 3,25 | B | 90 | 45,00 | 63,30 | 115,59 | 30,24 | 1,0947 | H |
| T-18530R | 0,21 | 6,00 | | | 6,70 | 3,25 | B | 90 | 45,00 | 63,30 | 115,59 | 30,24 | 1,0947 | H |
| T-18531L | 0,21 | 6,00 | | | 6,70 | 3,50 | C | 180 | 45,00 | 68,19 | 115,59 | 29,71 | 1,1360 | H |
| T-18531R | 0,21 | 6,00 | | | 6,70 | 3,50 | C | 180 | 45,00 | 68,19 | 115,59 | 29,71 | 1,1360 | H |
| T-18532L | 0,21 | 6,00 | | | 6,70 | 3,75 | D | 270 | 45,00 | 73,07 | 115,59 | 29,22 | 1,1773 | H |
| T-18532R | 0,21 | 6,00 | | | 6,70 | 3,75 | D | 270 | 45,00 | 73,07 | 115,59 | 29,22 | 1,1773 | H |
| T-18533L | 0,21 | 6,00 | | | 6,70 | 4,00 | A | 0 | 45,00 | 77,95 | 115,59 | 28,77 | 1,2187 | H |
| T-18533R | 0,21 | 6,00 | | | 6,70 | 4,00 | A | 0 | 45,00 | 77,95 | 115,59 | 28,77 | 1,2187 | H |
| T-18534L | 0,21 | 6,00 | | | 6,70 | 5,25 | B | 90 | 45,00 | 102,28 | 115,59 | 26,95 | 1,4253 | H |
| T-18534R | 0,21 | 6,00 | | | 6,70 | 5,25 | B | 90 | 45,00 | 102,28 | 115,59 | 26,95 | 1,4253 | H |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18535L | 1,00 | 7,50 | 0,21 | 6,00 | 6,70 | 6,50 | C | 180 | 45,00 | 126,69 | 115,59 | 25,61 | 1,6319 | H | | |
| T-18535R | | | 0,21 | 6,00 | 6,70 | 6,50 | C | 180 | 45,00 | 126,69 | 115,59 | 25,61 | 1,6319 | H | | |
| T-18536L | | | 0,21 | 6,00 | 6,70 | 7,75 | D | 270 | 45,00 | 151,02 | 115,59 | 24,55 | 1,8386 | H | | |
| T-18536R | | | 0,21 | 6,00 | 6,70 | 7,75 | D | 270 | 45,00 | 151,02 | 115,59 | 24,55 | 1,8386 | H | | |
| T-18550L | 9,00 | 9,00 | 0,25 | 7,20 | 8,10 | 2,00 | A | 0 | 50,00 | 46,57 | 117,41 | 31,33 | 1,0083 | H | | |
| T-18550R | | | 0,25 | 7,20 | 8,10 | 2,00 | A | 0 | 50,00 | 46,57 | 117,41 | 31,33 | 1,0083 | H | | |
| T-18551L | | | 0,25 | 7,20 | 8,10 | 2,25 | B | 90 | 50,00 | 52,36 | 117,41 | 30,46 | 1,0569 | H | | |
| T-18551R | | | 0,25 | 7,20 | 8,10 | 2,25 | B | 90 | 50,00 | 52,36 | 117,41 | 30,46 | 1,0569 | H | | |
| T-18552L | | | 0,25 | 7,20 | 8,10 | 2,50 | C | 180 | 50,00 | 58,24 | 117,41 | 29,69 | 1,1056 | H | | |
| T-18552R | | | 0,25 | 7,20 | 8,10 | 2,50 | C | 180 | 50,00 | 58,24 | 117,41 | 29,69 | 1,1056 | H | | |
| T-18553L | | | 0,25 | 7,20 | 8,10 | 2,75 | D | 270 | 50,00 | 64,02 | 117,41 | 29,02 | 1,1542 | H | | |
| T-18553R | | | 0,25 | 7,20 | 8,10 | 2,75 | D | 270 | 50,00 | 64,02 | 117,41 | 29,02 | 1,1542 | H | | |
| T-18554L | | | 0,25 | 7,20 | 8,10 | 3,00 | A | 0 | 50,00 | 69,81 | 117,41 | 28,42 | 1,2028 | H | | |
| T-18554R | | | 0,25 | 7,20 | 8,10 | 3,00 | A | 0 | 50,00 | 69,81 | 117,41 | 28,42 | 1,2028 | H | | |
| T-18555L | | | 0,25 | 7,20 | 8,10 | 3,25 | B | 90 | 50,00 | 75,69 | 117,41 | 27,88 | 1,2514 | H | | |
| T-18555R | | | 0,25 | 7,20 | 8,10 | 3,25 | B | 90 | 50,00 | 75,69 | 117,41 | 27,88 | 1,2514 | H | | |
| T-18556L | | | 0,25 | 7,20 | 8,10 | 3,50 | C | 180 | 50,00 | 81,48 | 117,41 | 27,39 | 1,3000 | H | | |
| T-18556R | | | 0,25 | 7,20 | 8,10 | 3,50 | C | 180 | 50,00 | 81,48 | 117,41 | 27,39 | 1,3000 | H | | |
| T-18557L | | | 0,25 | 7,20 | 8,10 | 3,75 | D | 270 | 50,00 | 87,36 | 117,41 | 26,94 | 1,3487 | H | | |
| T-18557R | | | 0,25 | 7,20 | 8,10 | 3,75 | D | 270 | 50,00 | 87,36 | 117,41 | 26,94 | 1,3487 | H | | |
| T-18558L | | | 0,25 | 7,20 | 8,10 | 4,00 | A | 0 | 50,00 | 93,14 | 117,41 | 26,53 | 1,3973 | H | | |
| T-18558R | | | 0,25 | 7,20 | 8,10 | 4,00 | A | 0 | 50,00 | 93,14 | 117,41 | 26,53 | 1,3973 | H | | |
| T-18559L | | | 0,25 | 7,20 | 8,10 | 5,25 | B | 90 | 50,00 | 122,26 | 117,41 | 24,85 | 1,6404 | H | | |
| T-18559R | | | 0,25 | 7,20 | 8,10 | 5,25 | B | 90 | 50,00 | 122,26 | 117,41 | 24,85 | 1,6404 | H | | |
| T-18560L | | | 0,25 | 7,20 | 8,10 | 6,50 | C | 180 | 50,00 | 151,38 | 117,41 | 23,61 | 1,8835 | H | | |
| T-18560R | | | 0,25 | 7,20 | 8,10 | 6,50 | C | 180 | 50,00 | 151,38 | 117,41 | 23,61 | 1,8835 | H | | |
| T-18561L | | | 0,25 | 7,20 | 8,10 | 7,75 | D | 270 | 50,00 | 180,50 | 117,41 | 22,63 | 2,1266 | H | | |
| T-18561R | | | 0,25 | 7,20 | 8,10 | 7,75 | D | 270 | 50,00 | 180,50 | 117,41 | 22,63 | 2,1266 | H | | |
| T-18575L | | | 11,50 | 11,50 | 0,31 | 9,20 | 10,30 | 2,00 | A | 0 | 50,00 | 59,26 | 119,48 | 28,02 | 1,1056 | H |
| T-18575R | | | | | 0,31 | 9,20 | 10,30 | 2,00 | A | 0 | 50,00 | 59,26 | 119,48 | 28,02 | 1,1056 | H |
| T-18576L | | | | | 0,31 | 9,20 | 10,30 | 2,25 | B | 90 | 50,00 | 66,65 | 119,48 | 27,24 | 1,1663 | H |
| T-18576R | | | | | 0,31 | 9,20 | 10,30 | 2,25 | B | 90 | 50,00 | 66,65 | 119,48 | 27,24 | 1,1663 | H |
| T-18577L | | | | | 0,31 | 9,20 | 10,30 | 2,50 | C | 180 | 50,00 | 74,03 | 119,48 | 26,56 | 1,2271 | H |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|
| T-18577R | 1,00 | 11,50 | 0,31 | 9,20 | 10,30 | 2,50 | C | 180 | 50,00 | 74,03 | 119,48 | 26,56 | 1,2271 | H |
| T-18578L | | | 0,31 | 9,20 | 10,30 | 2,75 | D | 270 | 50,00 | 81,42 | 119,48 | 25,96 | 1,2879 | H |
| T-18578R | | | 0,31 | 9,20 | 10,30 | 2,75 | D | 270 | 50,00 | 81,42 | 119,48 | 25,96 | 1,2879 | H |
| T-18579L | | | 0,31 | 9,20 | 10,30 | 3,00 | A | 0 | 50,00 | 88,80 | 119,48 | 25,42 | 1,3487 | H |
| T-18579R | | | 0,31 | 9,20 | 10,30 | 3,00 | A | 0 | 50,00 | 88,80 | 119,48 | 25,42 | 1,3487 | H |
| T-18580L | | | 0,31 | 9,20 | 10,30 | 3,25 | B | 90 | 50,00 | 96,28 | 119,48 | 24,94 | 1,4094 | H |
| T-18580R | | | 0,31 | 9,20 | 10,30 | 3,25 | B | 90 | 50,00 | 96,28 | 119,48 | 24,94 | 1,4094 | H |
| T-18581L | | | 0,31 | 9,20 | 10,30 | 3,50 | C | 180 | 50,00 | 103,67 | 119,48 | 24,50 | 1,4702 | H |
| T-18581R | | | 0,31 | 9,20 | 10,30 | 3,50 | C | 180 | 50,00 | 103,67 | 119,48 | 24,50 | 1,4702 | H |
| T-18582L | | | 0,31 | 9,20 | 10,30 | 3,75 | D | 270 | 50,00 | 111,12 | 119,48 | 24,10 | 1,5310 | H |
| T-18582R | | | 0,31 | 9,20 | 10,30 | 3,75 | D | 270 | 50,00 | 111,12 | 119,48 | 24,10 | 1,5310 | H |
| T-18583L | | | 0,31 | 9,20 | 10,30 | 4,00 | A | 0 | 50,00 | 118,43 | 119,48 | 23,73 | 1,5918 | H |
| T-18583R | | | 0,31 | 9,20 | 10,30 | 4,00 | A | 0 | 50,00 | 118,43 | 119,48 | 23,73 | 1,5918 | H |
| T-18584L | | | 0,31 | 9,20 | 10,30 | 5,25 | B | 90 | 50,00 | 155,45 | 119,48 | 22,23 | 1,8956 | H |
| T-18584R | | | 0,31 | 9,20 | 10,30 | 5,25 | B | 90 | 50,00 | 155,45 | 119,48 | 22,23 | 1,8956 | H |
| T-18585L | | | 0,31 | 9,20 | 10,30 | 6,50 | C | 180 | 50,00 | 192,47 | 119,48 | 21,12 | 2,1995 | H |
| T-18585R | | | 0,31 | 9,20 | 10,30 | 6,50 | C | 180 | 50,00 | 192,47 | 119,48 | 21,12 | 2,1995 | H |
| T-18586L | | | 0,31 | 9,20 | 10,30 | 7,75 | D | 270 | 50,00 | 229,48 | 119,48 | 20,24 | 2,5034 | H |
| T-18586R | | | 0,31 | 9,20 | 10,30 | 7,75 | D | 270 | 50,00 | 229,48 | 119,48 | 20,24 | 2,5034 | H |
| T-18650L | | | 1,25 | 6,75 | 0,19 | 5,40 | 6,00 | 2,00 | A | 0 | 50,00 | 27,60 | 212,15 | 76,49 |
| T-18650R | 0,19 | 5,40 | | | 6,00 | 2,00 | A | 0 | 50,00 | 27,60 | 212,15 | 76,49 | 1,4540 | J |
| T-18651L | 0,19 | 5,40 | | | 6,00 | 2,25 | B | 90 | 50,00 | 31,00 | 212,15 | 74,35 | 1,5147 | J |
| T-18651R | 0,19 | 5,40 | | | 6,00 | 2,25 | B | 90 | 50,00 | 31,00 | 212,15 | 74,35 | 1,5147 | J |
| T-18652L | 0,19 | 5,40 | | | 6,00 | 2,50 | C | 180 | 50,00 | 34,49 | 212,15 | 72,50 | 1,5755 | J |
| T-18652R | 0,19 | 5,40 | | | 6,00 | 2,50 | C | 180 | 50,00 | 34,49 | 212,15 | 72,50 | 1,5755 | J |
| T-18653L | 0,19 | 5,40 | | | 6,00 | 2,75 | D | 270 | 50,00 | 37,90 | 212,15 | 70,86 | 1,6363 | J |
| T-18653R | 0,19 | 5,40 | | | 6,00 | 2,75 | D | 270 | 50,00 | 37,90 | 212,15 | 70,86 | 1,6363 | J |
| T-18654L | 0,19 | 5,40 | | | 6,00 | 3,00 | A | 0 | 50,00 | 41,39 | 212,15 | 69,39 | 1,6971 | J |
| T-18654R | 0,19 | 5,40 | | | 6,00 | 3,00 | A | 0 | 50,00 | 41,39 | 212,15 | 69,39 | 1,6971 | J |
| T-18655L | 0,19 | 5,40 | | | 6,00 | 3,25 | B | 90 | 50,00 | 44,80 | 212,15 | 68,07 | 1,7578 | J |
| T-18655R | 0,19 | 5,40 | | | 6,00 | 3,25 | B | 90 | 50,00 | 44,80 | 212,15 | 68,07 | 1,7578 | J |
| T-18656L | 0,19 | 5,40 | | | 6,00 | 3,50 | C | 180 | 50,00 | 48,29 | 212,15 | 66,87 | 1,8186 | J |
| T-18656R | 0,19 | 5,40 | | | 6,00 | 3,50 | C | 180 | 50,00 | 48,29 | 212,15 | 66,87 | 1,8186 | J |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18657L | 1,25 | 6,75 | 0,19 | 5,40 | 6,00 | 3,75 | D | 270 | 50,00 | 51,70 | 212,15 | 65,77 | 1,8794 | J | | |
| T-18657R | | | 0,19 | 5,40 | 6,00 | 3,75 | D | 270 | 50,00 | 51,70 | 212,15 | 65,77 | 1,8794 | J | | |
| T-18658L | | | 0,19 | 5,40 | 6,00 | 4,00 | A | 0 | 50,00 | 55,19 | 212,15 | 64,76 | 1,9402 | J | | |
| T-18658R | | | 0,19 | 5,40 | 6,00 | 4,00 | A | 0 | 50,00 | 55,19 | 212,15 | 64,76 | 1,9402 | J | | |
| T-18659L | | | 0,19 | 5,40 | 6,00 | 5,25 | B | 90 | 50,00 | 72,39 | 212,15 | 60,67 | 2,2440 | J | | |
| T-18659R | | | 0,19 | 5,40 | 6,00 | 5,25 | B | 90 | 50,00 | 72,39 | 212,15 | 60,67 | 2,2440 | J | | |
| T-18660L | | | 0,19 | 5,40 | 6,00 | 6,50 | C | 180 | 50,00 | 89,68 | 212,15 | 57,64 | 2,5479 | J | | |
| T-18660R | | | 0,19 | 5,40 | 6,00 | 6,50 | C | 180 | 50,00 | 89,68 | 212,15 | 57,64 | 2,5479 | J | | |
| T-18661L | | | 0,19 | 5,40 | 6,00 | 7,75 | D | 270 | 50,00 | 106,89 | 212,15 | 55,26 | 2,8518 | J | | |
| T-18661R | | | 0,19 | 5,40 | 6,00 | 7,75 | D | 270 | 50,00 | 106,89 | 212,15 | 55,26 | 2,8518 | J | | |
| T-18675L | | | 9,25 | 9,25 | 0,25 | 7,40 | 8,30 | 2,00 | A | 0 | 50,00 | 37,48 | 219,42 | 66,76 | 1,6059 | J |
| T-18675R | | | | | 0,25 | 7,40 | 8,30 | 2,00 | A | 0 | 50,00 | 37,48 | 219,42 | 66,76 | 1,6059 | J |
| T-18676L | | | | | 0,25 | 7,40 | 8,30 | 2,25 | B | 90 | 50,00 | 42,09 | 219,42 | 64,90 | 1,6857 | J |
| T-18676R | | | | | 0,25 | 7,40 | 8,30 | 2,25 | B | 90 | 50,00 | 42,09 | 219,42 | 64,90 | 1,6857 | J |
| T-18677L | | | | | 0,25 | 7,40 | 8,30 | 2,50 | C | 180 | 50,00 | 46,79 | 219,42 | 63,28 | 1,7654 | J |
| T-18677R | | | | | 0,25 | 7,40 | 8,30 | 2,50 | C | 180 | 50,00 | 46,79 | 219,42 | 63,28 | 1,7654 | J |
| T-18678L | | | | | 0,25 | 7,40 | 8,30 | 2,75 | D | 270 | 50,00 | 51,48 | 219,42 | 61,85 | 1,8452 | J |
| T-18678R | | | | | 0,25 | 7,40 | 8,30 | 2,75 | D | 270 | 50,00 | 51,48 | 219,42 | 61,85 | 1,8452 | J |
| T-18679L | 0,25 | 7,40 | | | 8,30 | 3,00 | A | 0 | 50,00 | 56,18 | 219,42 | 60,57 | 1,9250 | J | | |
| T-18679R | 0,25 | 7,40 | | | 8,30 | 3,00 | A | 0 | 50,00 | 56,18 | 219,42 | 60,57 | 1,9250 | J | | |
| T-18680L | 0,25 | 7,40 | | | 8,30 | 3,25 | B | 90 | 50,00 | 60,87 | 219,42 | 59,42 | 2,0047 | J | | |
| T-18680R | 0,25 | 7,40 | | | 8,30 | 3,25 | B | 90 | 50,00 | 60,87 | 219,42 | 59,42 | 2,0047 | J | | |
| T-18681L | 0,25 | 7,40 | | | 8,30 | 3,50 | C | 180 | 50,00 | 65,48 | 219,42 | 58,37 | 2,0845 | J | | |
| T-18681R | 0,25 | 7,40 | | | 8,30 | 3,50 | C | 180 | 50,00 | 65,48 | 219,42 | 58,37 | 2,0845 | J | | |
| T-18682L | 0,25 | 7,40 | | | 8,30 | 3,75 | D | 270 | 50,00 | 70,18 | 219,42 | 57,41 | 2,1643 | J | | |
| T-18682R | 0,25 | 7,40 | | | 8,30 | 3,75 | D | 270 | 50,00 | 70,18 | 219,42 | 57,41 | 2,1643 | J | | |
| T-18683L | 0,25 | 7,40 | | | 8,30 | 4,00 | A | 0 | 50,00 | 74,87 | 219,42 | 56,53 | 2,2440 | J | | |
| T-18683R | 0,25 | 7,40 | | | 8,30 | 4,00 | A | 0 | 50,00 | 74,87 | 219,42 | 56,53 | 2,2440 | J | | |
| T-18684L | 0,25 | 7,40 | | | 8,30 | 5,25 | B | 90 | 50,00 | 98,27 | 219,42 | 52,96 | 2,6429 | J | | |
| T-18684R | 0,25 | 7,40 | | | 8,30 | 5,25 | B | 90 | 50,00 | 98,27 | 219,42 | 52,96 | 2,6429 | J | | |
| T-18685L | 0,25 | 7,40 | | | 8,30 | 6,50 | C | 180 | 50,00 | 120,30 | 216,97 | 52,89 | 2,8442 | J | | |
| T-18685R | 0,25 | 7,40 | | | 8,30 | 6,50 | C | 180 | 50,00 | 120,30 | 216,97 | 52,89 | 2,8442 | J | | |
| T-18686L | 0,25 | 7,40 | | | 8,30 | 7,75 | D | 270 | 50,00 | 145,05 | 219,42 | 48,23 | 3,4405 | J | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---|
| T-18686R | 1,25 | 9,25 | 0,25 | 7,40 | 8,30 | 7,75 | D | 270 | 50,00 | 145,05 | 219,42 | 48,23 | 3,4405 | J | |
| T-18700L | | 11,25 | 0,30 | 9,00 | 10,10 | 2,00 | A | 0 | 55,00 | 45,29 | 223,16 | 61,19 | 1,8242 | J | |
| T-18700R | | | 0,30 | 9,00 | 10,10 | 2,00 | A | 0 | 55,00 | 45,29 | 223,16 | 61,19 | 1,8242 | J | |
| T-18701L | | | 0,30 | 7,00 | 10,10 | 2,25 | B | 90 | 55,00 | 50,98 | 213,97 | 59,48 | 1,9192 | J | |
| T-18701R | | | 0,30 | 7,00 | 10,10 | 2,25 | B | 90 | 55,00 | 50,98 | 213,97 | 59,48 | 1,9192 | J | |
| T-18702L | | | 0,30 | 9,00 | 10,10 | 2,50 | C | 180 | 55,00 | 56,68 | 223,16 | 58,00 | 2,0141 | J | |
| T-18702R | | | 0,30 | 9,00 | 10,10 | 2,50 | C | 180 | 55,00 | 56,68 | 223,16 | 58,00 | 2,0141 | J | |
| T-18703L | | | 0,30 | 9,00 | 10,10 | 2,75 | D | 270 | 55,00 | 62,28 | 223,16 | 56,69 | 2,1091 | J | |
| T-18703R | | | 0,30 | 9,00 | 10,10 | 2,75 | D | 270 | 55,00 | 62,28 | 223,16 | 56,69 | 2,1091 | J | |
| T-18704L | | | 0,30 | 9,00 | 10,10 | 3,00 | A | 0 | 55,00 | 67,97 | 223,16 | 55,51 | 2,2041 | J | |
| T-18704R | | | 0,30 | 9,00 | 10,10 | 3,00 | A | 0 | 55,00 | 67,97 | 223,16 | 55,51 | 2,2041 | J | |
| T-18705L | | | 0,30 | 9,00 | 10,10 | 3,25 | B | 90 | 55,00 | 73,67 | 223,16 | 54,46 | 2,2990 | J | |
| T-18705R | | | 0,30 | 9,00 | 10,10 | 3,25 | B | 90 | 55,00 | 73,67 | 223,16 | 54,46 | 2,2990 | J | |
| T-18706L | | | 0,30 | 9,00 | 10,10 | 3,50 | C | 180 | 55,00 | 79,27 | 223,16 | 53,50 | 2,3940 | J | |
| T-18706R | | | 0,30 | 9,00 | 10,10 | 3,50 | C | 180 | 55,00 | 79,27 | 223,16 | 53,50 | 2,3940 | J | |
| T-18707L | | | 0,30 | 9,00 | 10,10 | 3,75 | D | 270 | 55,00 | 84,97 | 223,16 | 52,62 | 2,4890 | J | |
| T-18707R | | | 0,30 | 9,00 | 10,10 | 3,75 | D | 270 | 55,00 | 84,97 | 223,16 | 52,62 | 2,4890 | J | |
| T-18708L | | | 0,30 | 9,00 | 10,10 | 4,00 | A | 0 | 55,00 | 90,66 | 223,16 | 51,81 | 2,5839 | J | |
| T-18708R | | | 0,30 | 9,00 | 10,10 | 4,00 | A | 0 | 55,00 | 90,66 | 223,16 | 51,81 | 2,5839 | J | |
| T-18709L | | | 0,30 | 9,00 | 10,10 | 5,25 | B | 90 | 55,00 | 118,95 | 223,16 | 48,54 | 3,0587 | J | |
| T-18709R | | | 0,30 | 9,00 | 10,10 | 5,25 | B | 90 | 55,00 | 118,95 | 223,16 | 48,54 | 3,0587 | J | |
| T-18710L | | | 0,30 | 9,00 | 10,10 | 6,50 | C | 180 | 55,00 | 147,25 | 223,16 | 46,11 | 3,5335 | J | |
| T-18710R | | | 0,30 | 9,00 | 10,10 | 6,50 | C | 180 | 55,00 | 147,25 | 223,16 | 46,11 | 3,5335 | J | |
| T-18711L | | | 0,30 | 9,00 | 10,10 | 7,75 | D | 270 | 55,00 | 175,63 | 223,16 | 44,21 | 4,0083 | J | |
| T-18711R | | | 0,30 | 9,00 | 10,10 | 7,75 | D | 270 | 55,00 | 175,63 | 223,16 | 44,21 | 4,0083 | J | |
| T-18725L | | | 14,25 | 0,37 | 11,40 | 12,80 | 2,00 | A | 0 | 55,00 | 57,18 | 226,96 | 54,95 | 2,0065 | J |
| T-18725R | | | | 0,37 | 11,40 | 12,80 | 2,00 | A | 0 | 55,00 | 57,18 | 226,96 | 54,95 | 2,0065 | J |
| T-18726L | | | | 0,37 | 11,40 | 12,80 | 2,25 | B | 90 | 55,00 | 64,28 | 226,96 | 53,42 | 2,1243 | J |
| T-18726R | | 0,37 | | 11,40 | 12,80 | 2,25 | B | 90 | 55,00 | 64,28 | 226,96 | 53,42 | 2,1243 | J | |
| T-18727L | | 0,37 | | 11,40 | 12,80 | 2,50 | C | 180 | 55,00 | 71,47 | 226,96 | 52,08 | 2,2421 | J | |
| T-18727R | | 0,37 | | 11,40 | 12,80 | 2,50 | C | 180 | 55,00 | 71,47 | 226,96 | 52,08 | 2,2421 | J | |
| T-18728L | | 0,37 | | 11,40 | 12,80 | 2,75 | D | 270 | 55,00 | 78,57 | 226,96 | 50,91 | 2,3598 | J | |
| T-18728R | | 0,37 | | 11,40 | 12,80 | 2,75 | D | 270 | 55,00 | 78,57 | 226,96 | 50,91 | 2,3598 | J | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18729L | 1,25 | 14,25 | 0,37 | 11,40 | 12,80 | 3,00 | A | 0 | 55,00 | 85,67 | 226,96 | 49,85 | 2,4776 | J | | |
| T-18729R | | | 0,37 | 11,40 | 12,80 | 3,00 | A | 0 | 55,00 | 85,67 | 226,96 | 49,85 | 2,4776 | J | | |
| T-18730L | | | 0,37 | 11,40 | 12,80 | 3,25 | B | 90 | 55,00 | 92,86 | 226,96 | 48,90 | 2,5953 | J | | |
| T-18730R | | | 0,37 | 11,40 | 12,80 | 3,25 | B | 90 | 55,00 | 92,86 | 226,96 | 48,90 | 2,5953 | J | | |
| T-18731L | | | 0,37 | 11,40 | 12,80 | 3,50 | C | 180 | 55,00 | 99,96 | 226,96 | 48,04 | 2,7131 | J | | |
| T-18731R | | | 0,37 | 11,40 | 12,80 | 3,50 | C | 180 | 55,00 | 99,96 | 226,96 | 48,04 | 2,7131 | J | | |
| T-18732L | | | 0,37 | 11,40 | 12,80 | 3,75 | D | 270 | 55,00 | 107,16 | 226,96 | 47,25 | 2,8308 | J | | |
| T-18732R | | | 0,37 | 11,40 | 12,80 | 3,75 | D | 270 | 55,00 | 107,16 | 226,96 | 47,25 | 2,8308 | J | | |
| T-18733L | | | 0,37 | 11,40 | 12,80 | 4,00 | A | 0 | 55,00 | 114,26 | 226,96 | 46,53 | 2,9486 | J | | |
| T-18733R | | | 0,37 | 11,40 | 12,80 | 4,00 | A | 0 | 55,00 | 114,26 | 226,96 | 46,53 | 2,9486 | J | | |
| T-18734L | | | 0,37 | 11,40 | 12,80 | 5,25 | B | 90 | 55,00 | 150,04 | 226,96 | 43,59 | 3,5373 | J | | |
| T-18734R | | | 0,37 | 11,40 | 12,80 | 5,25 | B | 90 | 55,00 | 150,04 | 226,96 | 43,59 | 3,5373 | J | | |
| T-18735L | | | 0,37 | 11,40 | 12,80 | 6,50 | C | 180 | 55,00 | 185,73 | 226,96 | 41,41 | 4,1261 | J | | |
| T-18735R | | | 0,37 | 11,40 | 12,80 | 6,50 | C | 180 | 55,00 | 185,73 | 226,96 | 41,41 | 4,1261 | J | | |
| T-18736L | | | 0,37 | 11,40 | 12,80 | 7,75 | D | 270 | 55,00 | 221,42 | 226,96 | 39,70 | 4,7148 | J | | |
| T-18736R | | | 0,37 | 11,40 | 12,80 | 7,75 | D | 270 | 55,00 | 221,42 | 226,96 | 39,70 | 4,7148 | J | | |
| T-16700L | | | 1,40 | 7,50 | 0,20 | 4,20 | 6,50 | 2,00 | A | 0 | 55,00 | 25,28 | 275,27 | 107,82 | 2,0139 | J |
| T-16700R | | | | | 0,20 | 4,20 | 6,50 | 2,00 | A | 0 | 55,00 | 25,28 | 275,27 | 107,82 | 2,0139 | J |
| T-16701L | | | | | 0,20 | 4,20 | 6,50 | 2,25 | B | 90 | 55,00 | 28,44 | 275,27 | 104,81 | 2,0987 | J |
| T-16701R | | | | | 0,20 | 4,20 | 6,50 | 2,25 | B | 90 | 55,00 | 28,44 | 275,27 | 104,81 | 2,0987 | J |
| T-16702L | 0,20 | 4,20 | | | 6,50 | 2,50 | C | 180 | 55,00 | 31,60 | 275,27 | 102,20 | 2,1835 | J | | |
| T-16702R | 0,20 | 4,20 | | | 6,50 | 2,50 | C | 180 | 55,00 | 31,60 | 275,27 | 102,20 | 2,1835 | J | | |
| T-16703L | 0,20 | 4,20 | | | 6,50 | 2,75 | D | 270 | 55,00 | 34,76 | 275,27 | 99,88 | 2,2683 | J | | |
| T-16703R | 0,20 | 4,20 | | | 6,50 | 2,75 | D | 270 | 55,00 | 34,80 | 275,27 | 99,86 | 2,2693 | J | | |
| T-16704L | 0,20 | 4,20 | | | 6,50 | 3,00 | A | 0 | 55,00 | 37,92 | 275,27 | 97,82 | 2,3531 | J | | |
| T-16704R | 0,20 | 4,20 | | | 6,50 | 3,00 | A | 0 | 55,00 | 37,92 | 275,27 | 97,82 | 2,3531 | J | | |
| T-16705L | 0,20 | 4,20 | | | 6,50 | 3,25 | B | 90 | 55,00 | 41,08 | 275,27 | 95,96 | 2,4379 | J | | |
| T-16705R | 0,20 | 4,20 | | | 6,50 | 3,25 | B | 90 | 55,00 | 41,08 | 275,27 | 95,96 | 2,4379 | J | | |
| T-16706L | 0,20 | 4,20 | | | 6,50 | 3,50 | C | 180 | 55,00 | 44,24 | 275,27 | 94,27 | 2,5227 | J | | |
| T-16706R | 0,20 | 4,20 | | | 6,50 | 3,50 | C | 180 | 55,00 | 44,24 | 275,27 | 94,27 | 2,5227 | J | | |
| T-16707L | 0,20 | 4,20 | | | 6,50 | 3,75 | D | 270 | 55,00 | 47,40 | 275,27 | 92,72 | 2,6075 | J | | |
| T-16707R | 0,20 | 4,20 | | | 6,50 | 3,75 | D | 270 | 55,00 | 47,40 | 275,27 | 92,72 | 2,6075 | J | | |
| T-16708L | 0,20 | 4,20 | | | 6,50 | 4,00 | A | 0 | 55,00 | 50,56 | 275,27 | 91,29 | 2,6924 | J | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16708R | 1,40 | 7,50 | 0,20 | 4,20 | 6,50 | 4,00 | A | 0 | 55,00 | 50,56 | 275,27 | 91,29 | 2,6924 | J | | |
| T-16709L | | | 0,20 | 4,20 | 6,50 | 5,25 | B | 90 | 55,00 | 66,37 | 275,27 | 85,53 | 3,1164 | J | | |
| T-16709R | | | 0,20 | 4,20 | 6,50 | 5,25 | B | 90 | 55,00 | 66,37 | 275,27 | 85,53 | 3,1164 | J | | |
| T-16710L | | | 0,20 | 4,20 | 6,50 | 6,50 | C | 180 | 55,00 | 82,17 | 275,27 | 81,25 | 3,5405 | J | | |
| T-16710R | | | 0,20 | 4,20 | 6,50 | 6,50 | C | 180 | 55,00 | 82,17 | 275,27 | 81,25 | 3,5405 | J | | |
| T-16711L | | | 0,20 | 4,20 | 6,50 | 7,75 | D | 270 | 55,00 | 97,97 | 275,27 | 77,89 | 3,9646 | J | | |
| T-16711R | | | 0,20 | 4,20 | 6,50 | 7,75 | D | 270 | 55,00 | 97,97 | 275,27 | 77,89 | 3,9646 | J | | |
| T-16712L | | | 10,40 | 10,40 | 0,25 | 5,00 | 9,00 | 2,00 | A | 0 | 55,00 | 34,71 | 285,09 | 93,64 | 2,2349 | J |
| T-16712R | 0,25 | 5,00 | | | 9,00 | 2,00 | A | 0 | 55,00 | 34,71 | 285,09 | 93,64 | 2,2349 | J | | |
| T-16713L | 0,25 | 5,00 | | | 9,00 | 2,25 | B | 90 | 55,00 | 39,05 | 285,09 | 91,03 | 2,3474 | J | | |
| T-16713R | 0,25 | 5,00 | | | 9,00 | 2,25 | B | 90 | 55,00 | 39,05 | 285,09 | 91,03 | 2,3474 | J | | |
| T-16714L | 0,25 | 5,00 | | | 9,00 | 2,50 | C | 180 | 55,00 | 43,39 | 285,09 | 88,75 | 2,4598 | J | | |
| T-16714R | 0,25 | 5,00 | | | 9,00 | 2,50 | C | 180 | 55,00 | 43,39 | 285,09 | 88,75 | 2,4598 | J | | |
| T-16715L | 0,25 | 5,00 | | | 9,00 | 2,75 | D | 270 | 55,00 | 47,73 | 285,09 | 86,75 | 2,5723 | J | | |
| T-16715R | 0,25 | 5,00 | | | 9,00 | 2,75 | D | 270 | 55,00 | 47,78 | 285,09 | 86,72 | 2,5736 | J | | |
| T-16716L | 0,25 | 5,00 | | | 9,00 | 3,00 | A | 0 | 55,00 | 52,07 | 285,09 | 84,95 | 2,6847 | J | | |
| T-16716R | 0,25 | 5,00 | | | 9,00 | 3,00 | A | 0 | 55,00 | 52,07 | 285,09 | 84,95 | 2,6847 | J | | |
| T-16717L | 0,25 | 5,00 | | | 9,00 | 3,25 | B | 90 | 55,00 | 56,41 | 285,09 | 83,34 | 2,7972 | J | | |
| T-16717R | 0,25 | 5,00 | | | 9,00 | 3,25 | B | 90 | 55,00 | 56,41 | 285,09 | 83,34 | 2,7972 | J | | |
| T-16718L | 0,25 | 5,00 | | | 9,00 | 3,50 | C | 180 | 55,00 | 60,75 | 285,09 | 81,87 | 2,9096 | J | | |
| T-16718R | 0,25 | 5,00 | | | 9,00 | 3,50 | C | 180 | 55,00 | 60,75 | 285,09 | 81,87 | 2,9096 | J | | |
| T-16719L | 0,25 | 5,00 | | | 9,00 | 3,75 | D | 270 | 55,00 | 65,09 | 285,09 | 80,52 | 3,0221 | J | | |
| T-16719R | 0,25 | 5,00 | | | 9,00 | 3,75 | D | 270 | 55,00 | 65,09 | 285,09 | 80,52 | 3,0221 | J | | |
| T-16720L | 0,25 | 5,00 | | | 9,00 | 4,00 | A | 0 | 55,00 | 69,43 | 285,09 | 79,29 | 3,1345 | J | | |
| T-16720R | 0,25 | 5,00 | | | 9,00 | 4,00 | A | 0 | 55,00 | 69,43 | 285,09 | 79,29 | 3,1345 | J | | |
| T-16721L | 0,25 | 5,00 | | | 9,00 | 5,25 | B | 90 | 55,00 | 91,13 | 285,09 | 74,28 | 3,6968 | J | | |
| T-16721R | 0,25 | 5,00 | | | 9,00 | 5,25 | B | 90 | 55,00 | 91,13 | 285,09 | 74,28 | 3,6968 | J | | |
| T-16722L | 0,25 | 5,00 | | | 9,00 | 6,50 | C | 180 | 55,00 | 112,82 | 285,09 | 70,57 | 4,2590 | J | | |
| T-16722R | 0,25 | 5,00 | | | 9,00 | 6,50 | C | 180 | 55,00 | 112,82 | 285,09 | 70,57 | 4,2590 | J | | |
| T-16723L | 0,25 | 5,00 | | | 9,00 | 7,75 | D | 270 | 55,00 | 134,52 | 285,09 | 67,65 | 4,8213 | J | | |
| T-16723R | 0,25 | 5,00 | | | 9,00 | 7,75 | D | 270 | 55,00 | 134,52 | 285,09 | 67,65 | 4,8213 | J | | |
| T-16724L | 12,60 | 12,60 | | | 0,30 | 7,00 | 10,80 | 2,00 | A | 0 | 55,00 | 41,87 | 289,84 | 85,97 | 2,4027 | J |
| T-16724R | | | | | 0,30 | 7,00 | 10,80 | 2,00 | A | 0 | 55,00 | 41,87 | 289,84 | 85,97 | 2,4027 | J |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16725L | 1,40 | 12,60 | 0,30 | 7,00 | 10,80 | 2,25 | B | 90 | 55,00 | 47,11 | 289,84 | 83,57 | 2,5361 | J | | |
| T-16725R | | | 0,30 | 7,00 | 10,80 | 2,25 | B | 90 | 55,00 | 47,11 | 289,84 | 83,57 | 2,5361 | J | | |
| T-16726L | | | 0,30 | 7,00 | 10,80 | 2,50 | C | 180 | 55,00 | 52,34 | 289,84 | 81,48 | 2,6695 | J | | |
| T-16726R | | | 0,30 | 7,00 | 10,80 | 2,50 | C | 180 | 55,00 | 52,34 | 289,84 | 81,48 | 2,6695 | J | | |
| T-16727L | | | 0,30 | 7,00 | 10,80 | 2,75 | D | 270 | 55,00 | 57,58 | 289,84 | 79,64 | 2,8029 | J | | |
| T-16727R | | | 0,30 | 7,00 | 10,80 | 2,75 | D | 270 | 55,00 | 57,64 | 289,84 | 79,62 | 2,8045 | J | | |
| T-16728L | | | 0,30 | 7,00 | 10,80 | 3,00 | A | 0 | 55,00 | 62,81 | 289,84 | 77,99 | 2,9363 | J | | |
| T-16728R | | | 0,30 | 7,00 | 10,80 | 3,00 | A | 0 | 55,00 | 62,81 | 289,84 | 77,99 | 2,9363 | J | | |
| T-16729L | | | 0,30 | 7,00 | 10,80 | 3,25 | B | 90 | 55,00 | 68,04 | 289,84 | 76,51 | 3,0697 | J | | |
| T-16729R | | | 0,30 | 7,00 | 10,80 | 3,25 | B | 90 | 55,00 | 68,04 | 289,84 | 76,51 | 3,0697 | J | | |
| T-16730L | | | 0,30 | 7,00 | 10,80 | 3,50 | C | 180 | 55,00 | 73,28 | 289,84 | 75,16 | 3,2031 | J | | |
| T-16730R | | | 0,30 | 7,00 | 10,80 | 3,50 | C | 180 | 55,00 | 73,28 | 289,84 | 75,16 | 3,2031 | J | | |
| T-16731L | | | 0,30 | 7,00 | 10,80 | 3,75 | D | 270 | 55,00 | 78,51 | 289,84 | 73,93 | 3,3366 | J | | |
| T-16731R | | | 0,30 | 7,00 | 10,80 | 3,75 | D | 270 | 55,00 | 78,51 | 289,84 | 73,93 | 3,3366 | J | | |
| T-16732L | | | 0,30 | 7,00 | 10,80 | 4,00 | A | 0 | 55,00 | 83,75 | 289,84 | 72,79 | 3,4700 | J | | |
| T-16732R | | | 0,30 | 7,00 | 10,80 | 4,00 | A | 0 | 55,00 | 83,75 | 289,84 | 72,79 | 3,4700 | J | | |
| T-16733L | | | 0,30 | 7,00 | 10,80 | 5,25 | B | 90 | 55,00 | 109,92 | 289,84 | 68,19 | 4,1370 | J | | |
| T-16733R | | | 0,30 | 7,00 | 10,80 | 5,25 | B | 90 | 55,00 | 109,92 | 289,84 | 68,19 | 4,1370 | J | | |
| T-16734L | | | 0,30 | 7,00 | 10,80 | 6,50 | C | 180 | 55,00 | 136,09 | 289,84 | 64,78 | 4,8041 | J | | |
| T-16734R | | | 0,30 | 7,00 | 10,80 | 6,50 | C | 180 | 55,00 | 136,09 | 289,84 | 64,78 | 4,8041 | J | | |
| T-16735L | | | 0,30 | 7,00 | 10,80 | 7,75 | D | 270 | 55,00 | 162,26 | 289,84 | 62,11 | 5,4712 | J | | |
| T-16735R | | | 0,30 | 7,00 | 10,80 | 7,75 | D | 270 | 55,00 | 162,26 | 289,84 | 62,11 | 5,4712 | J | | |
| T-16736L | | | 16,20 | 16,20 | 0,40 | 8,00 | 13,70 | 2,00 | A | 0 | 55,00 | 53,59 | 295,06 | 76,67 | 2,6771 | J |
| T-16736R | | | | | 0,40 | 8,00 | 13,70 | 2,00 | A | 0 | 55,00 | 53,59 | 295,06 | 76,67 | 2,6771 | J |
| T-16737L | | | | | 0,40 | 8,00 | 13,70 | 2,25 | B | 90 | 55,00 | 60,29 | 295,06 | 74,53 | 2,8448 | J |
| T-16737R | | | | | 0,40 | 8,00 | 13,70 | 2,25 | B | 90 | 55,00 | 60,29 | 295,06 | 74,53 | 2,8448 | J |
| T-16738L | | | | | 0,40 | 8,00 | 13,70 | 2,50 | C | 180 | 55,00 | 66,99 | 295,06 | 72,67 | 3,0126 | J |
| T-16738R | | | | | 0,40 | 8,00 | 13,70 | 2,50 | C | 180 | 55,00 | 66,99 | 295,06 | 72,67 | 3,0126 | J |
| T-16739L | | | | | 0,40 | 8,00 | 13,70 | 2,75 | D | 270 | 55,00 | 73,69 | 295,06 | 71,03 | 3,1803 | J |
| T-16739R | | | | | 0,40 | 8,00 | 13,70 | 2,75 | D | 270 | 55,00 | 73,77 | 295,06 | 71,01 | 3,1823 | J |
| T-16740L | | | | | 0,40 | 8,00 | 13,70 | 3,00 | A | 0 | 55,00 | 80,39 | 295,06 | 69,56 | 3,3480 | J |
| T-16740R | | | | | 0,40 | 8,00 | 13,70 | 3,00 | A | 0 | 55,00 | 80,39 | 295,06 | 69,56 | 3,3480 | J |
| T-16741L | | | | | 0,40 | 8,00 | 13,70 | 3,25 | B | 90 | 55,00 | 87,08 | 295,06 | 68,24 | 3,5157 | J |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | αn maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|--------------------------------|---------------------|--------------------------------------|-------------------------|---------------------------------|---------------------------------|----------------|
| T-16741R | 1,40 | 16,20 | 0,40 | 8,00 | 13,70 | 3,25 | B | 90 | 55,00 | 87,08 | 295,06 | 68,24 | 3,5157 | J |
| T-16742L | | | 0,40 | 8,00 | 13,70 | 3,50 | C | 180 | 55,00 | 93,78 | 295,06 | 67,03 | 3,6834 | J |
| T-16742R | | | 0,40 | 8,00 | 13,70 | 3,50 | C | 180 | 55,00 | 93,78 | 295,06 | 67,03 | 3,6834 | J |
| T-16743L | | | 0,40 | 8,00 | 13,70 | 3,75 | D | 270 | 55,00 | 100,48 | 295,06 | 65,93 | 3,8512 | J |
| T-16743R | | | 0,40 | 8,00 | 13,70 | 3,75 | D | 270 | 55,00 | 100,48 | 295,06 | 65,93 | 3,8512 | J |
| T-16744L | | | 0,40 | 8,00 | 13,70 | 4,00 | A | 0 | 55,00 | 107,18 | 295,06 | 64,92 | 4,0189 | J |
| T-16744R | | | 0,40 | 8,00 | 13,70 | 4,00 | A | 0 | 55,00 | 107,18 | 295,06 | 64,92 | 4,0189 | J |
| T-16745L | | | 0,40 | 8,00 | 13,70 | 5,25 | B | 90 | 55,00 | 140,67 | 295,06 | 60,82 | 4,8575 | J |
| T-16745R | | | 0,40 | 8,00 | 13,70 | 5,25 | B | 90 | 55,00 | 140,67 | 295,06 | 60,82 | 4,8575 | J |
| T-16746L | | | 0,40 | 8,00 | 13,70 | 6,50 | C | 180 | 55,00 | 174,17 | 295,06 | 57,78 | 5,6961 | J |
| T-16746R | | | 0,40 | 8,00 | 13,70 | 6,50 | C | 180 | 55,00 | 174,17 | 295,06 | 57,78 | 5,6961 | J |
| T-16747L | | | 0,40 | 8,00 | 13,70 | 7,75 | D | 270 | 55,00 | 207,66 | 295,06 | 55,39 | 6,5347 | J |
| T-16747R | | | 0,40 | 8,00 | 13,70 | 7,75 | D | 270 | 55,00 | 207,66 | 295,06 | 55,39 | 6,5347 | J |
| T-18800L | | | 1,60 | 8,90 | 0,24 | 7,10 | 8,00 | 2,00 | A | 0 | 55,00 | 27,25 | 429,24 | 158,40 |
| T-18800R | 0,24 | 7,10 | | | 8,00 | 2,00 | A | 0 | 55,00 | 27,25 | 429,24 | 158,40 | 2,7897 | K |
| T-18801L | 0,24 | 7,10 | | | 8,00 | 2,25 | B | 90 | 55,00 | 30,67 | 429,24 | 153,99 | 2,9204 | K |
| T-18801R | 0,24 | 7,10 | | | 8,00 | 2,25 | B | 90 | 55,00 | 30,67 | 429,24 | 153,99 | 2,9204 | K |
| T-18802L | 0,24 | 7,10 | | | 8,00 | 2,50 | C | 180 | 55,00 | 34,09 | 429,24 | 150,14 | 3,0510 | K |
| T-18802R | 0,24 | 7,10 | | | 8,00 | 2,50 | C | 180 | 55,00 | 34,09 | 429,24 | 150,14 | 3,0510 | K |
| T-18803L | 0,24 | 7,10 | | | 8,00 | 2,75 | D | 270 | 55,00 | 37,51 | 429,24 | 146,75 | 3,1817 | K |
| T-18803R | 0,24 | 7,10 | | | 8,00 | 2,75 | D | 270 | 55,00 | 37,51 | 429,24 | 146,75 | 3,1817 | K |
| T-18804L | 0,24 | 7,10 | | | 8,00 | 3,00 | A | 0 | 55,00 | 40,93 | 429,24 | 143,71 | 3,3124 | K |
| T-18804R | 0,24 | 7,10 | | | 8,00 | 3,00 | A | 0 | 55,00 | 40,93 | 429,24 | 143,71 | 3,3124 | K |
| T-18805L | 0,24 | 7,10 | | | 8,00 | 3,25 | B | 90 | 55,00 | 44,34 | 429,24 | 140,98 | 3,4431 | K |
| T-18805R | 0,24 | 7,10 | | | 8,00 | 3,25 | B | 90 | 55,00 | 44,34 | 429,24 | 140,98 | 3,4431 | K |
| T-18806L | 0,24 | 7,10 | | | 8,00 | 3,50 | C | 180 | 55,00 | 47,76 | 429,24 | 138,50 | 3,5738 | K |
| T-18806R | 0,24 | 7,10 | | | 8,00 | 3,50 | C | 180 | 55,00 | 47,76 | 429,24 | 138,50 | 3,5738 | K |
| T-18807L | 0,24 | 7,10 | | | 8,00 | 3,75 | D | 270 | 55,00 | 51,18 | 429,24 | 136,22 | 3,7045 | K |
| T-18807R | 0,24 | 7,10 | | | 8,00 | 3,75 | D | 270 | 55,00 | 51,18 | 429,24 | 136,22 | 3,7045 | K |
| T-18808L | 0,24 | 7,10 | | | 8,00 | 4,00 | A | 0 | 55,00 | 54,60 | 429,24 | 134,13 | 3,8352 | K |
| T-18808R | 0,24 | 7,10 | | | 8,00 | 4,00 | A | 0 | 55,00 | 54,60 | 429,24 | 134,13 | 3,8352 | K |
| T-18809L | 0,24 | 7,10 | | | 8,00 | 5,25 | B | 90 | 55,00 | 71,69 | 429,24 | 125,65 | 4,4886 | K |
| T-18809R | 0,24 | 7,10 | | | 8,00 | 5,25 | B | 90 | 55,00 | 71,69 | 429,24 | 125,65 | 4,4886 | K |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18810L | 1,60 | 8,90 | 0,24 | 7,10 | 8,00 | 6,50 | C | 180 | 55,00 | 88,69 | 429,24 | 119,37 | 5,1421 | K | | |
| T-18810R | | | 0,24 | 7,10 | 8,00 | 6,50 | C | 180 | 55,00 | 88,69 | 429,24 | 119,37 | 5,1421 | K | | |
| T-18811L | | | 0,24 | 7,10 | 8,00 | 7,75 | D | 270 | 55,00 | 105,78 | 429,24 | 114,44 | 5,7956 | K | | |
| T-18811R | | | 0,24 | 7,10 | 8,00 | 7,75 | D | 270 | 55,00 | 105,78 | 429,24 | 114,44 | 5,7956 | K | | |
| T-18825L | 11,90 | 11,90 | 0,31 | 9,50 | 10,70 | 2,00 | A | 0 | 55,00 | 36,14 | 442,58 | 139,70 | 3,0884 | K | | |
| T-18825R | | | 0,31 | 9,50 | 10,70 | 2,00 | A | 0 | 55,00 | 36,14 | 442,58 | 139,70 | 3,0884 | K | | |
| T-18826L | | | 0,31 | 9,50 | 10,70 | 2,25 | B | 90 | 55,00 | 40,66 | 442,58 | 135,80 | 3,2564 | K | | |
| T-18826R | | | 0,31 | 9,50 | 10,70 | 2,25 | B | 90 | 55,00 | 40,66 | 442,58 | 135,80 | 3,2564 | K | | |
| T-18827L | | | 0,31 | 9,50 | 10,70 | 2,50 | C | 180 | 55,00 | 45,18 | 442,58 | 132,41 | 3,4244 | K | | |
| T-18827R | | | 0,31 | 9,50 | 10,70 | 2,50 | C | 180 | 55,00 | 45,18 | 442,58 | 132,41 | 3,4244 | K | | |
| T-18828L | | | 0,31 | 9,50 | 10,70 | 2,75 | D | 270 | 55,00 | 49,70 | 442,58 | 129,42 | 3,5925 | K | | |
| T-18828R | | | 0,31 | 9,50 | 10,70 | 2,75 | D | 270 | 55,00 | 49,70 | 442,58 | 129,42 | 3,5925 | K | | |
| T-18829L | | | 0,31 | 9,50 | 10,70 | 3,00 | A | 0 | 55,00 | 54,22 | 442,58 | 126,74 | 3,7605 | K | | |
| T-18829R | | | 0,31 | 9,50 | 10,70 | 3,00 | A | 0 | 55,00 | 54,22 | 442,58 | 126,74 | 3,7605 | K | | |
| T-18830L | | | 0,31 | 9,50 | 10,70 | 3,25 | B | 90 | 55,00 | 58,73 | 442,58 | 124,33 | 3,9285 | K | | |
| T-18830R | | | 0,31 | 9,50 | 10,70 | 3,25 | B | 90 | 55,00 | 58,73 | 442,58 | 124,33 | 3,9285 | K | | |
| T-18831L | | | 0,31 | 9,50 | 10,70 | 3,50 | C | 180 | 55,00 | 63,10 | 441,52 | 123,52 | 4,0966 | K | | |
| T-18831R | | | 0,31 | 9,50 | 10,70 | 3,50 | C | 180 | 55,00 | 63,10 | 441,52 | 123,52 | 4,0966 | K | | |
| T-18832L | | | 0,31 | 9,50 | 10,70 | 3,75 | D | 270 | 55,00 | 67,77 | 442,58 | 120,14 | 4,2646 | K | | |
| T-18832R | | | 0,31 | 9,50 | 10,70 | 3,75 | D | 270 | 55,00 | 67,77 | 442,58 | 120,14 | 4,2646 | K | | |
| T-18833L | | | 0,31 | 9,50 | 10,70 | 4,00 | A | 0 | 55,00 | 72,29 | 442,58 | 118,29 | 4,4326 | K | | |
| T-18833R | | | 0,31 | 9,50 | 10,70 | 4,00 | A | 0 | 55,00 | 72,29 | 442,58 | 118,29 | 4,4326 | K | | |
| T-18834L | | | 0,31 | 9,50 | 10,70 | 5,25 | B | 90 | 55,00 | 94,97 | 442,58 | 110,82 | 5,2728 | K | | |
| T-18834R | | | 0,31 | 9,50 | 10,70 | 5,25 | B | 90 | 55,00 | 94,97 | 442,58 | 110,82 | 5,2728 | K | | |
| T-18835L | | | 0,31 | 9,50 | 10,70 | 6,50 | C | 180 | 55,00 | 117,28 | 441,52 | 106,47 | 6,1129 | K | | |
| T-18835R | | | 0,31 | 9,50 | 10,70 | 6,50 | C | 180 | 55,00 | 117,28 | 441,52 | 106,47 | 6,1129 | K | | |
| T-18836L | | | 0,31 | 9,50 | 10,70 | 7,75 | D | 270 | 55,00 | 140,15 | 442,58 | 100,93 | 6,9531 | K | | |
| T-18836R | | | 0,31 | 9,50 | 10,70 | 7,75 | D | 270 | 55,00 | 140,15 | 442,58 | 100,93 | 6,9531 | K | | |
| T-18850L | | | 14,40 | 14,40 | 0,37 | 11,50 | 13,00 | 2,00 | A | 0 | 60,00 | 43,54 | 449,91 | 128,32 | 3,4959 | K |
| T-18850R | | | | | 0,37 | 11,50 | 13,00 | 2,00 | A | 0 | 60,00 | 43,54 | 449,91 | 128,32 | 3,4959 | K |
| T-18851L | | | | | 0,37 | 11,50 | 13,00 | 2,25 | B | 90 | 60,00 | 49,05 | 449,91 | 124,74 | 3,6950 | K |
| T-18851R | | | | | 0,37 | 11,50 | 13,00 | 2,25 | B | 90 | 60,00 | 49,05 | 449,91 | 124,74 | 3,6950 | K |
| T-18852L | | | | | 0,37 | 11,50 | 13,00 | 2,50 | C | 180 | 60,00 | 54,47 | 449,91 | 121,63 | 3,8942 | K |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|
| T-18852R | 1,60 | 14,40 | 0,37 | 11,50 | 13,00 | 2,50 | C | 180 | 60,00 | 54,47 | 449,91 | 121,63 | 3,8942 | K |
| T-18853L | | | 0,37 | 11,50 | 13,00 | 2,75 | D | 270 | 60,00 | 59,89 | 449,91 | 118,88 | 4,0933 | K |
| T-18853R | | | 0,37 | 11,50 | 13,00 | 2,75 | D | 270 | 60,00 | 59,89 | 449,91 | 118,88 | 4,0933 | K |
| T-18854L | | | 0,37 | 11,50 | 13,00 | 3,00 | A | 0 | 60,00 | 65,31 | 449,91 | 116,42 | 4,2925 | K |
| T-18854R | | | 0,37 | 11,50 | 13,00 | 3,00 | A | 0 | 60,00 | 65,31 | 449,91 | 116,42 | 4,2925 | K |
| T-18855L | | | 0,37 | 11,50 | 13,00 | 3,25 | B | 90 | 60,00 | 70,82 | 449,91 | 114,21 | 4,4916 | K |
| T-18855R | | | 0,37 | 11,50 | 13,00 | 3,25 | B | 90 | 60,00 | 70,82 | 449,91 | 114,21 | 4,4916 | K |
| T-18856L | | | 0,37 | 11,50 | 13,00 | 3,50 | C | 180 | 60,00 | 76,24 | 449,91 | 112,19 | 4,6908 | K |
| T-18856R | | | 0,37 | 11,50 | 13,00 | 3,50 | C | 180 | 60,00 | 76,24 | 449,91 | 112,19 | 4,6908 | K |
| T-18857L | | | 0,37 | 11,50 | 13,00 | 3,75 | D | 270 | 60,00 | 81,66 | 449,91 | 110,35 | 4,8899 | K |
| T-18857R | | | 0,37 | 11,50 | 13,00 | 3,75 | D | 270 | 60,00 | 81,66 | 449,91 | 110,35 | 4,8899 | K |
| T-18858L | | | 0,37 | 11,50 | 13,00 | 4,00 | A | 0 | 60,00 | 87,17 | 449,91 | 108,66 | 5,0891 | K |
| T-18858R | | | 0,37 | 11,50 | 13,00 | 4,00 | A | 0 | 60,00 | 87,17 | 449,91 | 108,66 | 5,0891 | K |
| T-18859L | | | 0,37 | 11,50 | 13,00 | 5,25 | B | 90 | 60,00 | 114,36 | 449,91 | 101,79 | 6,0848 | K |
| T-18859R | | | 0,37 | 11,50 | 13,00 | 5,25 | B | 90 | 60,00 | 114,36 | 449,91 | 101,79 | 6,0848 | K |
| T-18860L | | | 0,37 | 11,50 | 13,00 | 6,50 | C | 180 | 60,00 | 141,55 | 449,91 | 96,70 | 7,0805 | K |
| T-18860R | | | 0,37 | 11,50 | 13,00 | 6,50 | C | 180 | 60,00 | 141,55 | 449,91 | 96,70 | 7,0805 | K |
| T-18861L | | | 0,37 | 11,50 | 13,00 | 7,75 | D | 270 | 60,00 | 168,83 | 449,91 | 92,71 | 8,0763 | K |
| T-18861R | | | 0,37 | 11,50 | 13,00 | 7,75 | D | 270 | 60,00 | 168,83 | 449,91 | 92,71 | 8,0763 | K |
| T-18875L | | | 18,40 | 18,40 | 0,46 | 14,70 | 16,50 | 2,00 | A | 0 | 60,00 | 55,43 | 457,84 | 114,77 |
| T-18875R | 0,46 | 14,70 | | | 16,50 | 2,00 | A | 0 | 60,00 | 55,43 | 457,84 | 114,77 | 3,8942 | K |
| T-18876L | 0,46 | 14,70 | | | 16,50 | 2,25 | B | 90 | 60,00 | 62,35 | 457,84 | 111,58 | 4,1431 | K |
| T-18876R | 0,46 | 14,70 | | | 16,50 | 2,25 | B | 90 | 60,00 | 62,35 | 457,84 | 111,58 | 4,1431 | K |
| T-18877L | 0,46 | 14,70 | | | 16,50 | 2,50 | C | 180 | 60,00 | 69,27 | 457,84 | 108,79 | 4,3920 | K |
| T-18877R | 0,46 | 14,70 | | | 16,50 | 2,50 | C | 180 | 60,00 | 69,27 | 457,84 | 108,79 | 4,3920 | K |
| T-18878L | 0,46 | 14,70 | | | 16,50 | 2,75 | D | 270 | 60,00 | 76,18 | 457,84 | 106,33 | 4,6410 | K |
| T-18878R | 0,46 | 14,70 | | | 16,50 | 2,75 | D | 270 | 60,00 | 76,18 | 457,84 | 106,33 | 4,6410 | K |
| T-18879L | 0,46 | 14,70 | | | 16,50 | 3,00 | A | 0 | 60,00 | 83,10 | 457,84 | 104,13 | 4,8899 | K |
| T-18879R | 0,46 | 14,70 | | | 16,50 | 3,00 | A | 0 | 60,00 | 83,10 | 457,84 | 104,13 | 4,8899 | K |
| T-18880L | 0,46 | 14,70 | | | 16,50 | 3,25 | B | 90 | 60,00 | 90,02 | 457,84 | 102,15 | 5,1388 | K |
| T-18880R | 0,46 | 14,70 | | | 16,50 | 3,25 | B | 90 | 60,00 | 90,02 | 457,84 | 102,15 | 5,1388 | K |
| T-18881L | 0,46 | 14,70 | | | 16,50 | 3,50 | C | 180 | 60,00 | 96,94 | 457,84 | 100,35 | 5,3878 | K |
| T-18881R | 0,46 | 14,70 | | | 16,50 | 3,50 | C | 180 | 60,00 | 96,94 | 457,84 | 100,35 | 5,3878 | K |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18882L | 1,60 | 18,40 | 0,46 | 14,70 | 16,50 | 3,75 | D | 270 | 60,00 | 103,85 | 457,84 | 98,70 | 5,6367 | K | | |
| T-18882R | | | 0,46 | 14,70 | 16,50 | 3,75 | D | 270 | 60,00 | 103,85 | 457,84 | 98,70 | 5,6367 | K | | |
| T-18883L | | | 0,46 | 14,70 | 16,50 | 4,00 | A | 0 | 60,00 | 110,77 | 457,84 | 97,18 | 5,8857 | K | | |
| T-18883R | | | 0,46 | 14,70 | 16,50 | 4,00 | A | 0 | 60,00 | 110,77 | 457,84 | 97,18 | 5,8857 | K | | |
| T-18884L | | | 0,46 | 14,70 | 16,50 | 5,25 | B | 90 | 60,00 | 145,45 | 457,84 | 91,04 | 7,1303 | K | | |
| T-18884R | | | 0,46 | 14,70 | 16,50 | 5,25 | B | 90 | 60,00 | 145,45 | 457,84 | 91,04 | 7,1303 | K | | |
| T-18885L | | | 0,46 | 14,70 | 16,50 | 6,50 | C | 180 | 60,00 | 180,04 | 457,84 | 86,50 | 8,3750 | K | | |
| T-18885R | | | 0,46 | 14,70 | 16,50 | 6,50 | C | 180 | 60,00 | 180,04 | 457,84 | 86,50 | 8,3750 | K | | |
| T-18886L | | | 0,46 | 14,70 | 16,50 | 7,75 | D | 270 | 60,00 | 214,72 | 457,84 | 82,92 | 9,6197 | K | | |
| T-18886R | | | 0,46 | 14,70 | 16,50 | 7,75 | D | 270 | 60,00 | 214,72 | 457,84 | 82,92 | 9,6197 | K | | |
| T-18900L | | | 1,80 | 10,00 | 0,25 | 6,00 | 8,80 | 2,00 | A | 0 | 60,00 | 24,73 | 554,97 | 225,66 | 3,8952 | K |
| T-18900R | | | | | 0,25 | 6,00 | 8,80 | 2,00 | A | 0 | 60,00 | 24,73 | 554,97 | 225,66 | 3,8952 | K |
| T-18901L | 0,25 | 6,00 | | | 8,80 | 2,25 | B | 90 | 60,00 | 27,82 | 554,97 | 219,37 | 4,0811 | K | | |
| T-18901R | 0,25 | 6,00 | | | 8,80 | 2,25 | B | 90 | 60,00 | 27,82 | 554,97 | 219,37 | 4,0811 | K | | |
| T-18902L | 0,25 | 6,00 | | | 8,80 | 2,50 | C | 180 | 60,00 | 30,91 | 554,97 | 213,89 | 4,2669 | K | | |
| T-18902R | 0,25 | 6,00 | | | 8,80 | 2,50 | C | 180 | 60,00 | 30,91 | 554,97 | 213,89 | 4,2669 | K | | |
| T-18903L | 0,25 | 6,00 | | | 8,80 | 2,75 | D | 270 | 60,00 | 34,00 | 554,97 | 209,05 | 4,4528 | K | | |
| T-18903R | 0,25 | 6,00 | | | 8,80 | 2,75 | D | 270 | 60,00 | 34,04 | 554,97 | 209,00 | 4,4551 | K | | |
| T-18904L | 0,25 | 6,00 | | | 8,80 | 3,00 | A | 0 | 60,00 | 37,10 | 554,97 | 204,73 | 4,6387 | K | | |
| T-18904R | 0,25 | 6,00 | | | 8,80 | 3,00 | A | 0 | 60,00 | 37,10 | 554,97 | 204,73 | 4,6387 | K | | |
| T-18905L | 0,25 | 6,00 | | | 8,80 | 3,25 | B | 90 | 60,00 | 40,19 | 554,97 | 200,84 | 4,8246 | K | | |
| T-18905R | 0,25 | 6,00 | | | 8,80 | 3,25 | B | 90 | 60,00 | 40,19 | 554,97 | 200,84 | 4,8246 | K | | |
| T-18906L | 0,25 | 6,00 | | | 8,80 | 3,50 | C | 180 | 60,00 | 43,28 | 554,97 | 197,30 | 5,0105 | K | | |
| T-18906R | 0,25 | 6,00 | | | 8,80 | 3,50 | C | 180 | 60,00 | 43,28 | 554,97 | 197,30 | 5,0105 | K | | |
| T-18907L | 0,25 | 6,00 | | | 8,80 | 3,75 | D | 270 | 60,00 | 46,37 | 554,97 | 194,06 | 5,1964 | K | | |
| T-18907R | 0,25 | 6,00 | | | 8,80 | 3,75 | D | 270 | 60,00 | 46,37 | 554,97 | 194,06 | 5,1964 | K | | |
| T-18908L | 0,25 | 6,00 | | | 8,80 | 4,00 | A | 0 | 60,00 | 49,46 | 554,97 | 191,08 | 5,3822 | K | | |
| T-18908R | 0,25 | 6,00 | | | 8,80 | 4,00 | A | 0 | 60,00 | 49,46 | 554,97 | 191,08 | 5,3822 | K | | |
| T-18909L | 0,25 | 6,00 | | | 8,80 | 5,25 | B | 90 | 60,00 | 64,92 | 554,97 | 179,00 | 6,3117 | K | | |
| T-18909R | 0,25 | 6,00 | | | 8,80 | 5,25 | B | 90 | 60,00 | 64,92 | 554,97 | 179,00 | 6,3117 | K | | |
| T-18910L | 0,25 | 6,00 | | | 8,80 | 6,50 | C | 180 | 60,00 | 80,37 | 554,97 | 170,06 | 7,2411 | K | | |
| T-18910R | 0,25 | 6,00 | | | 8,80 | 6,50 | C | 180 | 60,00 | 80,37 | 554,97 | 170,06 | 7,2411 | K | | |
| T-18911L | 0,25 | 6,00 | | | 8,80 | 7,75 | D | 270 | 60,00 | 95,83 | 554,97 | 163,03 | 8,1705 | K | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---|
| T-18911R | 1,80 | 10,00 | 0,25 | 6,00 | 8,80 | 7,75 | D | 270 | 60,00 | 95,83 | 554,97 | 163,03 | 8,1705 | K | |
| T-18912L | | | 13,50 | 0,35 | 8,00 | 11,70 | 2,00 | A | 0 | 60,00 | 33,09 | 572,76 | 198,17 | 4,3362 | K |
| T-18912R | | | | 0,35 | 8,00 | 11,70 | 2,00 | A | 0 | 60,00 | 33,09 | 572,76 | 198,17 | 4,3362 | K |
| T-18913L | | | | 0,35 | 8,00 | 11,70 | 2,25 | B | 90 | 60,00 | 37,23 | 572,76 | 192,65 | 4,5773 | K |
| T-18913R | | | | 0,35 | 8,00 | 11,70 | 2,25 | B | 90 | 60,00 | 37,23 | 572,76 | 192,65 | 4,5773 | K |
| T-18914L | | | | 0,35 | 8,00 | 11,70 | 2,50 | C | 180 | 60,00 | 41,37 | 572,76 | 187,84 | 4,8183 | K |
| T-18914R | | | | 0,35 | 8,00 | 11,70 | 2,50 | C | 180 | 60,00 | 41,37 | 572,76 | 187,84 | 4,8183 | K |
| T-18915L | | | | 0,35 | 8,00 | 11,70 | 2,75 | D | 270 | 60,00 | 45,50 | 572,76 | 183,59 | 5,0593 | K |
| T-18915R | | | | 0,35 | 8,00 | 11,70 | 2,75 | D | 270 | 60,00 | 45,55 | 572,76 | 183,54 | 5,0622 | K |
| T-18916L | | | | 0,35 | 8,00 | 11,70 | 3,00 | A | 0 | 60,00 | 49,64 | 572,76 | 179,80 | 5,3003 | K |
| T-18916R | | | | 0,35 | 8,00 | 11,70 | 3,00 | A | 0 | 60,00 | 49,64 | 572,76 | 179,80 | 5,3003 | K |
| T-18917L | | | | 0,35 | 8,00 | 11,70 | 3,25 | B | 90 | 60,00 | 53,78 | 572,76 | 176,38 | 5,5413 | K |
| T-18917R | | | | 0,35 | 8,00 | 11,70 | 3,25 | B | 90 | 60,00 | 53,78 | 572,76 | 176,38 | 5,5413 | K |
| T-18918L | | | | 0,35 | 8,00 | 11,70 | 3,50 | C | 180 | 60,00 | 57,91 | 572,76 | 173,27 | 5,7824 | K |
| T-18918R | | | | 0,35 | 8,00 | 11,70 | 3,50 | C | 180 | 60,00 | 57,91 | 572,76 | 173,27 | 5,7824 | K |
| T-18919L | | | | 0,35 | 8,00 | 11,70 | 3,75 | D | 270 | 60,00 | 62,05 | 572,76 | 170,42 | 6,0234 | K |
| T-18919R | | | | 0,35 | 8,00 | 11,70 | 3,75 | D | 270 | 60,00 | 62,05 | 572,76 | 170,42 | 6,0234 | K |
| T-18920L | | | | 0,35 | 8,00 | 11,70 | 4,00 | A | 0 | 60,00 | 66,19 | 572,76 | 167,80 | 6,2644 | K |
| T-18920R | | | | 0,35 | 8,00 | 11,70 | 4,00 | A | 0 | 60,00 | 66,19 | 572,76 | 167,80 | 6,2644 | K |
| T-18921L | | | | 0,35 | 8,00 | 11,70 | 5,25 | B | 90 | 60,00 | 86,87 | 572,76 | 157,20 | 7,4695 | K |
| T-18921R | 0,35 | 8,00 | 11,70 | 5,25 | B | 90 | 60,00 | 86,87 | 572,76 | 157,20 | 7,4695 | K | | | |
| T-18922L | 0,35 | 8,00 | 11,70 | 6,50 | C | 180 | 60,00 | 107,55 | 572,76 | 149,35 | 8,6746 | K | | | |
| T-18922R | 0,35 | 8,00 | 11,70 | 6,50 | C | 180 | 60,00 | 107,55 | 572,76 | 149,35 | 8,6746 | K | | | |
| T-18923L | 0,35 | 8,00 | 11,70 | 7,75 | D | 270 | 60,00 | 128,24 | 572,76 | 143,17 | 9,8797 | K | | | |
| T-18923R | 0,35 | 8,00 | 11,70 | 7,75 | D | 270 | 60,00 | 128,24 | 572,76 | 143,17 | 9,8797 | K | | | |
| T-18924L | 16,00 | 10,00 | 0,40 | 10,00 | 13,80 | 2,00 | A | 0 | 60,00 | 39,07 | 581,21 | 183,73 | 4,6513 | K | |
| T-18924R | | | 0,40 | 10,00 | 13,80 | 2,00 | A | 0 | 60,00 | 39,07 | 581,21 | 183,73 | 4,6513 | K | |
| T-18925L | | | 0,40 | 10,00 | 13,80 | 2,25 | B | 90 | 60,00 | 43,95 | 581,21 | 178,61 | 4,9317 | K | |
| T-18925R | | | 0,40 | 10,00 | 13,80 | 2,25 | B | 90 | 60,00 | 43,95 | 581,21 | 178,61 | 4,9317 | K | |
| T-18926L | | | 0,40 | 10,00 | 13,80 | 2,50 | C | 180 | 60,00 | 48,84 | 581,21 | 174,15 | 5,2121 | K | |
| T-18926R | | | 0,40 | 10,00 | 13,80 | 2,50 | C | 180 | 60,00 | 48,84 | 581,21 | 174,15 | 5,2121 | K | |
| T-18927L | | | 0,40 | 10,00 | 13,80 | 2,75 | D | 270 | 60,00 | 53,72 | 581,21 | 170,21 | 5,4925 | K | |
| T-18927R | | | 0,40 | 10,00 | 13,80 | 2,75 | D | 270 | 60,00 | 53,78 | 581,21 | 170,17 | 5,4959 | K | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | αn maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|--------------------------------|---------------------|--------------------------------------|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18928L | 1,80 | 16,00 | 0,40 | 10,00 | 13,80 | 3,00 | A | 0 | 60,00 | 58,60 | 581,21 | 166,69 | 5,7729 | K | | |
| T-18928R | | | 0,40 | 10,00 | 13,80 | 3,00 | A | 0 | 60,00 | 58,60 | 581,21 | 166,69 | 5,7729 | K | | |
| T-18929L | | | 0,40 | 10,00 | 13,80 | 3,25 | B | 90 | 60,00 | 63,49 | 581,21 | 163,52 | 6,0533 | K | | |
| T-18929R | | | 0,40 | 10,00 | 13,80 | 3,25 | B | 90 | 60,00 | 63,49 | 581,21 | 163,52 | 6,0533 | K | | |
| T-18930L | | | 0,40 | 10,00 | 13,80 | 3,50 | C | 180 | 60,00 | 68,37 | 581,21 | 160,64 | 6,3337 | K | | |
| T-18930R | | | 0,40 | 10,00 | 13,80 | 3,50 | C | 180 | 60,00 | 68,37 | 581,21 | 160,64 | 6,3337 | K | | |
| T-18931L | | | 0,40 | 10,00 | 13,80 | 3,75 | D | 270 | 60,00 | 73,25 | 581,21 | 158,00 | 6,6141 | K | | |
| T-18931R | | | 0,40 | 10,00 | 13,80 | 3,75 | D | 270 | 60,00 | 73,25 | 581,21 | 158,00 | 6,6141 | K | | |
| T-18932L | | | 0,40 | 10,00 | 13,80 | 4,00 | A | 0 | 60,00 | 78,14 | 581,21 | 155,57 | 6,8945 | K | | |
| T-18932R | | | 0,40 | 10,00 | 13,80 | 4,00 | A | 0 | 60,00 | 78,14 | 581,21 | 155,57 | 6,8945 | K | | |
| T-18933L | | | 0,40 | 10,00 | 13,80 | 5,25 | B | 90 | 60,00 | 102,56 | 581,21 | 145,74 | 8,2965 | K | | |
| T-18933R | | | 0,40 | 10,00 | 13,80 | 5,25 | B | 90 | 60,00 | 102,56 | 581,21 | 145,74 | 8,2965 | K | | |
| T-18934L | | | 0,40 | 10,00 | 13,80 | 6,50 | C | 180 | 60,00 | 126,97 | 581,21 | 138,46 | 9,6985 | K | | |
| T-18934R | | | 0,40 | 10,00 | 13,80 | 6,50 | C | 180 | 60,00 | 126,97 | 581,21 | 138,46 | 9,6985 | K | | |
| T-18935L | | | 0,40 | 10,00 | 13,80 | 7,75 | D | 270 | 60,00 | 151,39 | 581,21 | 132,74 | 11,1006 | K | | |
| T-18935R | | | 0,40 | 10,00 | 13,80 | 7,75 | D | 270 | 60,00 | 151,39 | 581,21 | 132,74 | 11,1006 | K | | |
| T-18936L | | | 20,50 | 20,50 | 0,50 | 12,00 | 17,40 | 2,00 | A | 0 | 60,00 | 49,83 | 591,67 | 164,15 | 5,2184 | K |
| T-18936R | | | | | 0,50 | 12,00 | 17,40 | 2,00 | A | 0 | 60,00 | 49,83 | 591,67 | 164,15 | 5,2184 | K |
| T-18937L | | | | | 0,50 | 12,00 | 17,40 | 2,25 | B | 90 | 60,00 | 56,06 | 591,67 | 159,57 | 5,5697 | K |
| T-18937R | | | | | 0,50 | 12,00 | 17,40 | 2,25 | B | 90 | 60,00 | 56,06 | 591,67 | 159,57 | 5,5697 | K |
| T-18938L | 0,50 | 12,00 | | | 17,40 | 2,50 | C | 180 | 60,00 | 62,28 | 591,67 | 155,59 | 5,9210 | K | | |
| T-18938R | 0,50 | 12,00 | | | 17,40 | 2,50 | C | 180 | 60,00 | 62,28 | 591,67 | 155,59 | 5,9210 | K | | |
| T-18939L | 0,50 | 12,00 | | | 17,40 | 2,75 | D | 270 | 60,00 | 68,51 | 591,67 | 152,07 | 6,2723 | K | | |
| T-18939R | 0,50 | 12,00 | | | 17,40 | 2,75 | D | 270 | 60,00 | 68,59 | 591,67 | 152,03 | 6,2765 | K | | |
| T-18940L | 0,50 | 12,00 | | | 17,40 | 3,00 | A | 0 | 60,00 | 74,74 | 591,67 | 148,93 | 6,6236 | K | | |
| T-18940R | 0,50 | 12,00 | | | 17,40 | 3,00 | A | 0 | 60,00 | 74,74 | 591,67 | 148,93 | 6,6236 | K | | |
| T-18941L | 0,50 | 12,00 | | | 17,40 | 3,25 | B | 90 | 60,00 | 80,97 | 591,67 | 146,09 | 6,9749 | K | | |
| T-18941R | 0,50 | 12,00 | | | 17,40 | 3,25 | B | 90 | 60,00 | 80,97 | 591,67 | 146,09 | 6,9749 | K | | |
| T-18942L | 0,50 | 12,00 | | | 17,40 | 3,50 | C | 180 | 60,00 | 87,20 | 591,67 | 143,52 | 7,3262 | K | | |
| T-18942R | 0,50 | 12,00 | | | 17,40 | 3,50 | C | 180 | 60,00 | 87,20 | 591,67 | 143,52 | 7,3262 | K | | |
| T-18943L | 0,50 | 12,00 | | | 17,40 | 3,75 | D | 270 | 60,00 | 93,43 | 591,67 | 141,16 | 7,6774 | K | | |
| T-18943R | 0,50 | 12,00 | | | 17,40 | 3,75 | D | 270 | 60,00 | 93,43 | 591,67 | 141,16 | 7,6774 | K | | |
| T-18944L | 0,50 | 12,00 | | | 17,40 | 4,00 | A | 0 | 60,00 | 99,65 | 591,67 | 138,99 | 8,0287 | K | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-18944R | 1,80 | 20,50 | 0,50 | 12,00 | 17,40 | 4,00 | A | 0 | 60,00 | 99,65 | 591,67 | 138,99 | 8,0287 | K | | |
| T-18945L | | | 0,50 | 12,00 | 17,40 | 5,25 | B | 90 | 60,00 | 130,80 | 591,67 | 130,21 | 9,7852 | K | | |
| T-18945R | | | 0,50 | 12,00 | 17,40 | 5,25 | B | 90 | 60,00 | 130,80 | 591,67 | 130,21 | 9,7852 | K | | |
| T-18946L | | | 0,50 | 12,00 | 17,40 | 6,50 | C | 180 | 60,00 | 161,94 | 591,67 | 123,71 | 11,5416 | K | | |
| T-18946R | | | 0,50 | 12,00 | 17,40 | 6,50 | C | 180 | 60,00 | 161,94 | 591,67 | 123,71 | 11,5416 | K | | |
| T-18947L | | | 0,50 | 12,00 | 17,40 | 7,75 | D | 270 | 60,00 | 193,08 | 591,67 | 118,59 | 13,2981 | K | | |
| T-18947R | | | 0,50 | 12,00 | 17,40 | 7,75 | D | 270 | 60,00 | 193,08 | 591,67 | 118,59 | 13,2981 | K | | |
| T-19100L | | | 2,00 | 11,00 | 0,29 | 8,80 | 9,90 | 2,00 | A | 0 | 65,00 | 25,73 | 798,72 | 310,87 | 5,2433 | K |
| T-19100R | 0,29 | 8,80 | | | 9,90 | 2,00 | A | 0 | 65,00 | 25,73 | 798,72 | 310,87 | 5,2433 | K | | |
| T-19101L | 0,29 | 8,80 | | | 9,90 | 2,25 | B | 90 | 65,00 | 28,97 | 798,72 | 302,20 | 5,4961 | K | | |
| T-19101R | 0,29 | 8,80 | | | 9,90 | 2,25 | B | 90 | 65,00 | 28,97 | 798,72 | 302,20 | 5,4961 | K | | |
| T-19102L | 0,29 | 8,80 | | | 9,90 | 2,50 | C | 180 | 65,00 | 32,21 | 798,72 | 294,65 | 5,7489 | K | | |
| T-19102R | 0,29 | 8,80 | | | 9,90 | 2,50 | C | 180 | 65,00 | 32,21 | 798,72 | 294,65 | 5,7489 | K | | |
| T-19103L | 0,29 | 8,80 | | | 9,90 | 2,75 | D | 270 | 65,00 | 35,45 | 798,72 | 287,99 | 6,0018 | K | | |
| T-19103R | 0,29 | 8,80 | | | 9,90 | 2,75 | D | 270 | 65,00 | 35,45 | 798,72 | 287,99 | 6,0018 | K | | |
| T-19104L | 0,29 | 8,80 | | | 9,90 | 3,00 | A | 0 | 65,00 | 38,60 | 798,72 | 282,04 | 6,2546 | K | | |
| T-19104R | 0,29 | 8,80 | | | 9,90 | 3,00 | A | 0 | 65,00 | 38,60 | 798,72 | 282,04 | 6,2546 | K | | |
| T-19105L | 0,29 | 8,80 | | | 9,90 | 3,25 | B | 90 | 65,00 | 41,83 | 798,72 | 276,67 | 6,5074 | K | | |
| T-19105R | 0,29 | 8,80 | | | 9,90 | 3,25 | B | 90 | 65,00 | 41,83 | 798,72 | 276,67 | 6,5074 | K | | |
| T-19106L | 0,29 | 8,80 | | | 9,90 | 3,50 | C | 180 | 65,00 | 45,07 | 798,72 | 271,80 | 6,7602 | K | | |
| T-19106R | 0,29 | 8,80 | | | 9,90 | 3,50 | C | 180 | 65,00 | 45,07 | 798,72 | 271,80 | 6,7602 | K | | |
| T-19107L | 0,29 | 8,80 | | | 9,90 | 3,75 | D | 270 | 65,00 | 48,31 | 798,72 | 267,33 | 7,0131 | K | | |
| T-19107R | 0,29 | 8,80 | | | 9,90 | 3,75 | D | 270 | 65,00 | 48,31 | 798,72 | 267,33 | 7,0131 | K | | |
| T-19108L | 0,29 | 8,80 | | | 9,90 | 4,00 | A | 0 | 65,00 | 51,55 | 798,72 | 263,22 | 7,2659 | K | | |
| T-19108R | 0,29 | 8,80 | | | 9,90 | 4,00 | A | 0 | 65,00 | 51,55 | 798,72 | 263,22 | 7,2659 | K | | |
| T-19109L | 0,29 | 8,80 | | | 9,90 | 5,25 | B | 90 | 65,00 | 67,65 | 798,72 | 246,59 | 8,5300 | K | | |
| T-19109R | 0,29 | 8,80 | | | 9,90 | 5,25 | B | 90 | 65,00 | 67,65 | 798,72 | 246,59 | 8,5300 | K | | |
| T-19110L | 0,29 | 8,80 | | | 9,90 | 6,50 | C | 180 | 65,00 | 83,67 | 798,72 | 234,27 | 9,7941 | K | | |
| T-19110R | 0,29 | 8,80 | | | 9,90 | 6,50 | C | 180 | 65,00 | 83,67 | 798,72 | 234,27 | 9,7941 | K | | |
| T-19111L | 0,29 | 8,80 | | | 9,90 | 7,75 | D | 270 | 65,00 | 99,77 | 798,72 | 224,59 | 11,0583 | K | | |
| T-19111R | 0,29 | 8,80 | | | 9,90 | 7,75 | D | 270 | 65,00 | 99,77 | 798,72 | 224,59 | 11,0583 | K | | |
| T-19125L | 15,00 | 15,00 | | | 0,38 | 12,00 | 13,50 | 2,00 | A | 0 | 65,00 | 34,82 | 825,31 | 271,84 | 5,8656 | K |
| T-19125R | | | | | 0,38 | 12,00 | 13,50 | 2,00 | A | 0 | 65,00 | 34,82 | 825,31 | 271,84 | 5,8656 | K |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-19126L | 2,00 | 15,00 | 0,38 | 12,00 | 13,50 | 2,25 | B | 90 | 65,00 | 39,16 | 825,31 | 264,27 | 6,1963 | K | | |
| T-19126R | | | 0,38 | 12,00 | 13,50 | 2,25 | B | 90 | 65,00 | 39,16 | 825,31 | 264,27 | 6,1963 | K | | |
| T-19127L | | | 0,38 | 12,00 | 13,50 | 2,50 | C | 180 | 65,00 | 43,50 | 825,31 | 257,67 | 6,5269 | K | | |
| T-19127R | | | 0,38 | 12,00 | 13,50 | 2,50 | C | 180 | 65,00 | 43,50 | 825,31 | 257,67 | 6,5269 | K | | |
| T-19128L | | | 0,38 | 12,00 | 13,50 | 2,75 | D | 270 | 65,00 | 47,84 | 825,31 | 251,84 | 6,8575 | K | | |
| T-19128R | | | 0,38 | 12,00 | 13,50 | 2,75 | D | 270 | 65,00 | 47,84 | 825,31 | 251,84 | 6,8575 | K | | |
| T-19129L | | | 0,38 | 12,00 | 13,50 | 3,00 | A | 0 | 65,00 | 52,18 | 825,31 | 246,64 | 7,1881 | K | | |
| T-19129R | | | 0,38 | 12,00 | 13,50 | 3,00 | A | 0 | 65,00 | 52,18 | 825,31 | 246,64 | 7,1881 | K | | |
| T-19130L | | | 0,38 | 12,00 | 13,50 | 3,25 | B | 90 | 65,00 | 56,52 | 825,31 | 241,94 | 7,5187 | K | | |
| T-19130R | | | 0,38 | 12,00 | 13,50 | 3,25 | B | 90 | 65,00 | 56,52 | 825,31 | 241,94 | 7,5187 | K | | |
| T-19131L | | | 0,38 | 12,00 | 13,50 | 3,50 | C | 180 | 65,00 | 60,86 | 825,31 | 237,68 | 7,8493 | K | | |
| T-19131R | | | 0,38 | 12,00 | 13,50 | 3,50 | C | 180 | 65,00 | 60,86 | 825,31 | 237,68 | 7,8493 | K | | |
| T-19132L | | | 0,38 | 12,00 | 13,50 | 3,75 | D | 270 | 65,00 | 65,20 | 825,31 | 233,78 | 8,1800 | K | | |
| T-19132R | | | 0,38 | 12,00 | 13,50 | 3,75 | D | 270 | 65,00 | 65,20 | 825,31 | 233,78 | 8,1800 | K | | |
| T-19133L | | | 0,38 | 12,00 | 13,50 | 4,00 | A | 0 | 65,00 | 69,54 | 825,31 | 230,18 | 8,5106 | K | | |
| T-19133R | | | 0,38 | 12,00 | 13,50 | 4,00 | A | 0 | 65,00 | 69,54 | 825,31 | 230,18 | 8,5106 | K | | |
| T-19134L | | | 0,38 | 12,00 | 13,50 | 5,25 | B | 90 | 65,00 | 91,34 | 825,31 | 215,64 | 10,1637 | K | | |
| T-19134R | | | 0,38 | 12,00 | 13,50 | 5,25 | B | 90 | 65,00 | 91,34 | 825,31 | 215,64 | 10,1637 | K | | |
| T-19135L | | | 0,38 | 12,00 | 13,50 | 6,50 | C | 180 | 65,00 | 113,04 | 825,31 | 204,86 | 11,8167 | K | | |
| T-19135R | | | 0,38 | 12,00 | 13,50 | 6,50 | C | 180 | 65,00 | 113,04 | 825,31 | 204,86 | 11,8167 | K | | |
| T-19136L | | | 0,38 | 12,00 | 13,50 | 7,75 | D | 270 | 65,00 | 134,83 | 825,31 | 196,40 | 13,4698 | K | | |
| T-19136R | | | 0,38 | 12,00 | 13,50 | 7,75 | D | 270 | 65,00 | 134,83 | 825,31 | 196,40 | 13,4698 | K | | |
| T-19150L | | | 18,00 | 18,00 | 0,44 | 14,40 | 16,20 | 2,00 | A | 0 | 70,00 | 41,52 | 838,31 | 250,63 | 6,5801 | K |
| T-19150R | | | | | 0,44 | 14,40 | 16,20 | 2,00 | A | 0 | 70,00 | 41,52 | 838,31 | 250,63 | 6,5801 | K |
| T-19151L | | | | | 0,44 | 14,40 | 16,20 | 2,25 | B | 90 | 70,00 | 46,76 | 838,31 | 243,64 | 6,9691 | K |
| T-19151R | | | | | 0,44 | 14,40 | 16,20 | 2,25 | B | 90 | 70,00 | 46,76 | 838,31 | 243,64 | 6,9691 | K |
| T-19152L | | | | | 0,44 | 14,40 | 16,20 | 2,50 | C | 180 | 70,00 | 51,99 | 838,31 | 237,56 | 7,3581 | K |
| T-19152R | | | | | 0,44 | 14,40 | 16,20 | 2,50 | C | 180 | 70,00 | 51,99 | 838,31 | 237,56 | 7,3581 | K |
| T-19153L | | | | | 0,44 | 14,40 | 16,20 | 2,75 | D | 270 | 70,00 | 57,14 | 838,31 | 232,19 | 7,7470 | K |
| T-19153R | | | | | 0,44 | 14,40 | 16,20 | 2,75 | D | 270 | 70,00 | 57,14 | 838,31 | 232,19 | 7,7470 | K |
| T-19154L | | | | | 0,44 | 14,40 | 16,20 | 3,00 | A | 0 | 70,00 | 62,37 | 838,31 | 227,39 | 8,1360 | K |
| T-19154R | | | | | 0,44 | 14,40 | 16,20 | 3,00 | A | 0 | 70,00 | 62,37 | 838,31 | 227,39 | 8,1360 | K |
| T-19155L | | | | | 0,44 | 14,40 | 16,20 | 3,25 | B | 90 | 70,00 | 67,51 | 838,31 | 223,06 | 8,5249 | K |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|
| T-19155R | 2,00 | 18,00 | 0,44 | 14,40 | 16,20 | 3,25 | B | 90 | 70,00 | 67,51 | 838,31 | 223,06 | 8,5249 | K | |
| T-19156L | | | 0,44 | 14,40 | 16,20 | 3,50 | C | 180 | 70,00 | 72,75 | 838,31 | 219,13 | 8,9139 | K | |
| T-19156R | | | 0,44 | 14,40 | 16,20 | 3,50 | C | 180 | 70,00 | 72,75 | 838,31 | 219,13 | 8,9139 | K | |
| T-19157L | | | 0,44 | 14,40 | 16,20 | 3,75 | D | 270 | 70,00 | 77,89 | 838,31 | 215,53 | 9,3029 | K | |
| T-19157R | | | 0,44 | 14,40 | 16,20 | 3,75 | D | 270 | 70,00 | 77,89 | 838,31 | 215,53 | 9,3029 | K | |
| T-19158L | | | 0,44 | 14,40 | 16,20 | 4,00 | A | 0 | 70,00 | 83,13 | 838,31 | 212,22 | 9,6918 | K | |
| T-19158R | | | 0,44 | 14,40 | 16,20 | 4,00 | A | 0 | 70,00 | 83,13 | 838,31 | 212,22 | 9,6918 | K | |
| T-19159L | | | 0,44 | 14,40 | 16,20 | 5,25 | B | 90 | 70,00 | 109,13 | 838,31 | 198,81 | 11,6366 | K | |
| T-19159R | | | 0,44 | 14,40 | 16,20 | 5,25 | B | 90 | 70,00 | 109,13 | 838,31 | 198,81 | 11,6366 | K | |
| T-19160L | | | 0,44 | 14,40 | 16,20 | 6,50 | C | 180 | 70,00 | 135,12 | 838,31 | 188,88 | 13,5814 | K | |
| T-19160R | | | 0,44 | 14,40 | 16,20 | 6,50 | C | 180 | 70,00 | 135,12 | 838,31 | 188,88 | 13,5814 | K | |
| T-19161L | | | 0,44 | 14,40 | 16,20 | 7,75 | D | 270 | 70,00 | 161,03 | 838,31 | 181,07 | 15,5262 | K | |
| T-19161R | | | 0,44 | 14,40 | 16,20 | 7,75 | D | 270 | 70,00 | 161,03 | 838,31 | 181,07 | 15,5262 | K | |
| T-19175L | | | 23,00 | 23,00 | 0,56 | 18,40 | 20,70 | 2,00 | A | 0 | 70,00 | 52,81 | 853,09 | 224,17 | 7,3581 |
| T-19175R | | 0,56 | | | 18,40 | 20,70 | 2,00 | A | 0 | 70,00 | 52,81 | 853,09 | 224,17 | 7,3581 | K |
| T-19176L | | 0,56 | | | 18,40 | 20,70 | 2,25 | B | 90 | 70,00 | 59,45 | 853,09 | 217,92 | 7,8443 | K |
| T-19176R | | 0,56 | | | 18,40 | 20,70 | 2,25 | B | 90 | 70,00 | 59,45 | 853,09 | 217,92 | 7,8443 | K |
| T-19177L | | 0,56 | | | 18,40 | 20,70 | 2,50 | C | 180 | 70,00 | 66,09 | 853,09 | 212,48 | 8,3305 | K |
| T-19177R | | 0,56 | | | 18,40 | 20,70 | 2,50 | C | 180 | 70,00 | 66,09 | 853,09 | 212,48 | 8,3305 | K |
| T-19178L | | 0,56 | | | 18,40 | 20,70 | 2,75 | D | 270 | 70,00 | 72,72 | 853,09 | 207,67 | 8,8167 | K |
| T-19178R | | 0,56 | | | 18,40 | 20,70 | 2,75 | D | 270 | 70,00 | 72,72 | 853,09 | 207,67 | 8,8167 | K |
| T-19179L | | 0,56 | | | 18,40 | 20,70 | 3,00 | A | 0 | 70,00 | 79,27 | 853,09 | 203,38 | 9,3029 | K |
| T-19179R | | 0,56 | | | 18,40 | 20,70 | 3,00 | A | 0 | 70,00 | 79,27 | 853,09 | 203,38 | 9,3029 | K |
| T-19180L | | 0,56 | | | 18,40 | 20,70 | 3,25 | B | 90 | 70,00 | 85,90 | 853,09 | 199,51 | 9,7891 | K |
| T-19180R | 0,56 | 18,40 | | | 20,70 | 3,25 | B | 90 | 70,00 | 85,90 | 853,09 | 199,51 | 9,7891 | K | |
| T-19181L | 0,56 | 18,40 | | | 20,70 | 3,50 | C | 180 | 70,00 | 92,54 | 853,09 | 195,99 | 10,2753 | K | |
| T-19181R | 0,56 | 18,40 | | | 20,70 | 3,50 | C | 180 | 70,00 | 92,54 | 853,09 | 195,99 | 10,2753 | K | |
| T-19182L | 0,56 | 18,40 | | | 20,70 | 3,75 | D | 270 | 70,00 | 99,09 | 853,09 | 192,78 | 10,7615 | K | |
| T-19182R | 0,56 | 18,40 | | | 20,70 | 3,75 | D | 270 | 70,00 | 99,09 | 853,09 | 192,78 | 10,7615 | K | |
| T-19183L | 0,56 | 18,40 | | | 20,70 | 4,00 | A | 0 | 70,00 | 105,72 | 853,09 | 189,81 | 11,2477 | K | |
| T-19183R | 0,56 | 18,40 | | | 20,70 | 4,00 | A | 0 | 70,00 | 105,72 | 853,09 | 189,81 | 11,2477 | K | |
| T-19184L | 0,56 | 18,40 | | | 20,70 | 5,25 | B | 90 | 70,00 | 138,72 | 853,09 | 177,82 | 13,6787 | K | |
| T-19184R | 0,56 | 18,40 | | | 20,70 | 5,25 | B | 90 | 70,00 | 138,72 | 853,09 | 177,82 | 13,6787 | K | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-19185L | 2,00 | 23,00 | 0,56 | 18,40 | 20,70 | 6,50 | C | 180 | 70,00 | 171,81 | 853,09 | 168,94 | 16,1097 | K | | |
| T-19185R | | | 0,56 | 18,40 | 20,70 | 6,50 | C | 180 | 70,00 | 171,81 | 853,09 | 168,94 | 16,1097 | K | | |
| T-19186L | | | 0,56 | 18,40 | 20,70 | 7,75 | D | 270 | 70,00 | 204,81 | 853,09 | 161,95 | 17,0542 | K | | |
| T-19186R | | | 0,56 | 18,40 | 20,70 | 7,75 | D | 270 | 70,00 | 204,81 | 853,09 | 161,95 | 17,0542 | K | | |
| T-16800L | 2,25 | 11,50 | 0,30 | 6,50 | 10,10 | 2,00 | A | 0 | 70,00 | 22,15 | 1041,37 | 456,48 | 7,0973 | L | | |
| T-16800R | | | 0,30 | 6,50 | 10,10 | 2,00 | A | 0 | 70,00 | 22,15 | 1041,37 | 456,48 | 7,0973 | L | | |
| T-16801L | | | 0,30 | 6,50 | 10,10 | 2,25 | B | 90 | 70,00 | 24,92 | 1041,37 | 443,76 | 7,4357 | L | | |
| T-16801R | | | 0,30 | 6,50 | 10,10 | 2,25 | B | 90 | 70,00 | 24,92 | 1041,37 | 443,76 | 7,4357 | L | | |
| T-16802L | | | 0,30 | 6,50 | 10,10 | 2,50 | C | 180 | 70,00 | 27,69 | 1041,37 | 432,68 | 7,7742 | L | | |
| T-16802R | | | 0,30 | 6,50 | 10,10 | 2,50 | C | 180 | 70,00 | 27,69 | 1041,37 | 432,68 | 7,7742 | L | | |
| T-16803L | | | 0,30 | 6,50 | 10,10 | 2,75 | D | 270 | 70,00 | 30,45 | 1041,37 | 422,90 | 8,1126 | L | | |
| T-16803R | | | 0,30 | 6,50 | 10,10 | 2,75 | D | 270 | 70,00 | 30,45 | 1041,37 | 422,90 | 8,1126 | L | | |
| T-16804L | | | 0,30 | 6,50 | 10,10 | 3,00 | A | 0 | 70,00 | 33,22 | 1041,37 | 414,16 | 8,4511 | L | | |
| T-16804R | | | 0,30 | 6,50 | 10,10 | 3,00 | A | 0 | 70,00 | 33,22 | 1041,37 | 414,16 | 8,4511 | L | | |
| T-16805L | | | 0,30 | 6,50 | 10,10 | 3,25 | B | 90 | 70,00 | 35,99 | 1041,37 | 406,28 | 8,7895 | L | | |
| T-16805R | | | 0,30 | 6,50 | 10,10 | 3,25 | B | 90 | 70,00 | 35,99 | 1041,37 | 406,28 | 8,7895 | L | | |
| T-16806L | | | 0,30 | 6,50 | 10,10 | 4,50 | C | 180 | 70,00 | 49,83 | 1041,37 | 375,75 | 10,4817 | L | | |
| T-16806R | | | 0,30 | 6,50 | 10,10 | 4,50 | C | 180 | 70,00 | 49,83 | 1041,37 | 375,75 | 10,4817 | L | | |
| T-16807L | | | 0,30 | 6,50 | 10,10 | 5,75 | D | 270 | 70,00 | 63,68 | 1041,37 | 354,29 | 12,1739 | L | | |
| T-16807R | | | 0,30 | 6,50 | 10,10 | 5,75 | D | 270 | 70,00 | 63,68 | 1041,37 | 354,29 | 12,1739 | L | | |
| T-16808L | | | 0,30 | 6,50 | 10,10 | 7,00 | A | 0 | 70,00 | 77,52 | 1041,37 | 337,95 | 13,8661 | L | | |
| T-16808R | | | 0,30 | 6,50 | 10,10 | 7,00 | A | 0 | 70,00 | 77,52 | 1041,37 | 337,95 | 13,8661 | L | | |
| T-16809L | | | 0,30 | 6,50 | 10,10 | 8,25 | B | 90 | 70,00 | 91,36 | 1041,37 | 324,88 | 15,5583 | L | | |
| T-16809R | | | 0,30 | 6,50 | 10,10 | 8,25 | B | 90 | 70,00 | 91,36 | 1041,37 | 324,88 | 15,5583 | L | | |
| T-16810L | | | 15,50 | 15,50 | 0,40 | 8,00 | 13,50 | 2,00 | A | 0 | 70,00 | 29,57 | 1076,95 | 401,77 | 7,8849 | L |
| T-16810R | | | | | 0,40 | 8,00 | 13,50 | 2,00 | A | 0 | 70,00 | 29,57 | 1076,95 | 401,77 | 7,8849 | L |
| T-16811L | | | | | 0,40 | 8,00 | 13,50 | 2,25 | B | 90 | 70,00 | 33,26 | 1076,95 | 390,57 | 8,3218 | L |
| T-16811R | | | | | 0,40 | 8,00 | 13,50 | 2,25 | B | 90 | 70,00 | 33,26 | 1076,95 | 390,57 | 8,3218 | L |
| T-16812L | | | | | 0,40 | 8,00 | 13,50 | 2,50 | C | 180 | 70,00 | 36,96 | 1076,95 | 380,82 | 8,7587 | L |
| T-16812R | | | | | 0,40 | 8,00 | 13,50 | 2,50 | C | 180 | 70,00 | 36,96 | 1076,95 | 380,82 | 8,7587 | L |
| T-16813L | | | | | 0,40 | 8,00 | 13,50 | 2,75 | D | 270 | 70,00 | 40,66 | 1076,95 | 372,21 | 9,1956 | L |
| T-16813R | | | | | 0,40 | 8,00 | 13,50 | 2,75 | D | 270 | 70,00 | 40,66 | 1076,95 | 372,21 | 9,1956 | L |
| T-16814L | | | | | 0,40 | 8,00 | 13,50 | 3,00 | A | 0 | 70,00 | 44,35 | 1076,95 | 364,52 | 9,6325 | L |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|
| T-16814R | 2,25 | 15,50 | 0,40 | 8,00 | 13,50 | 3,00 | A | 0 | 70,00 | 44,35 | 1076,95 | 364,52 | 9,6325 | L | |
| T-16815L | | | 0,40 | 8,00 | 13,50 | 3,25 | B | 90 | 70,00 | 48,05 | 1076,95 | 357,58 | 10,0694 | L | |
| T-16815R | | | 0,40 | 8,00 | 13,50 | 3,25 | B | 90 | 70,00 | 48,05 | 1076,95 | 357,58 | 10,0694 | L | |
| T-16816L | | | 0,40 | 8,00 | 13,50 | 4,50 | C | 180 | 70,00 | 66,53 | 1076,95 | 330,72 | 12,2539 | L | |
| T-16816R | | | 0,40 | 8,00 | 13,50 | 4,50 | C | 180 | 70,00 | 66,53 | 1076,95 | 330,72 | 12,2539 | L | |
| T-16817L | | | 0,40 | 8,00 | 13,50 | 5,75 | D | 270 | 70,00 | 85,01 | 1076,95 | 311,82 | 14,4384 | L | |
| T-16817R | | | 0,40 | 8,00 | 13,50 | 5,75 | D | 270 | 70,00 | 85,01 | 1076,95 | 311,82 | 14,4384 | L | |
| T-16818L | | | 0,40 | 8,00 | 13,50 | 7,00 | A | 0 | 70,00 | 103,49 | 1076,95 | 297,44 | 16,6229 | L | |
| T-16818R | | | 0,40 | 8,00 | 13,50 | 7,00 | A | 0 | 70,00 | 103,49 | 1076,95 | 297,44 | 16,6229 | L | |
| T-16819L | | | 0,40 | 8,00 | 13,50 | 8,25 | B | 90 | 70,00 | 121,97 | 1076,95 | 285,94 | 18,8074 | L | |
| T-16819R | | | 0,40 | 8,00 | 13,50 | 8,25 | B | 90 | 70,00 | 121,97 | 1076,95 | 285,94 | 18,8074 | L | |
| T-16820L | | | 18,50 | 18,50 | 0,45 | 11,00 | 16,00 | 2,00 | A | 0 | 70,00 | 35,14 | 1094,70 | 371,59 | 8,4757 |
| T-16820R | | 0,45 | | | 11,00 | 16,00 | 2,00 | A | 0 | 70,00 | 35,14 | 1094,70 | 371,59 | 8,4757 | L |
| T-16821L | | 0,45 | | | 11,00 | 16,00 | 2,25 | B | 90 | 70,00 | 39,53 | 1094,70 | 361,24 | 8,9864 | L |
| T-16821R | | 0,45 | | | 11,00 | 16,00 | 2,25 | B | 90 | 70,00 | 39,53 | 1094,70 | 361,24 | 8,9864 | L |
| T-16822L | | 0,45 | | | 11,00 | 16,00 | 2,50 | C | 180 | 70,00 | 43,92 | 1094,70 | 352,22 | 9,4971 | L |
| T-16822R | | 0,45 | | | 11,00 | 16,00 | 2,50 | C | 180 | 70,00 | 43,92 | 1094,70 | 352,22 | 9,4971 | L |
| T-16823L | | 0,45 | | | 11,00 | 16,00 | 2,75 | D | 270 | 70,00 | 48,31 | 1094,70 | 344,25 | 10,0079 | L |
| T-16823R | | 0,45 | | | 11,00 | 16,00 | 2,75 | D | 270 | 70,00 | 48,31 | 1094,70 | 344,25 | 10,0079 | L |
| T-16824L | | 0,45 | | | 11,00 | 16,00 | 3,00 | A | 0 | 70,00 | 52,70 | 1094,70 | 337,14 | 10,5186 | L |
| T-16824R | 0,45 | 11,00 | | | 16,00 | 3,00 | A | 0 | 70,00 | 52,70 | 1094,70 | 337,14 | 10,5186 | L | |
| T-16825L | 0,45 | 11,00 | | | 16,00 | 3,25 | B | 90 | 70,00 | 57,10 | 1094,70 | 330,72 | 11,0294 | L | |
| T-16825R | 0,45 | 11,00 | | | 16,00 | 3,25 | B | 90 | 70,00 | 57,10 | 1094,70 | 330,72 | 11,0294 | L | |
| T-16826L | 0,45 | 11,00 | | | 16,00 | 4,50 | C | 180 | 70,00 | 79,06 | 1094,70 | 305,88 | 13,5831 | L | |
| T-16826R | 0,45 | 11,00 | | | 16,00 | 4,50 | C | 180 | 70,00 | 79,06 | 1094,70 | 305,88 | 13,5831 | L | |
| T-16827L | 0,45 | 11,00 | | | 16,00 | 5,75 | D | 270 | 70,00 | 101,02 | 1094,70 | 288,40 | 16,1368 | L | |
| T-16827R | 0,45 | 11,00 | | | 16,00 | 5,75 | D | 270 | 70,00 | 101,02 | 1094,70 | 288,40 | 16,1368 | L | |
| T-16828L | 0,45 | 11,00 | | | 16,00 | 7,00 | A | 0 | 70,00 | 122,98 | 1094,70 | 275,10 | 18,6905 | L | |
| T-16828R | 0,45 | 11,00 | | | 16,00 | 7,00 | A | 0 | 70,00 | 122,98 | 1094,70 | 275,10 | 18,6905 | L | |
| T-16829L | 0,45 | 11,00 | | | 16,00 | 8,25 | B | 90 | 70,00 | 144,94 | 1094,70 | 264,46 | 21,2442 | L | |
| T-16829R | 0,45 | 11,00 | | | 16,00 | 8,25 | B | 90 | 70,00 | 144,94 | 1094,70 | 264,46 | 21,2442 | L | |
| T-16830L | 23,50 | 23,50 | 0,55 | 15,00 | 20,10 | 2,00 | A | 0 | 70,00 | 44,42 | 1115,14 | 333,57 | 9,4602 | L | |
| T-16830R | | | 0,55 | 15,00 | 20,10 | 2,00 | A | 0 | 70,00 | 44,42 | 1115,14 | 333,57 | 9,4602 | L | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---|
| T-16831L | 2,25 | 23,50 | 0,55 | 15,00 | 20,10 | 2,25 | B | 90 | 70,00 | 49,97 | 1115,14 | 324,27 | 10,0940 | L | | |
| T-16831R | | | 0,55 | 15,00 | 20,10 | 2,25 | B | 90 | 70,00 | 49,97 | 1115,14 | 324,27 | 10,0940 | L | | |
| T-16832L | | | 0,55 | 15,00 | 20,10 | 2,50 | C | 180 | 70,00 | 55,52 | 1115,14 | 316,18 | 10,7278 | L | | |
| T-16832R | | | 0,55 | 15,00 | 20,10 | 2,50 | C | 180 | 70,00 | 55,52 | 1115,14 | 316,18 | 10,7278 | L | | |
| T-16833L | | | 0,55 | 15,00 | 20,10 | 2,75 | D | 270 | 70,00 | 61,07 | 1115,14 | 309,03 | 11,3617 | L | | |
| T-16833R | | | 0,55 | 15,00 | 20,10 | 2,75 | D | 270 | 70,00 | 61,07 | 1115,14 | 309,03 | 11,3617 | L | | |
| T-16834L | | | 0,55 | 15,00 | 20,10 | 3,00 | A | 0 | 70,00 | 66,63 | 1115,14 | 302,64 | 11,9955 | L | | |
| T-16834R | | | 0,55 | 15,00 | 20,10 | 3,00 | A | 0 | 70,00 | 66,63 | 1115,14 | 302,64 | 11,9955 | L | | |
| T-16835L | | | 0,55 | 15,00 | 20,10 | 3,25 | B | 90 | 70,00 | 72,18 | 1115,14 | 296,88 | 12,6293 | L | | |
| T-16835R | | | 0,55 | 15,00 | 20,10 | 3,25 | B | 90 | 70,00 | 72,18 | 1115,14 | 296,88 | 12,6293 | L | | |
| T-16836L | | | 0,55 | 15,00 | 20,10 | 4,50 | C | 180 | 70,00 | 99,94 | 1115,14 | 274,58 | 15,7983 | L | | |
| T-16836R | | | 0,55 | 15,00 | 20,10 | 4,50 | C | 180 | 70,00 | 99,94 | 1115,14 | 274,58 | 15,7983 | L | | |
| T-16837L | | | 0,55 | 15,00 | 20,10 | 5,75 | D | 270 | 70,00 | 127,70 | 1115,14 | 258,89 | 18,9674 | L | | |
| T-16837R | | | 0,55 | 15,00 | 20,10 | 5,75 | D | 270 | 70,00 | 127,70 | 1115,14 | 258,89 | 18,9674 | L | | |
| T-16838L | | | 0,55 | 15,00 | 20,10 | 7,00 | A | 0 | 70,00 | 155,46 | 1115,14 | 246,95 | 22,1364 | L | | |
| T-16838R | | | 0,55 | 15,00 | 20,10 | 7,00 | A | 0 | 70,00 | 155,46 | 1115,14 | 246,95 | 22,1364 | L | | |
| T-16839L | | | 0,55 | 15,00 | 20,10 | 8,25 | B | 90 | 70,00 | 183,22 | 1115,14 | 237,40 | 25,3055 | L | | |
| T-16839R | | | 0,55 | 15,00 | 20,10 | 8,25 | B | 90 | 70,00 | 183,22 | 1115,14 | 237,40 | 25,3055 | L | | |
| T-19200L | | | 2,50 | 10,00 | 0,27 | 8,00 | 9,00 | 2,00 | A | 0 | 75,00 | 18,11 | 1422,19 | 692,27 | 8,8453 | L |
| T-19200R | | | | | 0,27 | 8,00 | 9,00 | 2,00 | A | 0 | 75,00 | 18,11 | 1422,19 | 692,27 | 8,8453 | L |
| T-19201L | 0,27 | 8,00 | | | 9,00 | 3,25 | B | 90 | 75,00 | 29,34 | 1422,19 | 616,13 | 10,7445 | L | | |
| T-19201R | 0,27 | 8,00 | | | 9,00 | 3,25 | B | 90 | 75,00 | 29,34 | 1422,19 | 616,13 | 10,7445 | L | | |
| T-19202L | 0,27 | 8,00 | | | 9,00 | 4,50 | C | 180 | 75,00 | 40,66 | 1422,19 | 569,84 | 12,6438 | L | | |
| T-19202R | 0,27 | 8,00 | | | 9,00 | 4,50 | C | 180 | 75,00 | 40,66 | 1422,19 | 569,84 | 12,6438 | L | | |
| T-19203L | 0,27 | 8,00 | | | 9,00 | 5,75 | D | 270 | 75,00 | 51,97 | 1422,19 | 537,28 | 14,5430 | L | | |
| T-19203R | 0,27 | 8,00 | | | 9,00 | 5,75 | D | 270 | 75,00 | 51,97 | 1422,19 | 537,28 | 14,5430 | L | | |
| T-19204L | 0,27 | 8,00 | | | 9,00 | 7,00 | A | 0 | 75,00 | 63,29 | 1422,19 | 512,50 | 16,4422 | L | | |
| T-19204R | 0,27 | 8,00 | | | 9,00 | 7,00 | A | 0 | 75,00 | 63,29 | 1422,19 | 512,50 | 16,4422 | L | | |
| T-19205L | 0,27 | 8,00 | | | 9,00 | 8,25 | B | 90 | 75,00 | 74,61 | 1422,19 | 492,69 | 18,3414 | L | | |
| T-19205R | 0,27 | 8,00 | | | 9,00 | 8,25 | B | 90 | 75,00 | 74,61 | 1422,19 | 492,69 | 18,3414 | L | | |
| T-19206L | 0,27 | 8,00 | | | 9,00 | 9,50 | C | 180 | 75,00 | 85,84 | 1422,19 | 476,29 | 20,2407 | L | | |
| T-19206R | 0,27 | 8,00 | | | 9,00 | 9,50 | C | 180 | 75,00 | 85,84 | 1422,19 | 476,29 | 20,2407 | L | | |
| T-19207L | 0,27 | 8,00 | | | 9,00 | 10,75 | D | 270 | 75,00 | 97,15 | 1422,19 | 462,36 | 22,1399 | L | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|--------|---------|---|
| T-19207R | 2,50 | 10,00 | 0,27 | 8,00 | 9,00 | 10,75 | D | 270 | 75,00 | 97,15 | 1422,19 | 462,36 | 22,1399 | L | | | |
| T-19220L | | | 13,50 | 0,34 | 10,80 | 12,10 | 2,00 | A | 0 | 75,00 | 24,10 | 1481,57 | 611,88 | 9,6962 | L | | |
| T-19220R | | | | 0,34 | 10,80 | 12,10 | 2,00 | A | 0 | 75,00 | 24,10 | 1481,57 | 611,88 | 9,6962 | L | | |
| T-19221L | | | | 0,34 | 10,80 | 12,10 | 3,25 | B | 90 | 75,00 | 39,12 | 1481,57 | 544,58 | 12,1272 | L | | |
| T-19221R | | | | 0,34 | 10,80 | 12,10 | 3,25 | B | 90 | 75,00 | 39,12 | 1481,57 | 544,58 | 12,1272 | L | | |
| T-19222L | | | | 0,34 | 10,80 | 12,10 | 4,50 | C | 180 | 75,00 | 54,23 | 1481,57 | 503,67 | 14,5582 | L | | |
| T-19222R | | | | 0,34 | 10,80 | 12,10 | 4,50 | C | 180 | 75,00 | 54,23 | 1481,57 | 503,67 | 14,5582 | L | | |
| T-19223L | | | | 0,34 | 10,80 | 12,10 | 5,75 | D | 270 | 75,00 | 69,25 | 1481,57 | 474,89 | 16,9892 | L | | |
| T-19223R | | | | 0,34 | 10,80 | 12,10 | 5,75 | D | 270 | 75,00 | 69,25 | 1481,57 | 474,89 | 16,9892 | L | | |
| T-19224L | | | | 0,34 | 10,80 | 12,10 | 7,00 | A | 0 | 75,00 | 84,27 | 1481,57 | 452,99 | 19,4202 | L | | |
| T-19224R | | | | 0,34 | 10,80 | 12,10 | 7,00 | A | 0 | 75,00 | 84,27 | 1481,57 | 452,99 | 19,4202 | L | | |
| T-19225L | | | | 0,34 | 10,80 | 12,10 | 8,25 | B | 90 | 75,00 | 99,12 | 1481,57 | 435,48 | 21,8512 | L | | |
| T-19225R | | | | 0,34 | 10,80 | 12,10 | 8,25 | B | 90 | 75,00 | 99,12 | 1481,57 | 435,48 | 21,8512 | L | | |
| T-19226L | | | | 0,34 | 10,80 | 12,10 | 9,50 | C | 180 | 75,00 | 105,66 | 1481,57 | 420,98 | 24,2822 | L | | |
| T-19226R | | | | 0,34 | 10,80 | 12,10 | 9,50 | C | 180 | 75,00 | 105,66 | 1481,57 | 420,98 | 24,2822 | L | | |
| T-19227L | | | | 0,34 | 10,80 | 12,10 | 10,75 | D | 270 | 75,00 | 129,50 | 1481,57 | 408,67 | 26,7132 | L | | |
| T-19227R | | | | 0,34 | 10,80 | 12,10 | 10,75 | D | 270 | 75,00 | 129,50 | 1481,57 | 408,67 | 26,7132 | L | | |
| T-19240L | | | | 17,50 | 14,00 | 0,43 | 14,00 | 15,70 | 2,00 | A | 0 | 75,00 | 30,99 | 1524,20 | 547,29 | 10,6686 | L |
| T-19240R | | | | | | 0,43 | 14,00 | 15,70 | 2,00 | A | 0 | 75,00 | 30,99 | 1524,20 | 547,29 | 10,6686 | L |
| T-19241L | | | | | | 0,43 | 14,00 | 15,70 | 3,25 | B | 90 | 75,00 | 50,31 | 1524,20 | 487,09 | 13,7073 | L |
| T-19241R | 0,43 | 14,00 | 15,70 | | | 3,25 | B | 90 | 75,00 | 50,31 | 1524,20 | 487,09 | 13,7073 | L | | | |
| T-19242L | 0,43 | 14,00 | 15,70 | | | 4,50 | C | 180 | 75,00 | 69,63 | 1524,20 | 450,49 | 16,7461 | L | | | |
| T-19242R | 0,43 | 14,00 | 15,70 | | | 4,50 | C | 180 | 75,00 | 69,63 | 1524,20 | 450,49 | 16,7461 | L | | | |
| T-19243L | 0,43 | 14,00 | 15,70 | | | 5,75 | D | 270 | 75,00 | 89,03 | 1524,20 | 424,76 | 19,7848 | L | | | |
| T-19243R | 0,43 | 14,00 | 15,70 | | | 5,75 | D | 270 | 75,00 | 89,03 | 1524,20 | 424,76 | 19,7848 | L | | | |
| T-19244L | 0,43 | 14,00 | 15,70 | | | 7,00 | A | 0 | 75,00 | 108,35 | 1524,20 | 405,17 | 22,8236 | L | | | |
| T-19244R | 0,43 | 14,00 | 15,70 | | | 7,00 | A | 0 | 75,00 | 108,35 | 1524,20 | 405,17 | 22,8236 | L | | | |
| T-19245L | 0,43 | 14,00 | 15,70 | | | 8,25 | B | 90 | 75,00 | 127,75 | 1524,20 | 389,50 | 25,8624 | L | | | |
| T-19245R | 0,43 | 14,00 | 15,70 | | | 8,25 | B | 90 | 75,00 | 127,75 | 1524,20 | 389,50 | 25,8624 | L | | | |
| T-19246L | 0,43 | 14,00 | 15,70 | | | 9,50 | C | 180 | 75,00 | 147,07 | 1524,20 | 376,54 | 28,9011 | L | | | |
| T-19246R | 0,43 | 14,00 | 15,70 | | | 9,50 | C | 180 | 75,00 | 147,07 | 1524,20 | 376,54 | 28,9011 | L | | | |
| T-19247L | 0,43 | 14,00 | 15,70 | | | 10,75 | D | 270 | 75,00 | 166,38 | 1524,20 | 365,53 | 31,9399 | L | | | |
| T-19247R | 0,43 | 14,00 | 15,70 | | | 10,75 | D | 270 | 75,00 | 166,38 | 1524,20 | 365,53 | 31,9399 | L | | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | αn maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|--------------------------------|---------------------|--------------------------------------|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19260L | 2,50 | 22,50 | 0,54 | 18,00 | 20,20 | 2,00 | A | 0 | 75,00 | 39,59 | 1558,44 | 489,51 | 11,8841 | L | | |
| T-19260R | | | 0,54 | 18,00 | 20,20 | 2,00 | A | 0 | 75,00 | 39,59 | 1558,44 | 489,51 | 11,8841 | L | | |
| T-19261L | | | 0,54 | 18,00 | 20,20 | 3,25 | B | 90 | 75,00 | 64,30 | 1558,44 | 435,67 | 15,6825 | L | | |
| T-19261R | | | 0,54 | 18,00 | 20,20 | 3,25 | B | 90 | 75,00 | 64,30 | 1558,44 | 435,67 | 15,6825 | L | | |
| T-19262L | | | 0,54 | 18,00 | 20,20 | 4,50 | C | 180 | 75,00 | 89,01 | 1558,44 | 402,93 | 19,4810 | L | | |
| T-19262R | | | 0,54 | 18,00 | 20,20 | 4,50 | C | 180 | 75,00 | 89,01 | 1558,44 | 402,93 | 19,4810 | L | | |
| T-19263L | | | 0,54 | 18,00 | 20,20 | 5,75 | D | 270 | 75,00 | 113,72 | 1558,44 | 379,91 | 23,2794 | L | | |
| T-19263R | | | 0,54 | 18,00 | 20,20 | 5,75 | D | 270 | 75,00 | 113,72 | 1558,44 | 379,91 | 23,2794 | L | | |
| T-19264L | | | 0,54 | 18,00 | 20,20 | 7,00 | A | 0 | 75,00 | 138,43 | 1558,44 | 362,40 | 27,0779 | L | | |
| T-19264R | | | 0,54 | 18,00 | 20,20 | 7,00 | A | 0 | 75,00 | 138,43 | 1558,44 | 362,40 | 27,0779 | L | | |
| T-19265L | | | 0,54 | 18,00 | 20,20 | 8,25 | B | 90 | 75,00 | 163,14 | 1558,44 | 348,38 | 30,8763 | L | | |
| T-19265R | | | 0,54 | 18,00 | 20,20 | 8,25 | B | 90 | 75,00 | 163,14 | 1558,44 | 348,38 | 30,8763 | L | | |
| T-19266L | | | 0,54 | 18,00 | 20,20 | 9,50 | C | 180 | 75,00 | 187,94 | 1558,44 | 336,78 | 34,6748 | L | | |
| T-19266R | | | 0,54 | 18,00 | 20,20 | 9,50 | C | 180 | 75,00 | 187,94 | 1558,44 | 336,78 | 34,6748 | L | | |
| T-19267L | | | 0,54 | 18,00 | 20,20 | 10,75 | D | 270 | 75,00 | 212,65 | 1558,44 | 326,94 | 38,4732 | L | | |
| T-19267R | | | 0,54 | 18,00 | 20,20 | 10,75 | D | 270 | 75,00 | 212,65 | 1558,44 | 326,94 | 38,4732 | L | | |
| T-16900L | | | 2,80 | 11,50 | 0,30 | 8,00 | 10,10 | 2,00 | A | 0 | 80,00 | 17,42 | 1888,38 | 962,33 | 12,1300 | M |
| T-16900R | | | | | 0,30 | 8,00 | 10,10 | 2,00 | A | 0 | 80,00 | 17,42 | 1888,38 | 962,33 | 12,1300 | M |
| T-16901L | | | | | 0,30 | 8,00 | 10,10 | 2,25 | B | 90 | 80,00 | 19,59 | 1888,38 | 935,51 | 12,6751 | M |
| T-16901R | | | | | 0,30 | 8,00 | 10,10 | 2,25 | B | 90 | 80,00 | 19,59 | 1888,38 | 935,51 | 12,6751 | M |
| T-16902L | 0,30 | 8,00 | | | 10,10 | 2,50 | C | 180 | 80,00 | 21,77 | 1888,38 | 912,15 | 13,2202 | M | | |
| T-16902R | 0,30 | 8,00 | | | 10,10 | 2,50 | C | 180 | 80,00 | 21,77 | 1888,38 | 912,15 | 13,2202 | M | | |
| T-16903L | 0,30 | 8,00 | | | 10,10 | 2,75 | D | 270 | 80,00 | 23,95 | 1888,38 | 891,52 | 13,7653 | M | | |
| T-16903R | 0,30 | 8,00 | | | 10,10 | 2,75 | D | 270 | 80,00 | 23,95 | 1888,38 | 891,52 | 13,7653 | M | | |
| T-16904L | 0,30 | 8,00 | | | 10,10 | 3,00 | A | 0 | 80,00 | 26,12 | 1888,38 | 873,10 | 14,3104 | M | | |
| T-16904R | 0,30 | 8,00 | | | 10,10 | 3,00 | A | 0 | 80,00 | 26,12 | 1888,38 | 873,10 | 14,3104 | M | | |
| T-16905L | 0,30 | 8,00 | | | 10,10 | 3,25 | B | 90 | 80,00 | 28,30 | 1888,38 | 856,48 | 14,8555 | M | | |
| T-16905R | 0,30 | 8,00 | | | 10,10 | 3,25 | B | 90 | 80,00 | 28,30 | 1888,38 | 856,48 | 14,8555 | M | | |
| T-16906L | 0,30 | 8,00 | | | 10,10 | 4,50 | C | 180 | 80,00 | 39,19 | 1888,38 | 792,14 | 17,5809 | M | | |
| T-16906R | 0,30 | 8,00 | | | 10,10 | 4,50 | C | 180 | 80,00 | 39,19 | 1888,38 | 792,14 | 17,5809 | M | | |
| T-16907L | 0,30 | 8,00 | | | 10,10 | 5,75 | D | 270 | 80,00 | 50,07 | 1888,38 | 746,88 | 20,3064 | M | | |
| T-16907R | 0,30 | 8,00 | | | 10,10 | 5,75 | D | 270 | 80,00 | 50,07 | 1888,38 | 746,88 | 20,3064 | M | | |
| T-16908L | 0,30 | 8,00 | | | 10,10 | 7,00 | A | 0 | 80,00 | 60,96 | 1888,38 | 712,44 | 23,0318 | M | | |

Torsion springs

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-16908R | 2,80 | 11,50 | 0,30 | 8,00 | 10,10 | 7,00 | A | 0 | 80,00 | 60,96 | 1888,38 | 712,44 | 23,0318 | M | | |
| T-16909L | | | 0,30 | 8,00 | 10,10 | 8,25 | B | 90 | 80,00 | 71,84 | 1888,38 | 684,89 | 25,7573 | M | | |
| T-16909R | | | 0,30 | 8,00 | 10,10 | 8,25 | B | 90 | 80,00 | 71,84 | 1888,38 | 684,89 | 25,7573 | M | | |
| T-16910L | 15,50 | 15,50 | 0,40 | 10,00 | 13,60 | 2,00 | A | 0 | 80,00 | 23,20 | 1965,24 | 850,68 | 13,3498 | M | | |
| T-16910R | | | 0,40 | 10,00 | 13,60 | 2,00 | A | 0 | 80,00 | 23,20 | 1965,24 | 850,68 | 13,3498 | M | | |
| T-16911L | | | 0,40 | 10,00 | 13,60 | 2,25 | B | 90 | 80,00 | 26,09 | 1965,24 | 826,97 | 14,0474 | M | | |
| T-16911R | | | 0,40 | 10,00 | 13,60 | 2,25 | B | 90 | 80,00 | 26,09 | 1965,24 | 826,97 | 14,0474 | M | | |
| T-16912L | | | 0,40 | 10,00 | 13,60 | 2,50 | C | 180 | 80,00 | 28,99 | 1965,24 | 806,32 | 14,7449 | M | | |
| T-16912R | | | 0,40 | 10,00 | 13,60 | 2,50 | C | 180 | 80,00 | 28,99 | 1965,24 | 806,32 | 14,7449 | M | | |
| T-16913L | | | 0,40 | 10,00 | 13,60 | 2,75 | D | 270 | 80,00 | 31,89 | 1965,24 | 788,09 | 15,4425 | M | | |
| T-16913R | | | 0,40 | 10,00 | 13,60 | 2,75 | D | 270 | 80,00 | 31,89 | 1965,24 | 788,09 | 15,4425 | M | | |
| T-16914L | | | 0,40 | 10,00 | 13,60 | 3,00 | A | 0 | 80,00 | 34,79 | 1965,24 | 771,80 | 16,1401 | M | | |
| T-16914R | | | 0,40 | 10,00 | 13,60 | 3,00 | A | 0 | 80,00 | 34,79 | 1965,24 | 771,80 | 16,1401 | M | | |
| T-16915L | | | 0,40 | 10,00 | 13,60 | 3,25 | B | 90 | 80,00 | 37,69 | 1965,24 | 757,11 | 16,8376 | M | | |
| T-16915R | | | 0,40 | 10,00 | 13,60 | 3,25 | B | 90 | 80,00 | 37,69 | 1965,24 | 757,11 | 16,8376 | M | | |
| T-16916L | | | 0,40 | 10,00 | 13,60 | 4,50 | C | 180 | 80,00 | 52,19 | 1965,24 | 700,23 | 20,3254 | M | | |
| T-16916R | | | 0,40 | 10,00 | 13,60 | 4,50 | C | 180 | 80,00 | 52,19 | 1965,24 | 700,23 | 20,3254 | M | | |
| T-16917L | | | 0,40 | 10,00 | 13,60 | 5,75 | D | 270 | 80,00 | 66,69 | 1965,24 | 660,23 | 23,8133 | M | | |
| T-16917R | | | 0,40 | 10,00 | 13,60 | 5,75 | D | 270 | 80,00 | 66,69 | 1965,24 | 660,23 | 23,8133 | M | | |
| T-16918L | | | 0,40 | 10,00 | 13,60 | 7,00 | A | 0 | 80,00 | 81,18 | 1965,24 | 629,78 | 27,3011 | M | | |
| T-16918R | | | 0,40 | 10,00 | 13,60 | 7,00 | A | 0 | 80,00 | 81,18 | 1965,24 | 629,78 | 27,3011 | M | | |
| T-16919L | | | 0,40 | 10,00 | 13,60 | 8,25 | B | 90 | 80,00 | 95,68 | 1965,24 | 605,43 | 30,7889 | M | | |
| T-16919R | | | 0,40 | 10,00 | 13,60 | 8,25 | B | 90 | 80,00 | 95,68 | 1965,24 | 605,43 | 30,7889 | M | | |
| T-16920L | | | 19,50 | 19,50 | 0,45 | 12,00 | 17,00 | 2,00 | A | 0 | 80,00 | 28,98 | 2014,76 | 770,62 | 14,5696 | M |
| T-16920R | | | | | 0,45 | 12,00 | 17,00 | 2,00 | A | 0 | 80,00 | 28,98 | 2014,76 | 770,62 | 14,5696 | M |
| T-16921L | | | | | 0,45 | 12,00 | 17,00 | 2,25 | B | 90 | 80,00 | 32,60 | 2014,76 | 749,14 | 15,4196 | M |
| T-16921R | | | | | 0,45 | 12,00 | 17,00 | 2,25 | B | 90 | 80,00 | 32,60 | 2014,76 | 749,14 | 15,4196 | M |
| T-16922L | | | | | 0,45 | 12,00 | 17,00 | 2,50 | C | 180 | 80,00 | 36,22 | 2014,76 | 730,43 | 16,2697 | M |
| T-16922R | | | | | 0,45 | 12,00 | 17,00 | 2,50 | C | 180 | 80,00 | 36,22 | 2014,76 | 730,43 | 16,2697 | M |
| T-16923L | | | | | 0,45 | 12,00 | 17,00 | 2,75 | D | 270 | 80,00 | 39,84 | 2014,76 | 713,92 | 17,1197 | M |
| T-16923R | 0,45 | 12,00 | | | 17,00 | 2,75 | D | 270 | 80,00 | 39,84 | 2014,76 | 713,92 | 17,1197 | M | | |
| T-16924L | 0,45 | 12,00 | | | 17,00 | 3,00 | A | 0 | 80,00 | 43,47 | 2014,76 | 699,16 | 17,9697 | M | | |
| T-16924R | 0,45 | 12,00 | | | 17,00 | 3,00 | A | 0 | 80,00 | 43,47 | 2014,76 | 699,16 | 17,9697 | M | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-16925L | 2,80 | 19,50 | 0,45 | 12,00 | 17,00 | 3,25 | B | 90 | 80,00 | 47,09 | 2014,76 | 685,86 | 18,8198 | M | | |
| T-16925R | | | 0,45 | 12,00 | 17,00 | 3,25 | B | 90 | 80,00 | 47,09 | 2014,76 | 685,86 | 18,8198 | M | | |
| T-16926L | | | 0,45 | 12,00 | 17,00 | 4,50 | C | 180 | 80,00 | 65,20 | 2014,76 | 634,33 | 23,0700 | M | | |
| T-16926R | | | 0,45 | 12,00 | 17,00 | 4,50 | C | 180 | 80,00 | 65,20 | 2014,76 | 634,33 | 23,0700 | M | | |
| T-16927L | | | 0,45 | 12,00 | 17,00 | 5,75 | D | 270 | 80,00 | 83,31 | 2014,76 | 598,09 | 27,3201 | M | | |
| T-16927R | | | 0,45 | 12,00 | 17,00 | 5,75 | D | 270 | 80,00 | 83,31 | 2014,76 | 598,09 | 27,3201 | M | | |
| T-16928L | | | 0,45 | 12,00 | 17,00 | 7,00 | A | 0 | 80,00 | 101,42 | 2014,76 | 570,51 | 31,5703 | M | | |
| T-16928R | | | 0,45 | 12,00 | 17,00 | 7,00 | A | 0 | 80,00 | 101,42 | 2014,76 | 570,51 | 31,5703 | M | | |
| T-16929L | | | 0,45 | 12,00 | 17,00 | 8,25 | B | 90 | 80,00 | 119,53 | 2014,76 | 548,45 | 35,8205 | M | | |
| T-16929R | | | 0,45 | 12,00 | 17,00 | 8,25 | B | 90 | 80,00 | 119,53 | 2014,76 | 548,45 | 35,8205 | M | | |
| T-16930L | | | 24,00 | 24,00 | 0,55 | 15,00 | 20,80 | 2,00 | A | 0 | 80,00 | 35,49 | 2052,94 | 702,95 | 15,9419 | M |
| T-16930R | | | | | 0,55 | 15,00 | 20,80 | 2,00 | A | 0 | 80,00 | 35,49 | 2052,94 | 702,95 | 15,9419 | M |
| T-16931L | | | | | 0,55 | 15,00 | 20,80 | 2,25 | B | 90 | 80,00 | 39,92 | 2052,94 | 683,36 | 16,9634 | M |
| T-16931R | | | | | 0,55 | 15,00 | 20,80 | 2,25 | B | 90 | 80,00 | 39,92 | 2052,94 | 683,36 | 16,9634 | M |
| T-16932L | | | | | 0,55 | 15,00 | 20,80 | 2,50 | C | 180 | 80,00 | 44,36 | 2052,94 | 666,29 | 17,9850 | M |
| T-16932R | | | | | 0,55 | 15,00 | 20,80 | 2,50 | C | 180 | 80,00 | 44,36 | 2052,94 | 666,29 | 17,9850 | M |
| T-16933L | | | | | 0,55 | 15,00 | 20,80 | 2,75 | D | 270 | 80,00 | 48,79 | 2052,94 | 651,23 | 19,0066 | M |
| T-16933R | | | | | 0,55 | 15,00 | 20,80 | 2,75 | D | 270 | 80,00 | 48,79 | 2052,94 | 651,23 | 19,0066 | M |
| T-16934L | 0,55 | 15,00 | | | 20,80 | 3,00 | A | 0 | 80,00 | 53,23 | 2052,94 | 637,77 | 20,0281 | M | | |
| T-16934R | 0,55 | 15,00 | | | 20,80 | 3,00 | A | 0 | 80,00 | 53,23 | 2052,94 | 637,77 | 20,0281 | M | | |
| T-16935L | 0,55 | 15,00 | | | 20,80 | 3,25 | B | 90 | 80,00 | 57,66 | 2052,94 | 625,63 | 21,0497 | M | | |
| T-16935R | 0,55 | 15,00 | | | 20,80 | 3,25 | B | 90 | 80,00 | 57,66 | 2052,94 | 625,63 | 21,0497 | M | | |
| T-16936L | 0,55 | 15,00 | | | 20,80 | 4,50 | C | 180 | 80,00 | 79,84 | 2052,94 | 578,63 | 26,1575 | M | | |
| T-16936R | 0,55 | 15,00 | | | 20,80 | 4,50 | C | 180 | 80,00 | 79,84 | 2052,94 | 578,63 | 26,1575 | M | | |
| T-16937L | 0,55 | 15,00 | | | 20,80 | 5,75 | D | 270 | 80,00 | 102,02 | 2052,94 | 545,57 | 31,2654 | M | | |
| T-16937R | 0,55 | 15,00 | | | 20,80 | 5,75 | D | 270 | 80,00 | 102,02 | 2052,94 | 545,57 | 31,2654 | M | | |
| T-16938L | 0,55 | 15,00 | | | 20,80 | 7,00 | A | 0 | 80,00 | 124,20 | 2052,94 | 520,41 | 36,3732 | M | | |
| T-16938R | 0,55 | 15,00 | | | 20,80 | 7,00 | A | 0 | 80,00 | 124,20 | 2052,94 | 520,41 | 36,3732 | M | | |
| T-16939L | 0,55 | 15,00 | | | 20,80 | 8,25 | B | 90 | 80,00 | 146,38 | 2052,94 | 500,29 | 41,4811 | M | | |
| T-16939R | 0,55 | 15,00 | | | 20,80 | 8,25 | B | 90 | 80,00 | 146,38 | 2052,94 | 500,29 | 41,4811 | M | | |
| T-19300L | 3,00 | 12,00 | | | 0,31 | 9,60 | 10,80 | 2,00 | A | 0 | 80,00 | 17,35 | 2364,22 | 1196,24 | 14,1698 | M |
| T-19300R | | | | | 0,31 | 9,60 | 10,80 | 2,00 | A | 0 | 80,00 | 17,35 | 2364,22 | 1196,24 | 14,1698 | M |
| T-19301L | | | 0,31 | 9,60 | 10,80 | 3,25 | B | 90 | 80,00 | 28,25 | 2364,22 | 1064,66 | 17,4517 | M | | |

Torsion springs

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | αn maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|--------------------------------|---------------------|--------------------------------------|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19301R | 3,00 | 12,00 | 0,31 | 9,60 | 10,80 | 3,25 | B | 90 | 80,00 | 28,25 | 2364,22 | 1064,66 | 17,4517 | M | | |
| T-19302L | | | 0,31 | 9,60 | 10,80 | 4,50 | C | 180 | 80,00 | 39,15 | 2364,22 | 984,68 | 20,7336 | M | | |
| T-19302R | | | 0,31 | 9,60 | 10,80 | 4,50 | C | 180 | 80,00 | 39,15 | 2364,22 | 984,68 | 20,7336 | M | | |
| T-19303L | | | 0,31 | 9,60 | 10,38 | 5,75 | D | 270 | 80,00 | 49,96 | 2364,22 | 928,42 | 24,0154 | M | | |
| T-19303R | | | 0,31 | 9,60 | 10,38 | 5,75 | D | 270 | 80,00 | 49,96 | 2364,22 | 928,42 | 24,0154 | M | | |
| T-19304L | | | 0,31 | 9,60 | 10,80 | 7,00 | A | 0 | 80,00 | 60,86 | 2364,22 | 885,61 | 27,2973 | M | | |
| T-19304R | | | 0,31 | 9,60 | 10,80 | 7,00 | A | 0 | 80,00 | 60,86 | 2364,22 | 885,61 | 27,2973 | M | | |
| T-19305L | | | 0,31 | 9,60 | 10,80 | 8,25 | B | 90 | 80,00 | 71,76 | 2364,22 | 851,36 | 30,5791 | M | | |
| T-19305R | | | 0,31 | 9,60 | 10,80 | 8,25 | B | 90 | 80,00 | 71,76 | 2364,22 | 851,36 | 30,5791 | M | | |
| T-19306L | | | 0,31 | 9,60 | 10,80 | 9,50 | C | 180 | 80,00 | 82,57 | 2364,22 | 823,02 | 33,8610 | M | | |
| T-19306R | | | 0,31 | 9,60 | 10,80 | 9,50 | C | 180 | 80,00 | 82,57 | 2364,22 | 823,02 | 33,8610 | M | | |
| T-19307L | | | 0,31 | 9,60 | 10,80 | 10,75 | D | 270 | 80,00 | 93,47 | 2364,22 | 798,96 | 37,1429 | M | | |
| T-19307R | | | 0,31 | 9,60 | 10,80 | 10,75 | D | 270 | 80,00 | 93,47 | 2364,22 | 798,96 | 37,1429 | M | | |
| T-19320L | | | 16,00 | 16,00 | 0,39 | 12,80 | 14,40 | 2,00 | A | 0 | 80,00 | 22,93 | 2459,20 | 1062,88 | 15,5701 | M |
| T-19320R | 0,39 | 12,80 | | | 14,40 | 2,00 | A | 0 | 80,00 | 22,93 | 2459,20 | 1062,88 | 15,5701 | M | | |
| T-19321L | 0,39 | 12,80 | | | 14,40 | 3,25 | B | 90 | 80,00 | 37,23 | 2459,20 | 945,98 | 19,7271 | M | | |
| T-19321R | 0,39 | 12,80 | | | 14,40 | 3,25 | B | 90 | 80,00 | 37,23 | 2459,20 | 945,98 | 19,7271 | M | | |
| T-19322L | 0,39 | 12,80 | | | 14,40 | 4,50 | C | 180 | 80,00 | 51,53 | 2459,20 | 874,91 | 23,8841 | M | | |
| T-19322R | 0,39 | 12,80 | | | 14,40 | 4,50 | C | 180 | 80,00 | 51,53 | 2459,20 | 874,91 | 23,8841 | M | | |
| T-19323L | 0,39 | 12,80 | | | 14,40 | 5,75 | D | 270 | 80,00 | 65,83 | 2459,20 | 824,92 | 28,0412 | M | | |
| T-19323R | 0,39 | 12,80 | | | 14,40 | 5,75 | D | 270 | 80,00 | 65,83 | 2459,20 | 824,92 | 28,0412 | M | | |
| T-19324L | 0,39 | 12,80 | | | 14,40 | 7,00 | A | 0 | 80,00 | 80,13 | 2459,20 | 786,88 | 32,1982 | M | | |
| T-19324R | 0,39 | 12,80 | | | 14,40 | 7,00 | A | 0 | 80,00 | 80,13 | 2459,20 | 786,88 | 32,1982 | M | | |
| T-19325L | 0,39 | 12,80 | | | 14,40 | 8,25 | B | 90 | 80,00 | 94,43 | 2459,20 | 756,46 | 36,3552 | M | | |
| T-19325R | 0,39 | 12,80 | | | 14,40 | 8,25 | B | 90 | 80,00 | 94,43 | 2459,20 | 756,46 | 36,3552 | M | | |
| T-19326L | 0,39 | 12,80 | | | 14,40 | 9,50 | C | 180 | 80,00 | 108,73 | 2459,20 | 731,27 | 40,5122 | M | | |
| T-19326R | 0,39 | 12,80 | | | 14,40 | 9,50 | C | 180 | 80,00 | 108,73 | 2459,20 | 731,27 | 40,5122 | M | | |
| T-19327L | 0,39 | 12,80 | | | 14,40 | 10,75 | D | 270 | 80,00 | 123,03 | 2459,20 | 709,90 | 44,6693 | M | | |
| T-19327R | 0,39 | 12,80 | | | 14,40 | 10,75 | D | 270 | 80,00 | 123,03 | 2459,20 | 709,90 | 44,6693 | M | | |
| T-19340L | 21,00 | 21,00 | | | 0,50 | 16,80 | 18,90 | 2,00 | A | 0 | 80,00 | 29,83 | 2533,79 | 945,71 | 17,3204 | M |
| T-19340R | | | | | 0,50 | 16,80 | 18,90 | 2,00 | A | 0 | 80,00 | 29,83 | 2533,79 | 945,71 | 17,3204 | M |
| T-19341L | | | 0,50 | 16,80 | 18,90 | 3,25 | B | 90 | 80,00 | 48,42 | 2533,79 | 841,69 | 22,5714 | M | | |
| T-19341R | | | 0,50 | 16,80 | 18,90 | 3,25 | B | 90 | 80,00 | 48,42 | 2533,79 | 841,69 | 22,5714 | M | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19342L | 3,00 | 21,00 | 0,50 | 16,80 | 18,90 | 4,50 | C | 180 | 80,00 | 67,02 | 2533,79 | 778,46 | 27,8224 | M | | |
| T-19342R | | | 0,50 | 16,80 | 18,90 | 4,50 | C | 180 | 80,00 | 67,02 | 2533,79 | 778,46 | 27,8224 | M | | |
| T-19343L | | | 0,50 | 16,80 | 18,90 | 5,75 | D | 270 | 80,00 | 85,62 | 2533,79 | 733,98 | 33,0733 | M | | |
| T-19343R | | | 0,50 | 16,80 | 18,90 | 5,75 | D | 270 | 80,00 | 85,62 | 2533,79 | 733,98 | 33,0733 | M | | |
| T-19344L | | | 0,50 | 16,80 | 18,90 | 4,00 | A | 0 | 80,00 | 62,80 | 2533,79 | 800,77 | 25,7220 | M | | |
| T-19344R | | | 0,50 | 16,80 | 18,90 | 4,00 | A | 0 | 80,00 | 62,80 | 2533,79 | 800,77 | 25,7220 | M | | |
| T-19345L | | | 0,50 | 16,80 | 18,90 | 8,25 | B | 90 | 80,00 | 122,90 | 2533,79 | 673,06 | 43,5753 | M | | |
| T-19345R | | | 0,50 | 16,80 | 18,90 | 8,25 | B | 90 | 80,00 | 122,90 | 2533,79 | 673,06 | 43,5753 | M | | |
| T-19346L | | | 0,50 | 16,80 | 18,90 | 9,50 | C | 180 | 80,00 | 141,50 | 2533,79 | 650,66 | 48,8263 | M | | |
| T-19346R | | | 0,50 | 16,80 | 18,90 | 9,50 | C | 180 | 80,00 | 141,50 | 2533,79 | 650,66 | 48,8263 | M | | |
| T-19347L | | | 0,50 | 16,80 | 18,90 | 10,75 | D | 270 | 80,00 | 160,09 | 2533,79 | 631,64 | 54,0773 | M | | |
| T-19347R | | | 0,50 | 16,80 | 18,90 | 10,75 | D | 270 | 80,00 | 160,09 | 2533,79 | 631,64 | 54,0773 | M | | |
| T-19360L | | | 26,00 | 26,00 | 0,60 | 20,80 | 23,40 | 2,00 | A | 0 | 80,00 | 36,72 | 2582,84 | 860,33 | 19,0707 | M |
| T-19360R | | | | | 0,60 | 20,80 | 23,40 | 2,00 | A | 0 | 80,00 | 36,72 | 2582,84 | 860,33 | 19,0707 | M |
| T-19361L | 0,60 | 20,80 | | | 23,40 | 3,25 | B | 90 | 80,00 | 59,62 | 2582,84 | 765,70 | 25,4157 | M | | |
| T-19361R | 0,60 | 20,80 | | | 23,40 | 3,25 | B | 90 | 80,00 | 59,62 | 2582,84 | 765,70 | 25,4157 | M | | |
| T-19362L | 0,60 | 20,80 | | | 23,40 | 4,50 | C | 180 | 80,00 | 82,51 | 2582,84 | 708,17 | 31,7606 | M | | |
| T-19362R | 0,60 | 20,80 | | | 23,40 | 4,50 | C | 180 | 80,00 | 82,51 | 2582,84 | 708,17 | 31,7606 | M | | |
| T-19363L | 0,60 | 20,80 | | | 23,40 | 5,75 | D | 270 | 80,00 | 105,41 | 2582,84 | 667,71 | 38,1055 | M | | |
| T-19363R | 0,60 | 20,80 | | | 23,40 | 5,75 | D | 270 | 80,00 | 105,41 | 2582,84 | 667,71 | 38,1055 | M | | |
| T-19364L | 0,60 | 20,80 | | | 23,40 | 7,00 | A | 0 | 80,00 | 128,39 | 2582,84 | 636,92 | 44,4505 | M | | |
| T-19364R | 0,60 | 20,80 | | | 23,40 | 7,00 | A | 0 | 80,00 | 128,39 | 2582,84 | 636,92 | 44,4505 | M | | |
| T-19365L | 0,60 | 20,80 | | | 23,40 | 8,25 | B | 90 | 80,00 | 151,29 | 2582,84 | 612,30 | 50,7954 | M | | |
| T-19365R | 0,60 | 20,80 | | | 23,40 | 8,25 | B | 90 | 80,00 | 151,29 | 2582,84 | 612,30 | 50,7954 | M | | |
| T-19366L | 0,60 | 20,80 | | | 23,40 | 9,50 | C | 180 | 80,00 | 174,18 | 2582,84 | 591,91 | 57,1403 | M | | |
| T-19366R | 0,60 | 20,80 | | | 23,40 | 9,50 | C | 180 | 80,00 | 174,18 | 2582,84 | 591,91 | 57,1403 | M | | |
| T-19367L | 0,60 | 20,80 | | | 23,40 | 10,75 | D | 270 | 80,00 | 197,17 | 2582,84 | 574,61 | 63,4853 | M | | |
| T-19367R | 0,60 | 20,80 | | | 23,40 | 10,75 | D | 270 | 80,00 | 197,17 | 2582,84 | 574,61 | 63,4853 | M | | |
| T-17000L | 3,20 | 12,50 | | | 0,30 | 8,00 | 11,10 | 2,00 | A | 0 | 80,00 | 16,09 | 2709,97 | 1465,59 | 16,4009 | M |
| T-17000R | | | | | 0,30 | 8,00 | 11,10 | 2,00 | A | 0 | 80,00 | 16,09 | 2709,97 | 1465,59 | 16,4009 | M |
| T-17001L | | | | | 0,30 | 8,00 | 11,10 | 2,25 | B | 90 | 80,00 | 18,10 | 2709,97 | 1424,75 | 17,1826 | M |
| T-17001R | | | | | 0,30 | 8,00 | 11,10 | 2,25 | B | 90 | 80,00 | 18,10 | 2709,97 | 1424,75 | 17,1826 | M |
| T-17002L | | | 0,30 | 8,00 | 11,10 | 2,50 | C | 180 | 80,00 | 20,11 | 2709,97 | 1389,17 | 17,9642 | M | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-17002R | 3,20 | 12,50 | 0,30 | 8,00 | 11,10 | 2,50 | C | 180 | 80,00 | 20,11 | 2709,97 | 1389,17 | 17,9642 | M | | |
| T-17003L | | | 0,30 | 8,00 | 11,10 | 2,75 | D | 270 | 80,00 | 22,12 | 2709,97 | 1357,75 | 18,7459 | M | | |
| T-17003R | | | 0,30 | 8,00 | 11,10 | 2,75 | D | 270 | 80,00 | 22,12 | 2709,97 | 1357,75 | 18,7459 | M | | |
| T-17004L | | | 0,30 | 8,00 | 11,10 | 3,00 | A | 0 | 80,00 | 24,13 | 2709,97 | 1329,69 | 19,5276 | M | | |
| T-17004R | | | 0,30 | 8,00 | 11,10 | 3,00 | A | 0 | 80,00 | 24,13 | 2709,97 | 1329,69 | 19,5276 | M | | |
| T-17005L | | | 0,30 | 8,00 | 11,10 | 3,25 | B | 90 | 80,00 | 26,14 | 2709,97 | 1304,39 | 20,3092 | M | | |
| T-17005R | | | 0,30 | 8,00 | 11,10 | 3,25 | B | 90 | 80,00 | 26,14 | 2709,97 | 1304,39 | 20,3092 | M | | |
| T-17006L | | | 0,30 | 8,00 | 11,10 | 4,50 | C | 180 | 80,00 | 36,19 | 2709,97 | 1206,40 | 24,2175 | M | | |
| T-17006R | | | 0,30 | 8,00 | 11,10 | 4,50 | C | 180 | 80,00 | 36,19 | 2709,97 | 1206,40 | 24,2175 | M | | |
| T-17007L | | | 0,30 | 8,00 | 11,10 | 5,75 | D | 270 | 80,00 | 46,25 | 2709,97 | 1137,47 | 28,1258 | M | | |
| T-17007R | | | 0,30 | 8,00 | 11,10 | 5,75 | D | 270 | 80,00 | 46,25 | 2709,97 | 1137,47 | 28,1258 | M | | |
| T-17008L | | | 0,30 | 8,00 | 11,10 | 7,00 | A | 0 | 80,00 | 56,30 | 2709,97 | 1085,02 | 32,0341 | M | | |
| T-17008R | | | 0,30 | 8,00 | 11,10 | 7,00 | A | 0 | 80,00 | 56,30 | 2709,97 | 1085,02 | 32,0341 | M | | |
| T-17009L | | | 0,30 | 8,00 | 11,10 | 8,25 | B | 90 | 80,00 | 66,35 | 2709,97 | 1043,07 | 35,9423 | M | | |
| T-17009R | | | 0,30 | 8,00 | 11,10 | 8,25 | B | 90 | 80,00 | 66,35 | 2709,97 | 1043,07 | 35,9423 | M | | |
| T-17010L | | | 17,00 | 17,00 | 0,40 | 11,00 | 15,00 | 2,00 | A | 0 | 80,00 | 21,60 | 2827,78 | 1292,08 | 18,1933 | M |
| T-17010R | | | | | 0,40 | 11,00 | 15,00 | 2,00 | A | 0 | 80,00 | 21,60 | 2827,78 | 1292,08 | 18,1933 | M |
| T-17011L | | | | | 0,40 | 11,00 | 15,00 | 2,25 | B | 90 | 80,00 | 24,30 | 2827,78 | 1256,06 | 19,1990 | M |
| T-17011R | | | | | 0,40 | 11,00 | 15,00 | 2,25 | B | 90 | 80,00 | 24,30 | 2827,78 | 1256,06 | 19,1990 | M |
| T-17012L | | | | | 0,40 | 11,00 | 15,00 | 2,50 | C | 180 | 80,00 | 26,99 | 2827,78 | 1224,70 | 20,2047 | M |
| T-17012R | 0,40 | 11,00 | | | 15,00 | 2,50 | C | 180 | 80,00 | 26,99 | 2827,78 | 1224,70 | 20,2047 | M | | |
| T-17013L | 0,40 | 11,00 | | | 15,00 | 2,75 | D | 270 | 80,00 | 29,69 | 2827,78 | 1197,00 | 21,2104 | M | | |
| T-17013R | 0,40 | 11,00 | | | 15,00 | 2,75 | D | 270 | 80,00 | 29,69 | 2827,78 | 1197,00 | 21,2104 | M | | |
| T-17014L | 0,40 | 11,00 | | | 15,00 | 3,00 | A | 0 | 80,00 | 32,39 | 2827,78 | 1172,27 | 22,2161 | M | | |
| T-17014R | 0,40 | 11,00 | | | 15,00 | 3,00 | A | 0 | 80,00 | 32,39 | 2827,78 | 1172,27 | 22,2161 | M | | |
| T-17015L | 0,40 | 11,00 | | | 15,00 | 3,25 | B | 90 | 80,00 | 35,09 | 2827,78 | 1149,96 | 23,2218 | M | | |
| T-17015R | 0,40 | 11,00 | | | 15,00 | 3,25 | B | 90 | 80,00 | 35,09 | 2827,78 | 1149,96 | 23,2218 | M | | |
| T-17016L | 0,40 | 11,00 | | | 15,00 | 4,50 | C | 180 | 80,00 | 48,59 | 2827,78 | 1063,57 | 28,2502 | M | | |
| T-17016R | 0,40 | 11,00 | | | 15,00 | 4,50 | C | 180 | 80,00 | 48,59 | 2827,78 | 1063,57 | 28,2502 | M | | |
| T-17017L | 0,40 | 11,00 | | | 15,00 | 5,75 | D | 270 | 80,00 | 62,09 | 2827,78 | 1002,80 | 33,2787 | M | | |
| T-17017R | 0,40 | 11,00 | | | 15,00 | 5,75 | D | 270 | 80,00 | 62,09 | 2827,78 | 1002,80 | 33,2787 | M | | |
| T-17018L | 0,40 | 11,00 | | | 15,00 | 7,00 | A | 0 | 80,00 | 75,58 | 2827,78 | 956,56 | 38,3072 | M | | |
| T-17018R | 0,40 | 11,00 | | | 15,00 | 7,00 | A | 0 | 80,00 | 75,58 | 2827,78 | 956,56 | 38,3072 | M | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-17019L | 3,20 | 17,00 | 0,40 | 11,00 | 15,00 | 8,25 | B | 90 | 80,00 | 89,08 | 2827,78 | 919,57 | 43,3357 | M | | |
| T-17019R | | | 0,40 | 11,00 | 15,00 | 8,25 | B | 90 | 80,00 | 89,08 | 2827,78 | 919,57 | 43,3357 | M | | |
| T-17020L | 22,00 | 22,00 | 0,50 | 13,00 | 19,30 | 2,00 | A | 0 | 80,00 | 27,72 | 2909,76 | 1156,81 | 20,1847 | M | | |
| T-17020R | | | 0,50 | 13,00 | 19,30 | 2,00 | A | 0 | 80,00 | 27,72 | 2909,76 | 1156,81 | 20,1847 | M | | |
| T-17021L | | | 0,50 | 13,00 | 19,30 | 2,25 | B | 90 | 80,00 | 31,19 | 2909,76 | 1124,57 | 21,4394 | M | | |
| T-17021R | | | 0,50 | 13,00 | 19,30 | 2,25 | B | 90 | 80,00 | 31,19 | 2909,76 | 1124,57 | 21,4394 | M | | |
| T-17022L | | | 0,50 | 13,00 | 19,30 | 2,50 | C | 180 | 80,00 | 34,65 | 2909,76 | 1096,49 | 22,6940 | M | | |
| T-17022R | | | 0,50 | 13,00 | 19,30 | 2,50 | C | 180 | 80,00 | 34,65 | 2909,76 | 1096,49 | 22,6940 | M | | |
| T-17023L | | | 0,50 | 13,00 | 19,30 | 2,75 | D | 270 | 80,00 | 38,12 | 2909,76 | 1071,69 | 23,9486 | M | | |
| T-17023R | | | 0,50 | 13,00 | 19,30 | 2,75 | D | 270 | 80,00 | 38,12 | 2909,76 | 1071,69 | 23,9486 | M | | |
| T-17024L | | | 0,50 | 13,00 | 19,30 | 3,00 | A | 0 | 80,00 | 41,58 | 2909,76 | 1049,55 | 25,2033 | M | | |
| T-17024R | | | 0,50 | 13,00 | 19,30 | 3,00 | A | 0 | 80,00 | 41,58 | 2909,76 | 1049,55 | 25,2033 | M | | |
| T-17025L | | | 0,50 | 13,00 | 19,30 | 3,25 | B | 90 | 80,00 | 45,05 | 2909,76 | 1029,58 | 26,4579 | M | | |
| T-17025R | | | 0,50 | 13,00 | 19,30 | 3,25 | B | 90 | 80,00 | 45,05 | 2909,76 | 1029,58 | 26,4579 | M | | |
| T-17026L | | | 0,50 | 13,00 | 19,30 | 4,50 | C | 180 | 80,00 | 62,37 | 2909,76 | 952,22 | 32,7311 | M | | |
| T-17026R | | | 0,50 | 13,00 | 19,30 | 4,50 | C | 180 | 80,00 | 62,37 | 2909,76 | 952,22 | 32,7311 | M | | |
| T-17027L | | | 0,50 | 13,00 | 19,30 | 5,75 | D | 270 | 80,00 | 79,70 | 2909,76 | 897,82 | 39,0042 | M | | |
| T-17027R | | | 0,50 | 13,00 | 19,30 | 5,75 | D | 270 | 80,00 | 79,70 | 2909,76 | 897,82 | 39,0042 | M | | |
| T-17028L | | | 0,50 | 13,00 | 19,30 | 7,00 | A | 0 | 80,00 | 97,03 | 2909,76 | 856,42 | 45,2774 | M | | |
| T-17028R | | | 0,50 | 13,00 | 19,30 | 7,00 | A | 0 | 80,00 | 97,03 | 2909,76 | 856,42 | 45,2774 | M | | |
| T-17029L | | | 0,50 | 13,00 | 19,30 | 8,25 | B | 90 | 80,00 | 114,35 | 2909,76 | 823,31 | 51,5506 | M | | |
| T-17029R | | | 0,50 | 13,00 | 19,30 | 8,25 | B | 90 | 80,00 | 114,35 | 2909,76 | 823,31 | 51,5506 | M | | |
| T-17030L | | | 27,00 | 27,00 | 0,60 | 18,00 | 23,50 | 2,00 | A | 0 | 80,00 | 33,85 | 2964,79 | 1056,72 | 22,1762 | M |
| T-17030R | | | | | 0,60 | 18,00 | 23,50 | 2,00 | A | 0 | 80,00 | 33,85 | 2964,79 | 1056,72 | 22,1762 | M |
| T-17031L | 0,60 | 18,00 | | | 23,50 | 2,25 | B | 90 | 80,00 | 38,08 | 2964,79 | 1027,27 | 23,6798 | M | | |
| T-17031R | 0,60 | 18,00 | | | 23,50 | 2,25 | B | 90 | 80,00 | 38,08 | 2964,79 | 1027,27 | 23,6798 | M | | |
| T-17032L | 0,60 | 18,00 | | | 23,50 | 2,50 | C | 180 | 80,00 | 42,31 | 2964,79 | 1001,62 | 25,1834 | M | | |
| T-17032R | 0,60 | 18,00 | | | 23,50 | 2,50 | C | 180 | 80,00 | 42,31 | 2964,79 | 1001,62 | 25,1834 | M | | |
| T-17033L | 0,60 | 18,00 | | | 23,50 | 2,75 | D | 270 | 80,00 | 46,55 | 2964,79 | 978,97 | 26,6869 | M | | |
| T-17033R | 0,60 | 18,00 | | | 23,50 | 2,75 | D | 270 | 80,00 | 46,55 | 2964,79 | 978,97 | 26,6869 | M | | |
| T-17034L | 0,60 | 18,00 | | | 23,50 | 3,00 | A | 0 | 80,00 | 50,78 | 2964,79 | 958,73 | 28,1905 | M | | |
| T-17034R | 0,60 | 18,00 | | | 23,50 | 3,00 | A | 0 | 80,00 | 50,78 | 2964,79 | 958,73 | 28,1905 | M | | |
| T-17035L | 0,60 | 18,00 | | | 23,50 | 3,25 | B | 90 | 80,00 | 55,01 | 2964,79 | 940,49 | 29,6941 | M | | |

Torsion springs

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | αn maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|--------------------------------|---------------------|--------------------------------------|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-17035R | 3,20 | 27,00 | 0,60 | 18,00 | 23,50 | 3,25 | B | 90 | 80,00 | 55,01 | 2964,79 | 940,49 | 29,6941 | M | | |
| T-17036L | | | 0,60 | 18,00 | 23,50 | 4,50 | C | 180 | 80,00 | 76,16 | 2964,79 | 869,83 | 37,2119 | M | | |
| T-17036R | | | 0,60 | 18,00 | 23,50 | 4,50 | C | 180 | 80,00 | 76,16 | 2964,79 | 869,83 | 37,2119 | M | | |
| T-17037L | | | 0,60 | 18,00 | 23,50 | 5,75 | D | 270 | 80,00 | 97,32 | 2964,79 | 820,14 | 44,7298 | M | | |
| T-17037R | | | 0,60 | 18,00 | 23,50 | 5,75 | D | 270 | 80,00 | 97,32 | 2964,79 | 820,14 | 44,7298 | M | | |
| T-17038L | | | 0,60 | 18,00 | 23,50 | 7,00 | A | 0 | 80,00 | 118,48 | 2964,79 | 782,32 | 52,2476 | M | | |
| T-17038R | | | 0,60 | 18,00 | 23,50 | 7,00 | A | 0 | 80,00 | 118,48 | 2964,79 | 782,32 | 52,2476 | M | | |
| T-17039L | | | 0,60 | 18,00 | 23,50 | 8,25 | B | 90 | 80,00 | 139,64 | 2964,79 | 752,07 | 59,7654 | M | | |
| T-17039R | | | 0,60 | 18,00 | 23,50 | 8,25 | B | 90 | 80,00 | 139,64 | 2964,79 | 752,07 | 59,7654 | M | | |
| T-19400L | | | 3,60 | 12,40 | 0,32 | 9,90 | 11,10 | 2,00 | A | 0 | 85,00 | 14,81 | 3909,65 | 2192,49 | 21,7113 | M |
| T-19400R | 0,32 | 9,90 | | | 11,10 | 2,00 | A | 0 | 85,00 | 14,81 | 3909,65 | 2192,49 | 21,7113 | M | | |
| T-19401L | 0,32 | 9,90 | | | 11,10 | 3,25 | B | 90 | 85,00 | 24,06 | 3909,65 | 1951,34 | 26,7523 | M | | |
| T-19401R | 0,32 | 9,90 | | | 11,10 | 3,25 | B | 90 | 85,00 | 24,06 | 3909,65 | 1951,34 | 26,7523 | M | | |
| T-19402L | 0,32 | 9,90 | | | 11,10 | 4,50 | C | 180 | 85,00 | 33,31 | 3909,65 | 1804,74 | 31,7932 | M | | |
| T-19402R | 0,32 | 9,90 | | | 11,10 | 4,50 | C | 180 | 85,00 | 33,31 | 3909,65 | 1804,74 | 31,7932 | M | | |
| T-19403L | 0,32 | 9,90 | | | 11,10 | 5,75 | D | 270 | 85,00 | 42,55 | 3909,65 | 1701,63 | 36,8342 | M | | |
| T-19403R | 0,32 | 9,90 | | | 11,10 | 5,75 | D | 270 | 85,00 | 42,55 | 3909,65 | 1701,63 | 36,8342 | M | | |
| T-19404L | 0,32 | 9,90 | | | 11,10 | 7,00 | A | 0 | 85,00 | 51,80 | 3909,65 | 1623,16 | 41,8751 | M | | |
| T-19404R | 0,32 | 9,90 | | | 11,10 | 7,00 | A | 0 | 85,00 | 51,80 | 3909,65 | 1623,16 | 41,8751 | M | | |
| T-19405L | 0,32 | 9,90 | | | 11,10 | 8,25 | B | 90 | 85,00 | 61,05 | 3909,65 | 1560,40 | 46,9160 | M | | |
| T-19405R | 0,32 | 9,90 | | | 11,10 | 8,25 | B | 90 | 85,00 | 61,05 | 3909,65 | 1560,40 | 46,9160 | M | | |
| T-19406L | 0,32 | 9,90 | | | 11,10 | 9,50 | C | 180 | 85,00 | 70,30 | 3909,65 | 1508,45 | 51,9570 | M | | |
| T-19406R | 0,32 | 9,90 | | | 11,10 | 9,50 | C | 180 | 85,00 | 70,30 | 3909,65 | 1508,45 | 51,9570 | M | | |
| T-19407L | 0,32 | 9,90 | | | 11,10 | 10,75 | D | 270 | 85,00 | 79,54 | 3909,65 | 1464,36 | 56,9979 | M | | |
| T-19407R | 0,32 | 9,90 | | | 11,10 | 10,75 | D | 270 | 85,00 | 79,54 | 3909,65 | 1464,36 | 56,9979 | M | | |
| T-19420L | 17,40 | 17,40 | | | 0,42 | 13,90 | 15,60 | 2,00 | A | 0 | 85,00 | 20,41 | 4113,81 | 1913,76 | 24,2318 | M |
| T-19420R | | | | | 0,42 | 13,90 | 15,60 | 2,00 | A | 0 | 85,00 | 20,41 | 4113,81 | 1913,76 | 24,2318 | M |
| T-19421L | | | | | 0,42 | 13,90 | 15,60 | 3,25 | B | 90 | 85,00 | 33,15 | 4113,81 | 1703,27 | 30,8480 | M |
| T-19421R | | | | | 0,42 | 13,90 | 15,60 | 3,25 | B | 90 | 85,00 | 33,15 | 4113,81 | 1703,27 | 30,8480 | M |
| T-19422L | | | | | 0,42 | 13,90 | 15,60 | 4,50 | C | 180 | 85,00 | 45,98 | 4113,81 | 1575,30 | 37,4643 | M |
| T-19422R | | | | | 0,42 | 13,90 | 15,60 | 4,50 | C | 180 | 85,00 | 45,98 | 4113,81 | 1575,30 | 37,4643 | M |
| T-19423L | | | | | 0,42 | 13,90 | 15,60 | 5,75 | D | 270 | 85,00 | 58,73 | 4113,81 | 1485,30 | 44,0805 | M |
| T-19423R | | | | | 0,42 | 13,90 | 15,60 | 5,75 | D | 270 | 85,00 | 58,73 | 4113,81 | 1485,30 | 44,0805 | M |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19424L | 3,60 | 17,40 | 0,42 | 13,90 | 15,60 | 7,00 | A | 0 | 85,00 | 71,47 | 4113,81 | 1416,81 | 50,6967 | M | | |
| T-19424R | | | 0,42 | 13,90 | 15,60 | 7,00 | A | 0 | 85,00 | 71,47 | 4113,81 | 1416,81 | 50,6967 | M | | |
| T-19425L | | | 0,42 | 13,90 | 15,60 | 8,25 | B | 90 | 85,00 | 84,22 | 4113,81 | 1362,03 | 57,3130 | M | | |
| T-19425R | | | 0,42 | 13,90 | 15,60 | 8,25 | B | 90 | 85,00 | 84,22 | 4113,81 | 1362,03 | 57,3130 | M | | |
| T-19426L | | | 0,42 | 13,90 | 15,60 | 9,50 | C | 180 | 85,00 | 96,96 | 4113,81 | 1316,68 | 63,9292 | M | | |
| T-19426R | | | 0,42 | 13,90 | 15,60 | 9,50 | C | 180 | 85,00 | 96,96 | 4113,81 | 1316,68 | 63,9292 | M | | |
| T-19427L | | | 0,42 | 13,90 | 15,60 | 10,75 | D | 270 | 85,00 | 109,79 | 4113,81 | 1278,19 | 70,5454 | M | | |
| T-19427R | | | 0,42 | 13,90 | 15,60 | 10,75 | D | 270 | 85,00 | 109,79 | 4113,81 | 1278,19 | 70,5454 | M | | |
| T-19440L | 22,40 | 22,40 | 0,52 | 17,90 | 20,10 | 2,00 | A | 0 | 85,00 | 26,01 | 4240,20 | 1719,93 | 26,7523 | M | | |
| T-19440R | | | 0,52 | 17,90 | 20,10 | 2,00 | A | 0 | 85,00 | 26,01 | 4240,20 | 1719,93 | 26,7523 | M | | |
| T-19441L | | | 0,52 | 17,90 | 20,10 | 3,25 | B | 90 | 85,00 | 42,34 | 4240,20 | 1530,76 | 34,9438 | M | | |
| T-19441R | | | 0,52 | 17,90 | 20,10 | 3,25 | B | 90 | 85,00 | 42,34 | 4240,20 | 1530,76 | 34,9438 | M | | |
| T-19442L | | | 0,52 | 17,90 | 20,10 | 4,50 | C | 180 | 85,00 | 58,58 | 4240,20 | 1415,75 | 43,1353 | M | | |
| T-19442R | | | 0,52 | 17,90 | 20,10 | 4,50 | C | 180 | 85,00 | 58,58 | 4240,20 | 1415,75 | 43,1353 | M | | |
| T-19443L | | | 0,52 | 17,90 | 20,10 | 5,75 | D | 270 | 85,00 | 74,91 | 4240,20 | 1334,87 | 51,3269 | M | | |
| T-19443R | | | 0,52 | 17,90 | 20,10 | 5,75 | D | 270 | 85,00 | 74,91 | 4240,20 | 1334,87 | 51,3269 | M | | |
| T-19444L | | | 0,52 | 17,90 | 20,10 | 7,00 | A | 0 | 85,00 | 91,15 | 4240,20 | 1273,31 | 59,5184 | M | | |
| T-19444R | | | 0,52 | 17,90 | 20,10 | 7,00 | A | 0 | 85,00 | 91,15 | 4240,20 | 1273,31 | 59,5184 | M | | |
| T-19445L | | | 0,52 | 17,90 | 20,10 | 8,25 | B | 90 | 85,00 | 107,39 | 4240,20 | 1224,08 | 67,7099 | M | | |
| T-19445R | | | 0,52 | 17,90 | 20,10 | 8,25 | B | 90 | 85,00 | 107,39 | 4240,20 | 1224,08 | 67,7099 | M | | |
| T-19446L | | | 0,52 | 17,90 | 20,10 | 9,50 | C | 180 | 85,00 | 123,72 | 4240,20 | 1183,33 | 75,9014 | M | | |
| T-19446R | | | 0,52 | 17,90 | 20,10 | 9,50 | C | 180 | 85,00 | 123,72 | 4240,20 | 1183,33 | 75,9014 | M | | |
| T-19447L | | | 0,52 | 17,90 | 20,10 | 10,75 | D | 270 | 85,00 | 139,97 | 4240,20 | 1148,74 | 84,0930 | M | | |
| T-19447R | | | 0,52 | 17,90 | 20,10 | 10,75 | D | 270 | 85,00 | 139,97 | 4240,20 | 1148,74 | 84,0930 | M | | |
| T-19460L | | | 27,40 | 27,40 | 0,62 | 21,90 | 24,60 | 2,00 | A | 0 | 85,00 | 31,69 | 4326,15 | 1575,13 | 29,2728 | M |
| T-19460R | | | | | 0,62 | 21,90 | 24,60 | 2,00 | A | 0 | 85,00 | 31,69 | 4326,15 | 1575,13 | 29,2728 | M |
| T-19461L | | | | | 0,62 | 21,90 | 24,60 | 3,25 | B | 90 | 85,00 | 51,43 | 4326,15 | 1401,88 | 39,0396 | M |
| T-19461R | | | | | 0,62 | 21,90 | 24,60 | 3,25 | B | 90 | 85,00 | 51,43 | 4326,15 | 1401,88 | 39,0396 | M |
| T-19462L | 0,62 | 21,90 | | | 24,60 | 4,50 | C | 180 | 85,00 | 71,27 | 4326,15 | 1296,56 | 48,8064 | M | | |
| T-19462R | 0,62 | 21,90 | | | 24,60 | 4,50 | C | 180 | 85,00 | 71,27 | 4326,15 | 1296,56 | 48,8064 | M | | |
| T-19463L | 0,62 | 21,90 | | | 24,60 | 5,75 | D | 270 | 85,00 | 91,10 | 4326,15 | 1222,48 | 58,5732 | M | | |
| T-19463R | 0,62 | 21,90 | | | 24,60 | 5,75 | D | 270 | 85,00 | 91,10 | 4326,15 | 1222,48 | 58,5732 | M | | |
| T-19464L | 0,62 | 21,90 | 24,60 | 7,00 | A | 0 | 85,00 | 110,84 | 4326,15 | 1166,11 | 68,3400 | M | | | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19464R | 3,60 | 27,40 | 0,62 | 21,90 | 24,60 | 7,00 | A | 0 | 85,00 | 110,84 | 4326,15 | 1166,11 | 68,3400 | M | | |
| T-19465L | | | 0,62 | 21,90 | 24,60 | 8,25 | B | 90 | 85,00 | 130,67 | 4326,15 | 1121,02 | 78,1068 | M | | |
| T-19465R | | | 0,62 | 21,90 | 24,60 | 8,25 | B | 90 | 85,00 | 130,67 | 4326,15 | 1121,02 | 78,1068 | M | | |
| T-19466L | | | 0,62 | 21,90 | 24,60 | 9,50 | C | 180 | 85,00 | 150,41 | 4326,15 | 1083,70 | 87,8737 | M | | |
| T-19466R | | | 0,62 | 21,90 | 24,60 | 9,50 | C | 180 | 85,00 | 150,41 | 4326,15 | 1083,70 | 87,8737 | M | | |
| T-19467L | | | 0,62 | 21,90 | 24,60 | 10,75 | D | 270 | 85,00 | 170,24 | 4326,15 | 1052,02 | 97,6405 | M | | |
| T-19467R | | | 0,62 | 21,90 | 24,60 | 10,75 | D | 270 | 85,00 | 170,24 | 4326,15 | 1052,02 | 97,6405 | M | | |
| T-19500L | | | 4,00 | 17,50 | 0,43 | 14,00 | 15,70 | 2,00 | A | 0 | 90,00 | 18,35 | 5236,92 | 2734,82 | 31,2180 | S |
| T-19500R | 0,43 | 14,00 | | | 15,70 | 2,00 | A | 0 | 90,00 | 18,35 | 5236,92 | 2734,82 | 31,2180 | S | | |
| T-19501L | 0,43 | 14,00 | | | 15,70 | 3,25 | B | 90 | 90,00 | 29,73 | 5491,74 | 2434,02 | 39,5806 | S | | |
| T-19501R | 0,43 | 14,00 | | | 15,70 | 3,25 | B | 90 | 90,00 | 29,73 | 5491,74 | 2434,02 | 39,5806 | S | | |
| T-19502L | 0,43 | 14,00 | | | 15,70 | 4,50 | C | 180 | 90,00 | 41,20 | 5491,74 | 2251,16 | 47,9433 | S | | |
| T-19502R | 0,43 | 14,00 | | | 15,70 | 4,50 | C | 180 | 90,00 | 41,20 | 5491,74 | 2251,16 | 47,9433 | S | | |
| T-19503L | 0,43 | 14,00 | | | 15,70 | 5,75 | D | 270 | 90,00 | 52,66 | 5491,74 | 2122,54 | 56,3060 | S | | |
| T-19503R | 0,43 | 14,00 | | | 15,70 | 5,75 | D | 270 | 90,00 | 52,66 | 5491,74 | 2122,54 | 56,3060 | S | | |
| T-19504L | 0,43 | 14,00 | | | 15,70 | 7,00 | A | 0 | 90,00 | 64,13 | 5491,74 | 2024,66 | 64,6686 | S | | |
| T-19504R | 0,43 | 14,00 | | | 15,70 | 7,00 | A | 0 | 90,00 | 64,13 | 5491,74 | 2024,66 | 64,6686 | S | | |
| T-19505L | 0,43 | 14,00 | | | 15,70 | 8,25 | B | 90 | 90,00 | 75,51 | 5491,74 | 1946,38 | 73,0313 | S | | |
| T-19505R | 0,43 | 14,00 | | | 15,70 | 8,25 | B | 90 | 90,00 | 75,51 | 5491,74 | 1946,38 | 73,0313 | S | | |
| T-19506L | 0,43 | 14,00 | | | 15,70 | 9,50 | C | 180 | 90,00 | 86,98 | 5491,74 | 1881,58 | 81,3940 | S | | |
| T-19506R | 0,43 | 14,00 | | | 15,70 | 9,50 | C | 180 | 90,00 | 86,98 | 5491,74 | 1881,58 | 81,3940 | S | | |
| T-19507L | 0,43 | 14,00 | | | 15,70 | 10,75 | D | 270 | 90,00 | 98,45 | 5491,74 | 1826,58 | 89,7566 | S | | |
| T-19507R | 0,43 | 14,00 | | | 15,70 | 10,75 | D | 270 | 90,00 | 98,45 | 5491,74 | 1826,58 | 89,7566 | S | | |
| T-19520L | 22,50 | 22,50 | | | 0,52 | 18,00 | 20,20 | 2,00 | A | 0 | 90,00 | 23,34 | 5673,53 | 2463,35 | 34,3297 | S |
| T-19520R | | | | | 0,52 | 18,00 | 20,20 | 2,00 | A | 0 | 90,00 | 23,34 | 5673,53 | 2463,35 | 34,3297 | S |
| T-19521L | | | | | 0,52 | 18,00 | 20,20 | 3,25 | B | 90 | 90,00 | 37,91 | 5673,53 | 2192,41 | 44,6371 | S |
| T-19521R | | | | | 0,52 | 18,00 | 20,20 | 3,25 | B | 90 | 90,00 | 37,91 | 5673,53 | 2192,41 | 44,6371 | S |
| T-19522L | | | | | 0,52 | 18,00 | 20,20 | 4,50 | C | 180 | 90,00 | 52,48 | 5673,53 | 2027,69 | 54,9446 | S |
| T-19522R | | | | | 0,52 | 18,00 | 20,20 | 4,50 | C | 180 | 90,00 | 52,48 | 5673,53 | 2027,69 | 54,9446 | S |
| T-19523L | | | | | 0,52 | 18,00 | 20,20 | 5,75 | D | 270 | 90,00 | 67,04 | 5673,53 | 1911,84 | 65,2521 | S |
| T-19523R | | | | | 0,52 | 18,00 | 20,20 | 5,75 | D | 270 | 90,00 | 67,04 | 5673,53 | 1911,84 | 65,2521 | S |
| T-19524L | | | 0,52 | 18,00 | 20,20 | 7,00 | A | 0 | 90,00 | 81,61 | 5673,53 | 1823,68 | 75,5596 | S | | |
| T-19524R | | | 0,52 | 18,00 | 20,20 | 7,00 | A | 0 | 90,00 | 81,61 | 5673,53 | 1823,68 | 75,5596 | S | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19525L | 4,00 | 22,50 | 0,52 | 18,00 | 20,20 | 8,25 | B | 90 | 90,00 | 96,18 | 5673,53 | 1753,17 | 85,8670 | S | | |
| T-19525R | | | 0,52 | 18,00 | 20,20 | 8,25 | B | 90 | 90,00 | 96,18 | 5673,53 | 1753,17 | 85,8670 | S | | |
| T-19526L | | | 0,52 | 18,00 | 20,20 | 9,50 | C | 180 | 90,00 | 110,74 | 5673,53 | 1694,80 | 96,1745 | S | | |
| T-19526R | | | 0,52 | 18,00 | 20,20 | 9,50 | C | 180 | 90,00 | 110,74 | 5673,53 | 1694,80 | 96,1745 | S | | |
| T-19527L | | | 0,52 | 18,00 | 20,20 | 10,75 | D | 270 | 90,00 | 125,31 | 5673,53 | 1645,26 | 106,4820 | S | | |
| T-19527R | | | 0,52 | 18,00 | 20,20 | 10,75 | D | 270 | 90,00 | 125,31 | 5673,53 | 1645,26 | 106,4820 | S | | |
| T-19540L | 27,50 | 27,50 | 0,62 | 22,00 | 24,70 | 2,00 | A | 0 | 90,00 | 28,34 | 5798,12 | 2259,40 | 37,4414 | S | | |
| T-19540R | | | 0,62 | 22,00 | 24,70 | 2,00 | A | 0 | 90,00 | 28,34 | 5798,12 | 2259,40 | 37,4414 | S | | |
| T-19541L | | | 0,62 | 22,00 | 24,70 | 3,25 | B | 90 | 90,00 | 46,01 | 5960,44 | 2010,89 | 49,6936 | S | | |
| T-19541R | | | 0,62 | 22,00 | 24,70 | 3,25 | B | 90 | 90,00 | 46,01 | 5960,44 | 2010,89 | 49,6936 | S | | |
| T-19542L | | | 0,62 | 22,00 | 24,70 | 4,50 | C | 180 | 91,00 | 63,67 | 5798,12 | 1859,81 | 62,1441 | S | | |
| T-19542R | | | 0,62 | 22,00 | 24,70 | 4,50 | C | 180 | 91,00 | 63,67 | 5798,12 | 1859,81 | 62,1441 | S | | |
| T-19543L | | | 0,62 | 22,00 | 24,70 | 5,75 | D | 270 | 90,00 | 81,34 | 5798,12 | 1753,56 | 74,1982 | S | | |
| T-19543R | | | 0,62 | 22,00 | 24,70 | 5,75 | D | 270 | 90,00 | 81,34 | 5798,12 | 1753,56 | 74,1982 | S | | |
| T-19544L | | | 0,62 | 22,00 | 24,70 | 7,00 | A | 0 | 90,00 | 99,10 | 5798,12 | 1672,70 | 86,4505 | S | | |
| T-19544R | | | 0,62 | 22,00 | 24,70 | 7,00 | A | 0 | 90,00 | 99,10 | 5798,12 | 1672,70 | 86,4505 | S | | |
| T-19545L | | | 0,62 | 22,00 | 24,70 | 8,25 | B | 90 | 90,00 | 116,76 | 5798,12 | 1608,02 | 98,7027 | S | | |
| T-19545R | | | 0,62 | 22,00 | 24,70 | 8,25 | B | 90 | 90,00 | 116,76 | 5798,12 | 1608,02 | 98,7027 | S | | |
| T-19546L | | | 0,62 | 22,00 | 24,70 | 9,50 | C | 180 | 90,00 | 134,43 | 5798,12 | 1554,49 | 110,9550 | S | | |
| T-19546R | | | 0,62 | 22,00 | 24,70 | 9,50 | C | 180 | 90,00 | 134,43 | 5798,12 | 1554,49 | 110,9550 | S | | |
| T-19547L | | | 0,62 | 22,00 | 24,70 | 10,75 | D | 270 | 90,00 | 152,19 | 5798,12 | 1509,05 | 123,2073 | S | | |
| T-19547R | | | 0,62 | 22,00 | 24,70 | 10,75 | D | 270 | 90,00 | 152,19 | 5798,12 | 1509,05 | 123,2073 | S | | |
| T-19560L | | | 32,50 | 32,50 | 0,72 | 26,00 | 29,20 | 2,00 | A | 0 | 90,00 | 33,34 | 5888,83 | 2098,95 | 40,5530 | S |
| T-19560R | | | | | 0,72 | 26,00 | 29,20 | 2,00 | A | 0 | 90,00 | 33,34 | 5888,83 | 2098,95 | 40,5530 | S |
| T-19561L | | | | | 0,72 | 26,00 | 29,20 | 3,25 | B | 90 | 90,00 | 54,10 | 5888,83 | 1868,09 | 54,7501 | S |
| T-19561R | | | | | 0,72 | 26,00 | 29,20 | 3,25 | B | 90 | 90,00 | 54,10 | 5888,83 | 1868,09 | 54,7501 | S |
| T-19562L | 0,72 | 26,00 | | | 29,20 | 4,50 | C | 180 | 90,00 | 74,96 | 5888,83 | 1727,74 | 68,9472 | S | | |
| T-19562R | 0,72 | 26,00 | | | 29,20 | 4,50 | C | 180 | 90,00 | 74,96 | 5888,83 | 1727,74 | 68,9472 | S | | |
| T-19563L | 0,72 | 26,00 | | | 29,20 | 5,75 | D | 270 | 90,00 | 95,73 | 5888,83 | 1629,03 | 83,1443 | S | | |
| T-19563R | 0,72 | 26,00 | | | 29,20 | 5,75 | D | 270 | 90,00 | 95,73 | 5888,83 | 1629,03 | 83,1443 | S | | |
| T-19564L | 0,72 | 26,00 | | | 29,20 | 7,00 | A | 0 | 90,00 | 116,59 | 5888,83 | 1553,91 | 97,3414 | S | | |
| T-19564R | 0,72 | 26,00 | | | 29,20 | 7,00 | A | 0 | 90,00 | 116,59 | 5888,83 | 1553,91 | 97,3414 | S | | |
| T-19565L | 0,72 | 26,00 | | | 29,20 | 8,25 | B | 90 | 90,00 | 137,35 | 5888,83 | 1493,83 | 111,5385 | S | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---|
| T-19565R | 4,00 | 32,50 | 0,72 | 26,00 | 29,20 | 8,25 | B | 90 | 90,00 | 137,35 | 5888,83 | 1493,83 | 111,5385 | S | |
| T-19566L | | | 0,72 | 26,00 | 29,20 | 9,50 | C | 180 | 90,00 | 158,21 | 5888,83 | 1444,09 | 125,7356 | S | |
| T-19566R | | | 0,72 | 26,00 | 29,20 | 9,50 | C | 180 | 90,00 | 158,21 | 5888,83 | 1444,09 | 125,7356 | S | |
| T-19567L | | | 0,72 | 26,00 | 29,20 | 10,75 | D | 270 | 90,00 | 178,98 | 5888,83 | 1401,88 | 139,9326 | S | |
| T-19567R | | | 0,72 | 26,00 | 29,20 | 10,75 | D | 270 | 90,00 | 178,98 | 5888,83 | 1401,88 | 139,9326 | S | |
| T-19700L | 4,50 | 20,50 | 0,50 | 14,00 | 18,10 | 2,00 | A | 0 | 100,00 | 17,43 | 7210,54 | 3830,12 | 44,7754 | S | |
| T-19700R | | | 0,50 | 14,00 | 18,10 | 2,00 | A | 0 | 100,00 | 17,43 | 7210,54 | 3830,12 | 44,7754 | S | |
| T-19701L | | | 0,50 | 14,00 | 18,10 | 2,25 | B | 90 | 100,00 | 19,61 | 7210,54 | 3723,37 | 47,2368 | S | |
| T-19701R | | | 0,50 | 14,00 | 18,10 | 2,25 | B | 90 | 100,00 | 19,61 | 7210,54 | 3723,37 | 47,2368 | S | |
| T-19702L | | | 0,50 | 14,00 | 18,10 | 2,50 | C | 180 | 100,00 | 21,78 | 7210,54 | 3630,40 | 49,6982 | S | |
| T-19702R | | | 0,50 | 14,00 | 18,10 | 2,50 | C | 180 | 100,00 | 21,78 | 7210,54 | 3630,40 | 49,6982 | S | |
| T-19703L | | | 0,50 | 14,00 | 18,10 | 2,75 | D | 270 | 100,00 | 23,96 | 7210,54 | 3548,30 | 52,1596 | S | |
| T-19703R | | | 0,50 | 14,00 | 18,10 | 2,75 | D | 270 | 100,00 | 23,96 | 7210,54 | 3548,30 | 52,1596 | S | |
| T-19704L | | | 0,50 | 14,00 | 18,10 | 3,00 | A | 0 | 100,00 | 26,14 | 7210,54 | 3474,97 | 54,6210 | S | |
| T-19704R | | | 0,50 | 14,00 | 18,10 | 3,00 | A | 0 | 100,00 | 26,14 | 7210,54 | 3474,97 | 54,6210 | S | |
| T-19705L | | | 0,50 | 14,00 | 18,10 | 3,25 | B | 90 | 100,00 | 28,32 | 7210,54 | 3408,85 | 57,0824 | S | |
| T-19705R | | | 0,50 | 14,00 | 18,10 | 3,25 | B | 90 | 100,00 | 28,32 | 7210,54 | 3408,85 | 57,0824 | S | |
| T-19706L | | | 0,50 | 14,00 | 18,10 | 4,50 | C | 180 | 100,00 | 39,21 | 7210,54 | 3152,74 | 69,3894 | S | |
| T-19706R | | | 0,50 | 14,00 | 18,10 | 4,50 | C | 180 | 100,00 | 39,21 | 7210,54 | 3152,74 | 69,3894 | S | |
| T-19707L | | | 0,50 | 14,00 | 18,10 | 5,75 | D | 270 | 100,00 | 50,10 | 7210,54 | 2972,62 | 81,6964 | S | |
| T-19707R | | | 0,50 | 14,00 | 18,10 | 5,75 | D | 270 | 100,00 | 50,10 | 7210,54 | 2972,62 | 81,6964 | S | |
| T-19708L | | | 0,50 | 14,00 | 18,10 | 7,00 | A | 0 | 100,00 | 61,00 | 7210,54 | 2835,54 | 94,0033 | S | |
| T-19708R | | | 0,50 | 14,00 | 18,10 | 7,00 | A | 0 | 100,00 | 61,00 | 7210,54 | 2835,54 | 94,0033 | S | |
| T-19740L | | | 0,50 | 14,00 | 18,10 | 8,25 | B | 90 | 100,00 | 71,89 | 7210,54 | 2725,90 | 106,6092 | S | |
| T-19740R | | | 0,50 | 14,00 | 18,10 | 8,25 | B | 90 | 100,00 | 71,89 | 7210,54 | 2725,90 | 106,6092 | S | |
| T-19741L | | | 0,50 | 14,00 | 18,10 | 9,50 | C | 180 | 100,00 | 17,43 | 7210,54 | 2635,15 | 118,9554 | S | |
| T-19741R | | | 0,50 | 14,00 | 18,10 | 9,50 | C | 180 | 100,00 | 82,78 | 7210,54 | 2635,15 | 118,9554 | S | |
| T-19709L | | | 25,50 | 0,60 | 16,00 | 22,50 | 2,00 | A | 0 | 100,00 | 21,50 | 7413,47 | 3496,41 | 48,7137 | S |
| T-19709R | | | | 0,60 | 16,00 | 22,50 | 2,00 | A | 0 | 100,00 | 21,50 | 7413,47 | 3496,41 | 48,7137 | S |
| T-19710L | | | | 0,60 | 16,00 | 22,50 | 2,25 | B | 90 | 100,00 | 24,19 | 7413,47 | 3398,95 | 51,6674 | S |
| T-19710R | | | | 0,60 | 16,00 | 22,50 | 2,25 | B | 90 | 100,00 | 24,19 | 7413,47 | 3398,95 | 51,6674 | S |
| T-19711L | | | | 0,60 | 16,00 | 22,50 | 2,50 | C | 180 | 100,00 | 26,88 | 7413,47 | 3314,08 | 54,6210 | S |
| T-19711R | | | | 0,60 | 16,00 | 22,50 | 2,50 | C | 180 | 100,00 | 26,88 | 7413,47 | 3314,08 | 54,6210 | S |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)

Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19712L | 4,50 | 25,50 | 0,60 | 16,00 | 22,50 | 2,75 | D | 270 | 100,00 | 29,56 | 7413,47 | 3239,14 | 57,5747 | S | | |
| T-19712R | | | 0,60 | 16,00 | 22,50 | 2,75 | D | 270 | 100,00 | 29,56 | 7413,47 | 3239,14 | 57,5747 | S | | |
| T-19713L | | | 0,60 | 16,00 | 22,50 | 3,00 | A | 0 | 100,00 | 32,25 | 7413,47 | 3172,20 | 60,5284 | S | | |
| T-19713R | | | 0,60 | 16,00 | 22,50 | 3,00 | A | 0 | 100,00 | 32,25 | 7413,47 | 3172,20 | 60,5284 | S | | |
| T-19714L | | | 0,60 | 16,00 | 22,50 | 3,25 | B | 90 | 100,00 | 34,94 | 7413,47 | 3111,84 | 63,4820 | S | | |
| T-19714R | | | 0,60 | 16,00 | 22,50 | 3,25 | B | 90 | 100,00 | 34,94 | 7413,47 | 3111,84 | 63,4820 | S | | |
| T-19715L | | | 0,60 | 16,00 | 22,50 | 4,50 | C | 180 | 100,00 | 48,38 | 7413,47 | 2878,05 | 78,2504 | S | | |
| T-19715R | | | 0,60 | 16,00 | 22,50 | 4,50 | C | 180 | 100,00 | 48,38 | 7413,47 | 2878,05 | 78,2504 | S | | |
| T-19716L | | | 0,60 | 16,00 | 22,50 | 5,75 | D | 270 | 100,00 | 61,82 | 7413,47 | 2713,62 | 93,0188 | S | | |
| T-19716R | | | 0,60 | 16,00 | 22,50 | 5,75 | D | 270 | 100,00 | 61,82 | 7413,47 | 2713,62 | 93,0188 | S | | |
| T-19717L | | | 0,60 | 16,00 | 22,50 | 7,00 | A | 0 | 100,00 | 75,25 | 7413,47 | 2588,48 | 107,7872 | S | | |
| T-19717R | | | 0,60 | 16,00 | 22,50 | 7,00 | A | 0 | 100,00 | 75,25 | 7413,47 | 2588,48 | 107,7872 | S | | |
| T-19745L | | | 0,60 | 16,00 | 22,50 | 8,25 | B | 90 | 100,00 | 88,69 | 7413,47 | 2488,40 | 122,9061 | S | | |
| T-19745R | | | 0,60 | 16,00 | 22,50 | 8,25 | B | 90 | 100,00 | 88,69 | 7413,47 | 2488,40 | 122,9061 | S | | |
| T-19746L | | | 0,60 | 16,00 | 22,50 | 9,50 | C | 180 | 100,00 | 102,13 | 7413,47 | 2405,56 | 137,7216 | S | | |
| T-19746R | | | 0,60 | 16,00 | 22,50 | 9,50 | C | 180 | 100,00 | 102,13 | 7413,47 | 2405,56 | 137,7216 | S | | |
| T-19718L | | | 30,50 | 30,50 | 0,70 | 19,00 | 26,90 | 2,00 | A | 0 | 100,00 | 25,58 | 7558,94 | 3237,04 | 52,6519 | S |
| T-19718R | | | | | 0,70 | 19,00 | 26,90 | 2,00 | A | 0 | 100,00 | 25,58 | 7558,94 | 3237,04 | 52,6519 | S |
| T-19719L | | | | | 0,70 | 19,00 | 26,90 | 2,25 | B | 90 | 100,00 | 28,77 | 7558,94 | 3146,82 | 56,0979 | S |
| T-19719R | | | | | 0,70 | 19,00 | 26,90 | 2,25 | B | 90 | 100,00 | 28,77 | 7558,94 | 3146,82 | 56,0979 | S |
| T-19720L | 0,70 | 19,00 | | | 26,90 | 2,50 | C | 180 | 100,00 | 31,97 | 7558,94 | 3068,25 | 59,5438 | S | | |
| T-19720R | 0,70 | 19,00 | | | 26,90 | 2,50 | C | 180 | 100,00 | 31,97 | 7558,94 | 3068,25 | 59,5438 | S | | |
| T-19721L | 0,70 | 19,00 | | | 26,90 | 2,75 | D | 270 | 100,00 | 35,17 | 7558,94 | 2998,86 | 62,9898 | S | | |
| T-19721R | 0,70 | 19,00 | | | 26,90 | 2,75 | D | 270 | 100,00 | 35,17 | 7558,94 | 2998,86 | 62,9898 | S | | |
| T-19722L | 0,70 | 19,00 | | | 26,90 | 3,00 | A | 0 | 100,00 | 38,37 | 7558,94 | 2936,88 | 66,4357 | S | | |
| T-19722R | 0,70 | 19,00 | | | 26,90 | 3,00 | A | 0 | 100,00 | 38,37 | 7558,94 | 2936,88 | 66,4357 | S | | |
| T-19723L | 0,70 | 19,00 | | | 26,90 | 3,25 | B | 90 | 100,00 | 41,56 | 7558,94 | 2881,00 | 69,8817 | S | | |
| T-19723R | 0,70 | 19,00 | | | 26,90 | 3,25 | B | 90 | 100,00 | 41,56 | 7558,94 | 2881,00 | 69,8817 | S | | |
| T-19724L | 0,70 | 19,00 | | | 26,90 | 4,50 | C | 180 | 100,00 | 57,55 | 7558,94 | 2664,55 | 87,1114 | S | | |
| T-19724R | 0,70 | 19,00 | | | 26,90 | 4,50 | C | 180 | 100,00 | 57,55 | 7558,94 | 2664,55 | 87,1114 | S | | |
| T-19725L | 0,70 | 19,00 | | | 26,90 | 5,75 | D | 270 | 100,00 | 73,53 | 7558,94 | 2512,32 | 104,3412 | S | | |
| T-19725R | 0,70 | 19,00 | | | 26,90 | 5,75 | D | 270 | 100,00 | 73,53 | 7558,94 | 2512,32 | 104,3412 | S | | |
| T-19726L | 0,70 | 19,00 | | | 26,90 | 7,00 | A | 0 | 100,00 | 89,52 | 7558,94 | 2396,47 | 121,5710 | S | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19726R | 4,50 | 30,50 | 0,70 | 19,00 | 26,90 | 7,00 | A | 0 | 100,00 | 89,52 | 7558,94 | 2396,47 | 121,5710 | S | | |
| T-19750L | | | 0,70 | 19,00 | 26,90 | 8,25 | B | 90 | 100,00 | 105,50 | 7558,94 | 2303,81 | 139,2031 | S | | |
| T-19750R | | | 0,70 | 19,00 | 26,90 | 8,25 | B | 90 | 100,00 | 105,50 | 7558,94 | 2303,81 | 139,2031 | S | | |
| T-19751L | | | 0,70 | 19,00 | 26,90 | 9,50 | C | 180 | 100,00 | 121,49 | 7558,94 | 2227,11 | 156,4878 | S | | |
| T-19751R | | | 0,70 | 19,00 | 26,90 | 9,50 | C | 180 | 100,00 | 139,23 | 8662,79 | 2227,11 | 156,4878 | S | | |
| T-19727L | 35,50 | 35,50 | 0,75 | 24,00 | 31,30 | 2,00 | A | 0 | 100,00 | 29,65 | 7668,33 | 3027,98 | 56,5901 | S | | |
| T-19727R | | | 0,75 | 24,00 | 31,30 | 2,00 | A | 0 | 100,00 | 29,65 | 7668,33 | 3027,98 | 56,5901 | S | | |
| T-19728L | | | 0,75 | 24,00 | 31,30 | 2,25 | B | 90 | 100,00 | 33,36 | 7668,33 | 2943,58 | 60,5284 | S | | |
| T-19728R | | | 0,75 | 24,00 | 31,30 | 2,25 | B | 90 | 100,00 | 33,36 | 7668,33 | 2943,58 | 60,5284 | S | | |
| T-19729L | | | 0,75 | 24,00 | 31,30 | 2,50 | C | 180 | 100,00 | 37,07 | 7668,33 | 2870,08 | 64,4666 | S | | |
| T-19729R | | | 0,75 | 24,00 | 31,30 | 2,50 | C | 180 | 100,00 | 37,07 | 7668,33 | 2870,08 | 64,4666 | S | | |
| T-19730L | | | 0,75 | 24,00 | 31,30 | 2,75 | D | 270 | 100,00 | 40,77 | 7668,33 | 2805,17 | 68,4048 | S | | |
| T-19730R | | | 0,75 | 24,00 | 31,30 | 2,75 | D | 270 | 100,00 | 40,77 | 7668,33 | 2805,17 | 68,4048 | S | | |
| T-19731L | | | 0,75 | 24,00 | 31,30 | 3,00 | A | 0 | 100,00 | 44,48 | 7668,33 | 2747,20 | 72,3431 | S | | |
| T-19731R | | | 0,75 | 24,00 | 31,30 | 3,00 | A | 0 | 100,00 | 44,48 | 7668,33 | 2747,20 | 72,3431 | S | | |
| T-19732L | | | 0,75 | 24,00 | 31,30 | 3,25 | B | 90 | 100,00 | 48,19 | 7668,33 | 2694,93 | 76,2813 | S | | |
| T-19732R | | | 0,75 | 24,00 | 31,30 | 3,25 | B | 90 | 100,00 | 48,19 | 7668,33 | 2694,93 | 76,2813 | S | | |
| T-19733L | | | 0,75 | 24,00 | 31,30 | 4,50 | C | 180 | 100,00 | 66,72 | 7668,33 | 2492,46 | 95,9725 | S | | |
| T-19733R | | | 0,75 | 24,00 | 31,30 | 4,50 | C | 180 | 100,00 | 66,72 | 7668,33 | 2492,46 | 95,9725 | S | | |
| T-19734L | | | 0,75 | 24,00 | 31,30 | 5,75 | D | 270 | 100,00 | 85,25 | 7668,33 | 2350,06 | 115,6636 | S | | |
| T-19734R | | | 0,75 | 24,00 | 31,30 | 5,75 | D | 270 | 100,00 | 85,25 | 7668,33 | 2350,06 | 115,6636 | S | | |
| T-19735L | | | 0,75 | 24,00 | 31,30 | 7,00 | A | 0 | 100,00 | 103,79 | 7668,33 | 2241,69 | 135,3548 | S | | |
| T-19735R | | | 0,75 | 24,00 | 31,30 | 7,00 | A | 0 | 100,00 | 103,79 | 7668,33 | 2241,69 | 135,3548 | S | | |
| T-19736L | | | 0,75 | 24,00 | 31,30 | 8,25 | B | 90 | 100,00 | 122,32 | 7668,33 | 2155,02 | 155,5001 | S | | |
| T-19736R | | | 0,75 | 24,00 | 31,30 | 8,25 | B | 90 | 100,00 | 122,32 | 7668,33 | 2155,02 | 155,5001 | S | | |
| T-19737L | | | 0,75 | 24,00 | 31,30 | 9,50 | C | 180 | 100,00 | 140,86 | 7668,33 | 2083,27 | 175,2540 | S | | |
| T-19737R | | | 0,75 | 24,00 | 31,30 | 9,50 | C | 180 | 100,00 | 140,86 | 7668,33 | 2083,27 | 175,2540 | S | | |
| T-19801L | | | 5,00 | 20,00 | 0,50 | 15,00 | 17,50 | 2,00 | A | 0 | 150,00 | 15,39 | 9706,06 | 5538,14 | 70,9139 | T |
| T-19801R | | | | | 0,50 | 15,00 | 17,50 | 2,00 | A | 0 | 150,00 | 15,39 | 9706,06 | 5538,14 | 70,9139 | T |
| T-19802L | | | | | 0,50 | 15,00 | 17,50 | 2,25 | B | 90 | 150,00 | 17,32 | 9706,06 | 5383,78 | 73,9623 | T |
| T-19802R | 0,50 | 15,00 | | | 17,50 | 2,25 | B | 90 | 150,00 | 17,32 | 9706,06 | 5383,78 | 73,9623 | T | | |
| T-19803L | 0,50 | 15,00 | | | 17,50 | 2,50 | C | 180 | 150,00 | 19,24 | 9706,06 | 5249,35 | 77,0108 | T | | |
| T-19803R | 0,50 | 15,00 | | | 17,50 | 2,50 | C | 180 | 150,00 | 19,24 | 9706,06 | 5249,35 | 77,0108 | T | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)
Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|---------|---|
| T-19804L | 5,00 | 20,00 | 0,50 | 15,00 | 17,50 | 2,75 | D | 270 | 150,00 | 21,16 | 9706,06 | 5130,63 | 80,0592 | T | | |
| T-19804R | | | 0,50 | 15,00 | 17,50 | 2,75 | D | 270 | 150,00 | 21,16 | 9706,06 | 5130,63 | 80,0592 | T | | |
| T-19805L | | | 0,50 | 15,00 | 17,50 | 3,00 | A | 0 | 150,00 | 23,09 | 9706,06 | 5024,60 | 83,1077 | T | | |
| T-19805R | | | 0,50 | 15,00 | 17,50 | 3,00 | A | 0 | 150,00 | 23,09 | 9706,06 | 5024,60 | 83,1077 | T | | |
| T-19806L | | | 0,50 | 15,00 | 17,50 | 3,25 | B | 90 | 150,00 | 25,01 | 9706,06 | 4929,00 | 86,1561 | T | | |
| T-19806R | | | 0,50 | 15,00 | 17,50 | 3,25 | B | 90 | 150,00 | 25,01 | 9706,06 | 4929,00 | 86,1561 | T | | |
| T-19807L | | | 0,50 | 15,00 | 17,50 | 4,50 | C | 180 | 150,00 | 34,63 | 9706,06 | 4558,69 | 101,3984 | T | | |
| T-19807R | | | 0,50 | 15,00 | 17,50 | 4,50 | C | 180 | 150,00 | 34,63 | 9706,06 | 4558,69 | 101,3984 | T | | |
| T-19808L | | | 0,50 | 15,00 | 17,50 | 5,75 | D | 270 | 150,00 | 44,25 | 9706,06 | 4298,24 | 116,6406 | T | | |
| T-19808R | | | 0,50 | 15,00 | 17,50 | 5,75 | D | 270 | 150,00 | 44,25 | 9706,06 | 4298,24 | 116,6406 | T | | |
| T-19809L | | | 0,50 | 15,00 | 17,50 | 7,00 | A | 0 | 150,00 | 53,87 | 9706,06 | 4100,03 | 131,8828 | T | | |
| T-19809R | | | 0,50 | 15,00 | 17,50 | 7,00 | A | 0 | 150,00 | 53,87 | 9706,06 | 4100,03 | 131,8828 | T | | |
| T-19810L | | | 0,50 | 15,00 | 17,50 | 8,25 | B | 90 | 150,00 | 63,49 | 9706,06 | 3941,50 | 147,1250 | T | | |
| T-19810R | | | 0,50 | 15,00 | 17,50 | 8,25 | B | 90 | 150,00 | 63,49 | 9706,06 | 3941,50 | 147,1250 | T | | |
| T-19811L | | | 0,50 | 15,00 | 17,50 | 9,50 | C | 180 | 150,00 | 15,39 | 9706,06 | 3810,28 | 162,3672 | T | | |
| T-19811R | | | 0,50 | 15,00 | 17,50 | 9,50 | C | 180 | 150,00 | 73,11 | 9706,06 | 3810,28 | 162,3672 | T | | |
| T-19815L | | | 28,00 | 28,00 | 0,60 | 18,00 | 24,80 | 2,00 | A | 0 | 150,00 | 21,26 | 10155,28 | 4820,33 | 78,7179 | T |
| T-19815R | | | | | 0,60 | 18,00 | 24,80 | 2,00 | A | 0 | 150,00 | 21,26 | 10155,28 | 4820,33 | 78,7179 | T |
| T-19816L | | | | | 0,60 | 18,00 | 24,80 | 2,25 | B | 90 | 150,00 | 23,91 | 10155,28 | 4685,98 | 82,7419 | T |
| T-19816R | | | | | 0,60 | 18,00 | 24,80 | 2,25 | B | 90 | 150,00 | 23,91 | 10155,28 | 4685,98 | 82,7419 | T |
| T-19817L | | | | | 0,60 | 18,00 | 24,80 | 2,50 | C | 180 | 150,00 | 26,57 | 10155,28 | 4568,97 | 86,7658 | T |
| T-19817R | | | | | 0,60 | 18,00 | 24,80 | 2,50 | C | 180 | 150,00 | 26,57 | 10155,28 | 4568,97 | 86,7658 | T |
| T-19818L | | | | | 0,60 | 18,00 | 24,80 | 2,75 | D | 270 | 150,00 | 29,23 | 10155,28 | 4465,64 | 90,7898 | T |
| T-19818R | | | | | 0,60 | 18,00 | 24,80 | 2,75 | D | 270 | 150,00 | 29,23 | 10155,28 | 4465,64 | 90,7898 | T |
| T-19819L | 0,60 | 18,00 | | | 24,80 | 3,00 | A | 0 | 150,00 | 31,89 | 10155,28 | 4373,36 | 94,8137 | T | | |
| T-19819R | 0,60 | 18,00 | | | 24,80 | 3,00 | A | 0 | 150,00 | 31,89 | 10155,28 | 4373,36 | 94,8137 | T | | |
| T-19820L | 0,60 | 18,00 | | | 24,80 | 3,25 | B | 90 | 150,00 | 34,54 | 10155,28 | 4290,14 | 98,8377 | T | | |
| T-19820R | 0,60 | 18,00 | | | 24,80 | 3,25 | B | 90 | 150,00 | 34,54 | 10155,28 | 4290,14 | 98,8377 | T | | |
| T-19821L | 0,60 | 18,00 | | | 24,80 | 4,50 | C | 180 | 150,00 | 47,83 | 10155,28 | 3967,83 | 118,9574 | T | | |
| T-19821R | 0,60 | 18,00 | | | 24,80 | 4,50 | C | 180 | 150,00 | 47,83 | 10155,28 | 3967,83 | 118,9574 | T | | |
| T-19822L | 0,60 | 18,00 | | | 24,80 | 5,75 | D | 270 | 150,00 | 61,11 | 10155,28 | 3741,14 | 139,0771 | T | | |
| T-19822R | 0,60 | 18,00 | | | 24,80 | 5,75 | D | 270 | 150,00 | 61,11 | 10155,28 | 3741,14 | 139,0771 | T | | |
| T-19823L | 0,60 | 18,00 | | | 24,80 | 7,00 | A | 0 | 150,00 | 74,40 | 10155,28 | 3568,62 | 159,1969 | T | | |

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group | | |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|----------|---|
| T-19823R | 5,00 | 28,00 | 0,60 | 18,00 | 24,80 | 7,00 | A | 0 | 150,00 | 74,40 | 10155,28 | 3568,62 | 159,1969 | T | | |
| T-19824L | | | 0,60 | 18,00 | 24,80 | 8,25 | B | 90 | 150,00 | 87,68 | 10155,28 | 3430,64 | 179,3166 | U | | |
| T-19824R | | | 0,60 | 18,00 | 24,80 | 8,25 | B | 90 | 150,00 | 87,68 | 10155,28 | 3430,64 | 179,3166 | U | | |
| T-19825L | | | 0,60 | 18,00 | 24,80 | 9,50 | C | 180 | 150,00 | 100,97 | 10155,28 | 3316,43 | 199,4363 | U | | |
| T-19825R | | | 0,60 | 18,00 | 24,80 | 9,50 | C | 180 | 150,00 | 100,97 | 10155,28 | 3316,43 | 199,4363 | U | | |
| T-19830L | 36,00 | 36,00 | 0,80 | 25,00 | 32,00 | 2,00 | A | 0 | 150,00 | 27,13 | 10430,68 | 4324,56 | 86,5219 | T | | |
| T-19830R | | | 0,80 | 25,00 | 32,00 | 2,00 | A | 0 | 150,00 | 27,13 | 10430,68 | 4324,56 | 86,5219 | T | | |
| T-19831L | | | 0,80 | 25,00 | 32,00 | 2,25 | B | 90 | 150,00 | 30,52 | 10430,68 | 4204,02 | 91,5214 | T | | |
| T-19831R | | | 0,80 | 25,00 | 32,00 | 2,25 | B | 90 | 150,00 | 30,52 | 10430,68 | 4204,02 | 91,5214 | T | | |
| T-19832L | | | 0,80 | 25,00 | 32,00 | 2,50 | C | 180 | 150,00 | 33,91 | 10430,68 | 4099,05 | 96,5208 | T | | |
| T-19832R | | | 0,80 | 25,00 | 32,00 | 2,50 | C | 180 | 150,00 | 33,91 | 10430,68 | 4099,05 | 96,5208 | T | | |
| T-19833L | | | 0,80 | 25,00 | 32,00 | 2,75 | D | 270 | 150,00 | 37,30 | 10430,68 | 4006,35 | 101,5203 | T | | |
| T-19833R | | | 0,80 | 25,00 | 32,00 | 2,75 | D | 270 | 150,00 | 37,30 | 10430,68 | 4006,35 | 101,5203 | T | | |
| T-19834L | | | 0,80 | 25,00 | 32,00 | 3,00 | A | 0 | 150,00 | 40,69 | 10430,68 | 3923,56 | 106,5197 | T | | |
| T-19834R | | | 0,80 | 25,00 | 32,00 | 3,00 | A | 0 | 150,00 | 40,69 | 10430,68 | 3923,56 | 106,5197 | T | | |
| T-19835L | | | 0,80 | 25,00 | 32,00 | 3,25 | B | 90 | 150,00 | 44,08 | 10430,68 | 3848,90 | 111,5192 | T | | |
| T-19835R | | | 0,80 | 25,00 | 32,00 | 3,25 | B | 90 | 150,00 | 44,08 | 10430,68 | 3848,90 | 111,5192 | T | | |
| T-19836L | | | 0,80 | 25,00 | 32,00 | 4,50 | C | 180 | 150,00 | 61,03 | 10430,68 | 3559,74 | 136,5164 | T | | |
| T-19836R | | | 0,80 | 25,00 | 32,00 | 4,50 | C | 180 | 150,00 | 61,03 | 10430,68 | 3559,74 | 136,5164 | T | | |
| T-19837L | | | 0,80 | 25,00 | 32,00 | 5,75 | D | 270 | 150,00 | 77,99 | 10430,68 | 3356,36 | 161,5137 | T | | |
| T-19837R | | | 0,80 | 25,00 | 32,00 | 5,75 | D | 270 | 150,00 | 77,99 | 10430,68 | 3356,36 | 161,5137 | T | | |
| T-19838L | | | 0,80 | 25,00 | 32,00 | 7,00 | A | 0 | 150,00 | 94,94 | 10430,68 | 3201,59 | 186,5109 | T | | |
| T-19838R | | | 0,80 | 25,00 | 32,00 | 7,00 | A | 0 | 150,00 | 94,94 | 10430,68 | 3201,59 | 186,5109 | T | | |
| T-19839L | | | 0,80 | 25,00 | 32,00 | 8,25 | B | 90 | 150,00 | 111,89 | 10430,68 | 3077,80 | 211,5082 | U | | |
| T-19839R | | | 0,80 | 25,00 | 32,00 | 8,25 | B | 90 | 150,00 | 111,89 | 10430,68 | 3077,80 | 211,5082 | U | | |
| T-19840L | | | 0,80 | 25,00 | 32,00 | 9,50 | C | 180 | 150,00 | 128,85 | 10430,68 | 2975,33 | 236,5054 | U | | |
| T-19840R | | | 0,80 | 25,00 | 32,00 | 9,50 | C | 180 | 150,00 | 146,57 | 11865,44 | 2975,33 | 236,5054 | U | | |
| T-19845L | | | 44,00 | 44,00 | 0,90 | 32,00 | 39,00 | 2,00 | A | 0 | 150,00 | 33,00 | 10616,80 | 3955,81 | 94,3260 | T |
| T-19845R | | | | | 0,90 | 32,00 | 39,00 | 2,00 | A | 0 | 150,00 | 33,00 | 10616,80 | 3955,81 | 94,3260 | T |
| T-19846L | | | | | 0,90 | 32,00 | 39,00 | 2,25 | B | 90 | 150,00 | 37,12 | 10616,80 | 3845,56 | 100,3009 | T |
| T-19846R | 0,90 | 32,00 | | | 39,00 | 2,25 | B | 90 | 150,00 | 37,12 | 10616,80 | 3845,56 | 100,3009 | T | | |
| T-19847L | 0,90 | 32,00 | | | 39,00 | 2,50 | C | 180 | 150,00 | 41,25 | 10616,80 | 3749,53 | 106,2759 | T | | |
| T-19847R | 0,90 | 32,00 | | | 39,00 | 2,50 | C | 180 | 150,00 | 41,25 | 10616,80 | 3749,53 | 106,2759 | T | | |

Torsion springs

Stainless steel no. 1.4310 (A301, BS 301521)

Please observe direction of coiling!

(final letter „R“ for right-hand, „L“ for left-hand)

| article number right/left hand coiled | d wire diameter | Di inner diameter | Ditol +/- tolerance Di | Ddmin minimum mandrel diameter | Ddmax maximum mandrel diameter | n number of coils | leg position see picture | α leg position degree | LS leg length | α_n maximum rotational angle | Mn maximum torgue | Mntol +/- tolerance Mn | weight one spring in gram | price group |
|---|-----------------------|-------------------------|---------------------------------|---|---|-------------------------|--------------------------------|---------------------------------------|---------------------|--|-------------------------|---------------------------------|---------------------------------|----------------|
| T-19848L | 5,00 | 44,00 | 0,90 | 32,00 | 39,00 | 2,75 | D | 270 | 150,00 | 45,37 | 10616,80 | 3664,74 | 112,2508 | T |
| T-19848R | | | 0,90 | 32,00 | 39,00 | 2,75 | D | 270 | 150,00 | 45,37 | 10616,80 | 3664,74 | 112,2508 | T |
| T-19849L | | | 0,90 | 32,00 | 39,00 | 3,00 | A | 0 | 150,00 | 49,50 | 10616,80 | 3589,00 | 118,2258 | T |
| T-19849R | | | 0,90 | 32,00 | 39,00 | 3,00 | A | 0 | 150,00 | 49,50 | 10616,80 | 3589,00 | 118,2258 | T |
| T-19850L | | | 0,90 | 32,00 | 39,00 | 3,25 | B | 90 | 150,00 | 53,62 | 10616,80 | 3520,71 | 124,2007 | T |
| T-19850R | | | 0,90 | 32,00 | 39,00 | 3,25 | B | 90 | 150,00 | 53,62 | 10616,80 | 3520,71 | 124,2007 | T |
| T-19851L | | | 0,90 | 32,00 | 39,00 | 4,50 | C | 180 | 150,00 | 74,24 | 10616,80 | 3256,21 | 154,0755 | T |
| T-19851R | | | 0,90 | 32,00 | 39,00 | 4,50 | C | 180 | 150,00 | 74,24 | 10616,80 | 3256,21 | 154,0755 | T |
| T-19852L | | | 0,90 | 32,00 | 39,00 | 5,75 | D | 270 | 150,00 | 94,87 | 10616,80 | 3070,17 | 183,9502 | T |
| T-19852R | | | 0,90 | 32,00 | 39,00 | 5,75 | D | 270 | 150,00 | 94,87 | 10616,80 | 3070,17 | 183,9502 | T |
| T-19853L | | | 0,90 | 32,00 | 39,00 | 7,00 | A | 0 | 150,00 | 115,49 | 10616,80 | 2928,59 | 213,8250 | U |
| T-19853R | | | 0,90 | 32,00 | 39,00 | 7,00 | A | 0 | 150,00 | 115,49 | 10616,80 | 2928,59 | 213,8250 | U |
| T-19854L | | | 0,90 | 32,00 | 39,00 | 8,25 | B | 90 | 150,00 | 136,11 | 10616,80 | 2815,36 | 243,6998 | U |
| T-19854R | | | 0,90 | 32,00 | 39,00 | 8,25 | B | 90 | 150,00 | 136,11 | 10616,80 | 2815,36 | 243,6998 | U |
| T-19855L | | | 0,90 | 32,00 | 39,00 | 9,50 | C | 180 | 150,00 | 156,74 | 10616,80 | 2721,63 | 273,5745 | U |
| T-19855R | | | 0,90 | 32,00 | 39,00 | 9,50 | C | 180 | 150,00 | 156,74 | 10616,80 | 2721,63 | 273,5745 | U |

Spring assortments



| | | Preisgruppe |
|---|--|-------------|
| Assortment A article no. S100 | Compression springs (d = 0.32–2.0 mm) music wire EN 10270-1-SH 160 springs in 80 different sizes | EA |
| Assortment AR article no. S500 | Compression springs (d = 0.32–2.0 mm) stainless steel EN 10270-3-1.4310 160 springs in 80 different sizes | EB |
| Assortment O article no. S600 | Extension springs (d = 0.32–2.0 mm) music wire EN 10270-1-SH 148 springs in 74 different sizes | EB |
| Assortment OR article no. S700 | Extension springs (d = 0.32–2.0 mm) stainless steel EN 10270-3-1.4310 148 springs in 74 different sizes | EB |
| Assortment B article no. S300 | Compression and extension springs (d = 0.32–2.0 mm) music wire EN 10270-1-SH 160 springs in 80 different sizes | EA |
| Assortment BR article no. S800 | Compression and extension springs (d = 0.32–2.0 mm) stainless steel EN 10270-3-1.4310 160 springs in 80 different sizes | EB |
| Electro assortment article no. S200 | Compression springs (d = 0.2–1.6 mm) music wire EN 10270-1-SH 170 springs in 85 different sizes | EB |
| Textilo assortment article no. S400 | Compression and extension springs (d = 0.2–3.2 mm) music wire EN 10270-1-SH 170 springs in 85 different sizes | EA |
| Assortment P article no. Prüf 1 | IHK-Springs 1986 – 1991 830 springs in 166 different sizes Compression and extension springs (d = 0.2–2.0 mm) | EC |

You can satisfy all
your spring needs at

www.federnshop.com



Steel wires packaged in coils

A. Patented drawn spring steel wire in compliance with EN 10270-1DH, from 1.9 mm EN 10270-1SH (A228, BS 5216).

B. Stainless spring steel wire X10CrNi188, material no. 1.4310 (A301, BS 301S21).

Available in small pre-packed amounts from stock, larger orders are available upon request. The diameter tolerances follow according to EN 10270.

We stock all standard spring steels as wire and have over 800 items in stock. We can serve your need immediately from this stock.

**Please contact our sales department.
Phone 0049 (0)7123 960-193, Fax -195
order@gutekunst-co.com**

| wire diameter mm | weight in grammes per unit | length in meters per unit | music wire EN 10270-1-SH and -DH | | stainless steel wire material no. 1.4310 | |
|------------------|----------------------------|---------------------------|----------------------------------|-------------|--|-------------|
| | | | article no. | price group | article no. | price group |
| 0,12 | 100 | 405 | 23008 | DA | 23108 | DE |
| 0,2 | 100 | 405 | 23010 | DA | 23110 | DE |
| 0,25 | 100 | 260 | 23012 | DA | 23112 | DE |
| 0,3 | 100 | 180 | 23014 | DA | 23114 | DE |
| 0,36 | 100 | 135 | 23015 | DA | 23115 | DE |
| 0,4 | 100 | 101 | 23016 | DA | 23116 | DE |
| 0,5 | 100 | 65 | 23018 | DA | 23118 | DE |
| 0,6 | 250 | 112 | 23020 | DA | 23120 | DE |
| 0,7 | 250 | 82 | 23022 | DB | 23122 | DE |
| 0,8 | 500 | 126 | 23024 | DB | 23124 | DG |
| 0,9 | 500 | 100 | 23026 | DB | 23126 | DG |
| 1 | 500 | 81 | 23028 | DB | 23128 | DG |
| 1,1 | 500 | 67 | 23030 | DB | 23130 | DG |
| 1,25 | 500 | 52 | 23032 | DB | 23132 | DG |
| 1,3 | 500 | 48 | 23034 | DB | 23134 | DG |
| 1,4 | 500 | 41 | 23036 | DB | 23136 | DG |
| 1,5 | 500 | 36 | 23038 | DB | 23138 | DG |
| 1,6 | 500 | 31 | 23040 | DB | 23140 | DG |
| 1,7 | 500 | 28 | 23042 | DB | 23142 | DG |
| 1,8 | 500 | 25 | 23044 | DB | 23144 | DG |
| 2 | 500 | 20 | 23046 | DC | 23146 | DH |
| 2,25 | 1000 | 31 | 23048 | DD | 23148 | DI |
| 2,5 | 1000 | 26 | 23050 | DF | 23150 | DI |
| 2,7 | 1000 | 21 | 23052 | DF | 23152 | DK |
| 3 | 1000 | 18 | 23054 | DH | 23154 | DK |

Steel wire bars

A. Patented drawn spring steel wire EN 10270-1 type DH, from 1.9 mm type SH (A228, BS 5216). The diameter tolerances follow according to EN 10270.

B. Stainless spring steel wire X10CrNi188, material no. 1.4310 (A301, BS 301S21).

The spring wires are pre-cut into lengths of 1000 mm. The prices quoted do not include delivery and are for orders of 2 or 5 bars. For price information concerning larger orders please contact our sales department.

**Phone 0049 (0) 7123 960-193, Fax -195
eMail: order@gutekunst-co.com**

| wire diameter | music wire EN 10270-1 DH/SH | | stainless steel material no. 1.4310 | |
|---------------|-----------------------------|-------------|-------------------------------------|-------------|
| | article number | price group | article number | price group |
| 0,2 | 23510 | DN | 23610 | DT |
| 0,3 | 23512 | DN | 23612 | DT |
| 0,4 | 23514 | DN | 23614 | DT |
| 0,5 | 23516 | DN | 23616 | DT |
| 0,63 | 23518 | DN | 23618 | DT |
| 0,7 | 23519 | DN | 23619 | DT |
| 0,8 | 23520 | DN | 23620 | DT |
| 0,9 | 23521 | DN | 23621 | DT |
| 1,0 | 23522 | DN | 23622 | DT |
| 1,1 | 23523 | DN | 23623 | DT |
| 1,25 | 23524 | DN | 23624 | DT |
| 1,3 | 23526 | DN | 23626 | DO |
| 1,4 | 23528 | DN | 23628 | DO |
| 1,5 | 23530 | DO | 23630 | DP |
| 1,6 | 23532 | DO | 23632 | DP |
| 1,8 | 23534 | DO | 23634 | DP |
| 2,0 | 23536 | DO | 23636 | DP |
| 2,5 | 23538 | DQ | 23638 | DR |
| 3,0 | 23540 | DQ | 23640 | DR |
| 4,0 | 23542 | DQ | 23642 | DR |
| 5,0 | 23544 | DU | 23644 | DS |
| 6,0 | 23546 | DU | 23646 | DS |
| 7,0 | 23548 | DU | 23648 | DS |
| 8,0 | 23550 | DS | 23650 | DS |
| 9,0 | 23552 | DS | 23652 | DS |
| 10,0 | 23555 | DS | 23655 | DS |

Prepared in lengths of 1000 mm

Strips of spring steel

To place orders or request information
please contact direct:

Gutekunst Stahlverformung KG

Phone 0049 (0)7445 85160 · Fax 0049 (0)7445

8516-12

info@gutekunst-kg.de

Materials and qualities available:

Soft

A. Material no. 1.1248

MK75 G-LG

resistance 600 N/mm²

Tempered

B. Material no. 1.1248

MK75 H+AP

resistance 1600–1800 N/mm²

Stainless

C. Material no. 1.4310

resistance 1500–1700 N/mm²

Width range in compliance with DIN 1544

Edge finish:

Strips up to 0.4 mm have an unrefined edge

Strips from 0.4 mm have rounded off edges

Quality:

A. Soft Strips should be tempered before
use as follows:

1. Heat for 5 minutes at 820 °C
2. Quench in oil
3. Leave to heat for an hour at 400 °C
for RC 48 for hardness of 1630 N/mm²
4. Air cooled

To place orders or request information
please contact direct:

Gutekunst Stahlverformung KG

Siemensstraße 11 · D-72285 Pfalzgrafenweiler

Phone 0049 (0)74 45/8 51 60

Fax 0049 (0)74 45/8516-12

E-mail: vertrieb@gutekunst-kg.de

<http://www.formfedern.com>

The strips can be delivered in any length without
incurring delay, if this should be required.

| | | A (soft) | | B (tempered) | | C (stainless) | |
|---|------|---------------------------------|----------------|----------------------------------|----------------|----------------------------------|----------------|
| measurement thickness × width in mm | | MK75 G+LG material-no.1.1248 | | MK75 H+AP material-no. 1.1248 | | X10CrNi188 material-no.1.4310 | |
| | | article number | price group | article number | price group | article number | price group |
| 0,2 | × 5 | 24002 | PA | 24102 | PA | 24202 | PB |
| | × 10 | 24004 | PA | 24104 | PA | 24204 | PB |
| | × 15 | 24006 | PA | 24106 | PA | 24206 | PC |
| | × 20 | 24008 | PA | 24108 | PB | 24208 | PC |
| | × 30 | 24010 | PB | 24110 | PB | 24210 | PC |
| 0,3 | × 5 | 24012 | PA | 24112 | PA | 24212 | PB |
| | × 10 | 24014 | PA | 24114 | PA | 24214 | PC |
| | × 15 | 24016 | PA | 24116 | PB | 24216 | PC |
| | × 20 | 24018 | PB | 24118 | PB | 24218 | PD |
| | × 30 | 24020 | PC | 24120 | PC | 24220 | PF |
| 0,4 | × 10 | 24022 | PA | 24122 | PB | 24222 | PC |
| | × 15 | 24024 | PB | 24124 | PB | 24224 | PD |
| | × 20 | 24026 | PC | 24126 | PC | 24226 | PF |
| | × 30 | 24028 | PC | 24128 | PD | 24228 | PG |
| | × 40 | 24030 | PC | 24130 | PE | 24230 | PJ |
| 0,5 | × 10 | 24032 | PA | 24132 | PB | 24232 | PD |
| | × 15 | 24034 | PB | 24134 | PC | 24234 | PE |
| | × 20 | 24036 | PC | 24136 | PC | 24236 | PF |
| | × 30 | 24038 | PC | 24138 | PD | 24238 | PH |
| | × 40 | 24040 | PD | 24140 | PE | 24240 | PK |
| 0,8 | × 10 | 24042 | PB | 24142 | PC | 24242 | PF |
| | × 15 | 24044 | PC | 24144 | PD | 24244 | PG |
| | × 20 | 24046 | PC | 24146 | PD | 24246 | PJ |

Strips of spring steel

Prepared in lengths of 1000 mm

To place orders or request information
please contact direct:

Gutekunst Stahlverformung KG

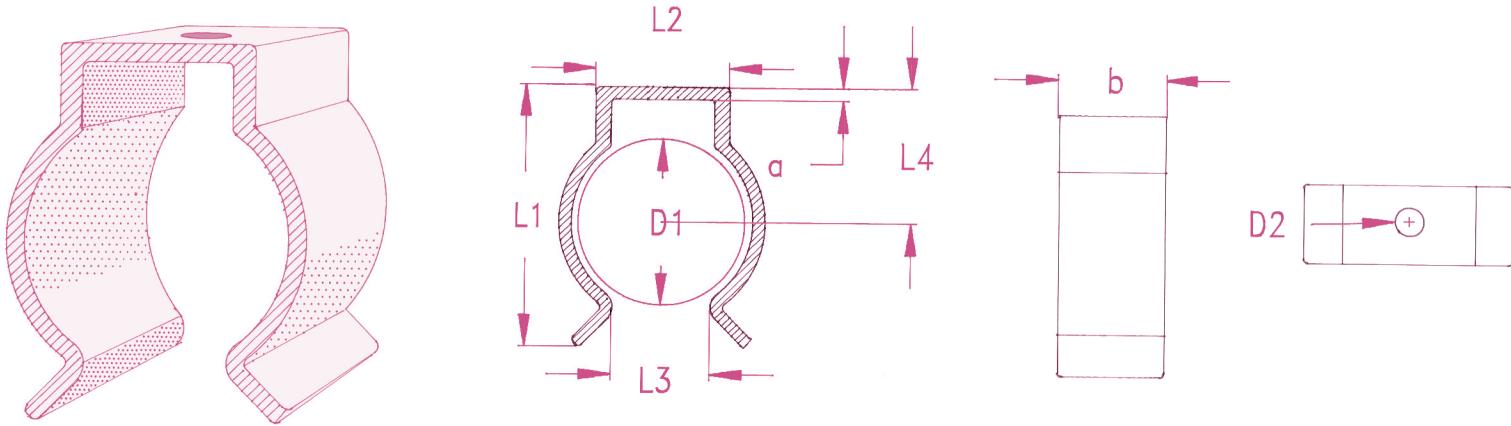
Phone 0049 (0)7445 85160 · Fax 0049 (0)7445 8516-12

vertrieb@gutekunst-kg.de

<http://www.formfedern.com>

| | | A (soft) | | B (tempered) | | C (stainless) | |
|---|------|----------------------------------|----------------|----------------------------------|----------------|-----------------------------------|----------------|
| measurement thickness × width in mm | | MK75 G+LG material-no. 1.1248 | | MK75 H+AP material-no. 1.1248 | | X10CrNi188 material-no. 1.4310 | |
| | | article number | price group | article number | price group | article number | price group |
| 0,8 | × 30 | 24048 | PE | 24148 | PH | 24248 | PM |
| | × 40 | 24050 | PF | 24150 | PK | 24250 | PP |
| 1,0 | × 10 | 24052 | PC | 24152 | PD | 24252 | PG |
| | × 15 | 24054 | PC | 24154 | PD | 24254 | PH |
| | × 20 | 24056 | PD | 24156 | PF | 24256 | PK |
| | × 30 | 24058 | PE | 24158 | PK | 24258 | PN |
| | × 40 | 24060 | PH | 24160 | PN | 24260 | PQ |
| | × 50 | 24062 | PL | 24162 | PS | 24262 | PT |
| | 1,25 | × 10 | 24064 | PC | 24164 | PD | 24264 |
| × 20 | | 24066 | PE | 24166 | PH | 24266 | PL |
| × 30 | | 24068 | PH | 24168 | PH | 24268 | PQ |
| × 40 | | 24070 | PL | 24170 | PQ | 24270 | PU |
| × 50 | | 24072 | PP | 24172 | PW | 24272 | PX |
| 1,5 | × 10 | 24074 | PC | 24174 | PD | 24274 | PJ |
| | × 20 | 24076 | PF | 24176 | PJ | 24276 | PN |
| | × 30 | 24078 | PK | 24178 | PQ | 24278 | PS |
| | × 40 | 24080 | PN | 24180 | PU | 24280 | PW |
| | × 50 | 24082 | PO | 24182 | PX | 24282 | PY |
| 2,0 | × 20 | 24084 | PK | 24184 | PP | 24284 | PR |
| | × 30 | 24086 | PN | 24186 | PU | 24286 | PW |
| | × 40 | 24088 | PT | 24188 | PX | 24288 | PY |
| | × 50 | 24090 | PV | 24190 | PY | 24290 | PZ |

Spring clips for pipes or shafts



Manufactured from material no.

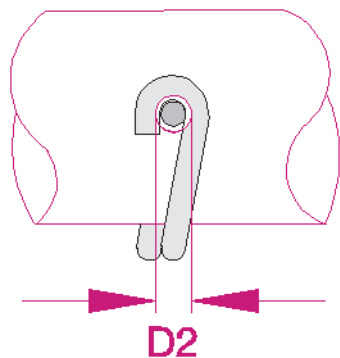
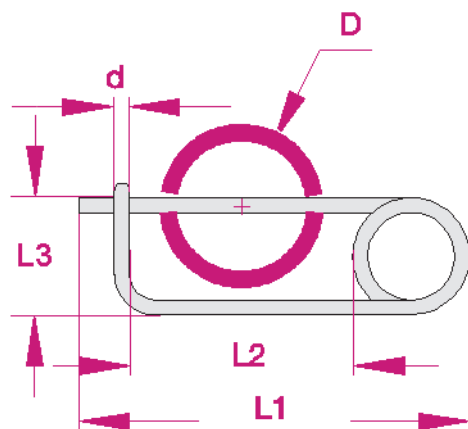
1.1248 GALZN (zinc coated)

1.4310 stainless (EN 10270-3).

| clamped diameter up to D1 mm | mat. thickness a mm | mat. width b mm | hight L1 mm | width L2 mm | opening L3 mm | distance L4 mm | hole diameter D2 mm | article no. zinc coated | price group | article no. stainless | price group |
|------------------------------|---------------------|-----------------|-------------|-------------|---------------|----------------|---------------------|-------------------------|-------------|-----------------------|-------------|
| 3 | 0,4 | 8 | 10,0 | 5 | 0,5 | 5 | 2,2 | C130-3L | AE | X130-3L | AF |
| 4 | 0,4 | 8 | 12,0 | 12 | 3,0 | 8 | 3,2 | C130-4L | AE | X130-4L | AF |
| 5 | 0,5 | 8 | 12,0 | 12 | 4,0 | 8 | 3,2 | C130-5L | AF | X130-5L | AG |
| 6 | 0,5 | 10 | 13,0 | 12 | 4,0 | 8 | 3,2 | C130-6L | AF | X130-6L | AG |
| 8 | 0,5 | 10 | 16,0 | 12 | 5,0 | 10 | 3,2 | C130-8L | AG | X130-8L | AH |
| 10 | 0,5 | 15 | 18,5 | 12 | 7,0 | 12 | 4,5 | C130-10L | AG | X130-10L | AH |
| 12 | 0,5 | 15 | 20,0 | 12 | 8,0 | 12 | 4,5 | C130-12L | AH | X130-12L | AJ |
| 16 | 0,8 | 15 | 25,0 | 16 | 10,0 | 16 | 5,5 | C130-16L | AH | X130-16L | AJ |
| 20 | 0,8 | 20 | 32,0 | 14 | 14,0 | 20 | 6,5 | C130-20L | AJ | X130-20L | AK |
| 25 | 1,0 | 30 | 38,0 | 20 | 19,0 | 25 | 6,5 | C130-25L | AJ | X130-25L | AK |
| 30 | 1,0 | 30 | 45,0 | 20 | 22,0 | 30 | 6,5 | C130-30L | AK | X130-30L | AL |
| 35 | 1,5 | 30 | 55,0 | 25 | 27,0 | 35 | 6,5 | C130-35L | AK | X130-35L | AL |
| 42 | 1,5 | 30 | 62,0 | 30 | 34,0 | 42 | 6,5 | C130-42L | AL | X130-42L | AM |
| 50 | 1,5 | 30 | 72,0 | 40 | 42,0 | 50 | 6,5 | C130-50L | AL | X130-50L | AM |

Safety clip (Fokker)

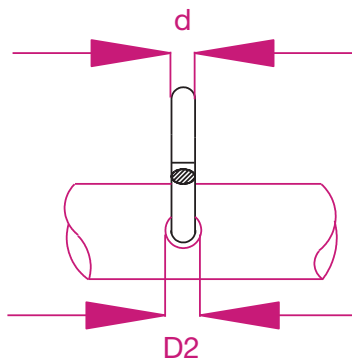
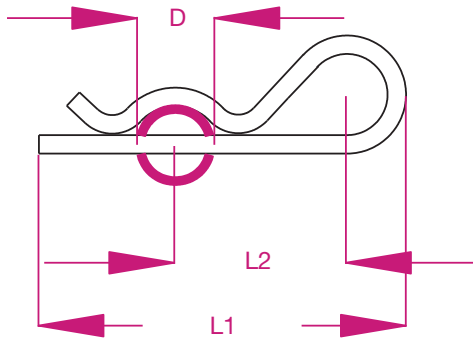
Parts in the table with the initial letter “C” are manufactured from music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter “X” are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).



| article no. music wire DH/SH | shaft pipe diameter D | wire dia- meter d | length L1 | length L2 | length L3 | hole diameter D2 | price group | article no. stainless | price group |
|------------------------------------|-----------------------------|----------------------------|--------------|--------------|--------------|------------------------|----------------|--------------------------|----------------|
| C400-6L | 6 | 1,6 | 40 | 18 | 15 | 2,0 | W | X400-6L | Z |
| C400-7L | 7 | 1,6 | 40 | 18 | 15 | 2,0 | W | X400-7L | Z |
| C400-8L | 8 | 2,25 | 55 | 24 | 18 | 2,5 | W | X400-8L | Z |
| C400-10L | 10 | 2,25 | 55 | 24 | 18 | 2,5 | W | X400-10L | Z |
| C400-12L | 12 | 2,8 | 60 | 26 | 21 | 3,2 | W | X400-12L | Z |
| C400-14L | 14 | 2,8 | 60 | 26 | 21 | 3,2 | W | X400-14L | Z |
| C400-16L | 16 | 3,6 | 86 | 32 | 38 | 4,0 | W | X400-16L | Z |
| C400-18L | 18 | 3,6 | 86 | 32 | 38 | 4,0 | W | X400-18L | Z |
| C400-22L | 22 | 3,6 | 88 | 34 | 38 | 4,0 | W | X400-22L | Z |
| C400-25L | 25 | 4,0 | 105 | 39 | 45 | 5,0 | W | X400-25L | Z |
| C400-28L | 28 | 4,0 | 110 | 39 | 49 | 5,0 | W | X400-28L | Z |
| C400-30L | 30 | 5,5 | 120 | 45 | 50 | 6,3 | W | X400-30L | Z |
| C400-35L | 35 - 45 | 5,5 | 134 | 56 | 50 | 7,0 | W | X400-35L | Z |
| C400-50L | 50 - 60 | 6,0 | 180 | 100 | 55 | 7,0 | W | X400-50L | Z |

Single spring plug

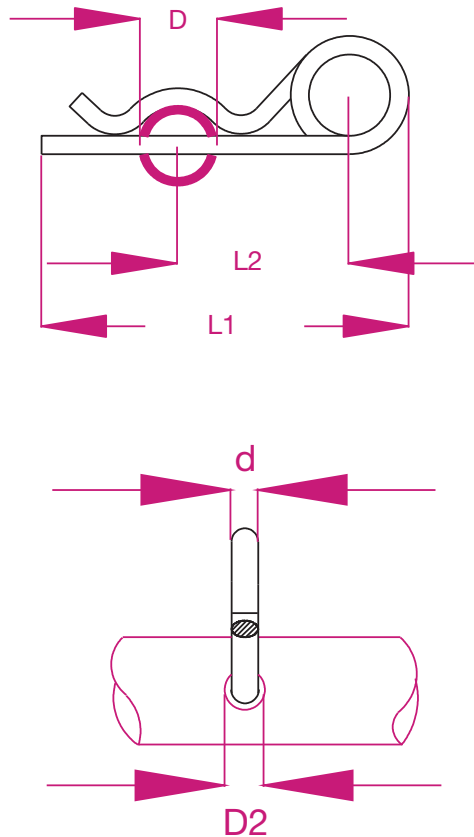
Parts in the table with the initial letter “C” are manufactured from music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter “X” are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21)..



| article no. music wire DH/SH | shaft pipe diameter D | wire diameter d | length L1 | length L2 | hole diameter D2 | price group | article no. stainless | price group |
|------------------------------------|--------------------------------|-----------------------|--------------|--------------|------------------------|----------------|--------------------------|----------------|
| C380-6L | 6,0 | 1,6 | 45 | 20 | 1,8 | W | X380-6L | Z |
| C380-7L | 7,0 | 1,8 | 48 | 22 | 2,0 | W | X380-7L | Z |
| C380-8L | 8,0 | 2,25 | 55 | 24 | 2,5 | W | X380-8L | Z |
| C380-10L | 10,0 | 2,25 | 55 | 24 | 2,5 | W | X380-10L | Z |
| C380-12L | 12,0 | 2,8 | 61 | 26 | 3,2 | W | X380-12L | Z |
| C380-14L | 14,0 | 2,8 | 61 | 26 | 3,2 | W | X380-14L | Z |
| C380-16L | 16,0 | 3,6 | 76 | 32 | 4,0 | W | X380-16L | Z |
| C380-18L | 18,0 | 3,6 | 76 | 32 | 4,0 | W | X380-18L | Z |
| C380-20L | 20,0 | 3,6 | 76 | 32 | 4,0 | W | X380-20L | Z |
| C380-22L | 22,0 | 4,5 | 97 | 39 | 5,0 | W | X380-22L | Z |
| C380-25L | 25,0 | 4,5 | 97 | 39 | 5,0 | W | X380-25L | Z |
| C380-28L | 28,0 | 5,6 | 116 | 45 | 6,3 | W | X380-28L | Z |
| C380-30L | 30,0 | 5,6 | 116 | 45 | 6,3 | W | X380-30L | Z |
| C380-32L | 32,0 | 5,6 | 116 | 45 | 6,3 | W | X380-32L | Z |
| C380-35L | 35,0 | 6,3 | 147 | 56 | 7,0 | W | X380-35L | Z |
| C380-40L | 40,0 | 6,3 | 147 | 56 | 7,0 | W | X380-40L | Z |
| C380-42L | 42,0 | 6,3 | 147 | 56 | 7,0 | W | X380-42L | Z |
| C380-45L | 45,0 | 6,3 | 147 | 56 | 7,0 | W | X380-45L | Z |
| C380-50L | 50,0 | 7,0 | 172 | 63 | 8,0 | W | X380-50L | Z |
| C380-55L | 55,0 | 7,0 | 172 | 63 | 8,0 | W | X380-55L | Z |

Double spring plug DIN 11024

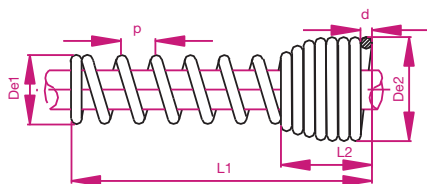
Parts in the table with the initial letter "C" are manufactured from music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).



| article no. music wire DH/SH | shaft pipe diameter D | wire diameter d | length L1 | length L2 | hole diameter D2 | price group | article no. stainless | price group |
|------------------------------------|--------------------------------|-----------------------|--------------|--------------|------------------------|----------------|--------------------------|----------------|
| C360-6L | 6,0 | 1,6 | 45 | 20 | 1,8 | W | X360-6L | Z |
| C360-7L | 7,0 | 1,8 | 48 | 22 | 2,0 | W | X360-7L | Z |
| C360-8L | 8,0 | 2,25 | 55 | 24 | 2,5 | W | X360-8L | Z |
| C360-10L | 10,0 | 2,25 | 55 | 24 | 2,5 | W | X360-10L | Z |
| C360-12L | 12,0 | 2,8 | 61 | 26 | 3,2 | W | X360-12L | Z |
| C360-14L | 14,0 | 2,8 | 61 | 26 | 3,2 | W | X360-14L | Z |
| C360-16L | 16,0 | 3,6 | 76 | 32 | 4,0 | W | X360-16L | Z |
| C360-18L | 18,0 | 3,6 | 76 | 32 | 4,0 | W | X360-18L | Z |
| C360-20L | 20,0 | 3,6 | 76 | 32 | 4,0 | W | X360-20L | Z |
| C360-22L | 22,0 | 4,5 | 97 | 39 | 5,0 | W | X360-22L | Z |
| C360-25L | 25,0 | 4,5 | 97 | 39 | 5,0 | W | X360-25L | Z |
| C360-28L | 28,0 | 5,6 | 116 | 45 | 6,3 | W | X360-28L | Z |
| C360-30L | 30,0 | 5,6 | 116 | 45 | 6,3 | W | X360-30L | Z |
| C360-32L | 32,0 | 5,6 | 116 | 45 | 6,3 | W | X360-32L | Z |
| C360-35L | 35,0 | 6,3 | 147 | 56 | 7,0 | W | X360-35L | Z |
| C360-40L | 40,0 | 6,3 | 147 | 56 | 7,0 | W | X360-40L | Z |
| C360-42L | 42,0 | 6,3 | 147 | 56 | 7,0 | W | X360-42L | Z |
| C360-45L | 45,0 | 6,3 | 147 | 56 | 7,0 | W | X360-45L | Z |
| C360-50L | 50,0 | 7,0 | 172 | 63 | 8,0 | W | X360-50L | Z |
| C360-55L | 55,0 | 7,0 | 172 | 63 | 8,0 | W | X360-55L | Z |

Cable/hose protection coil 1440

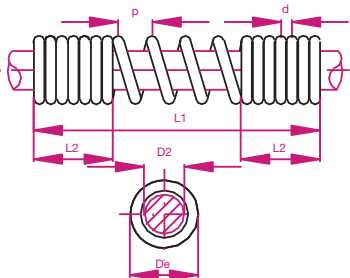
Parts in the table with the initial letter "C" are manufactured from galvanised music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).



| article no. music wire DH/SH | cable up to D2 | wire dia- meter d | outer dia- meter De1 | outer dia- meter De2 | pitch P | total length L1 | length L2 | price group | article no. stainless | price group |
|------------------------------------|----------------------|-------------------------|----------------------------|----------------------------|------------|-----------------------|--------------|----------------|--------------------------|----------------|
| C1440-3L | 3,0 | 0,8 | 5,6 | 6,8 | 2,5 | 130 | 10 | AA | X1440-3L | AC |
| C1440-3S | 3,0 | 0,9 | 5,8 | 7,0 | 2,8 | 140 | 12 | AA | X1440-3S | AC |
| C1440-4L | 4,0 | 1,0 | 7,1 | 9,2 | 4 | 145 | 12 | AA | X1440-4L | AC |
| C1440-4S | 4,0 | 1,0 | 7,3 | 9,5 | 4,5 | 150 | 12 | AA | X1440-4S | AC |
| C1440-5L | 5,0 | 1,2 | 8,8 | 11,5 | 5 | 160 | 14 | AB | X1440-5L | AD |
| C1440-5S | 5,0 | 1,4 | 9,2 | 12,0 | 5,5 | 170 | 15 | AB | X1440-5S | AD |
| C1440-6L | 6,0 | 1,6 | 11,2 | 14,3 | 6 | 175 | 16 | AC | X1440-6L | AE |
| C1440-6S | 6,0 | 1,8 | 11,6 | 15,0 | 7 | 185 | 18 | AC | X1440-6S | AE |
| C1440-8L | 8,0 | 2,0 | 14,0 | 18,2 | 8 | 200 | 20 | AD | X1440-8L | AF |
| C1440-8S | 8,0 | 2,2 | 14,4 | 18,2 | 9 | 210 | 24 | AD | X1440-8S | AF |
| C1440-10L | 10,0 | 2,5 | 17,5 | 24 | 10 | 220 | 32 | AE | X1440-10L | AF |
| C1440-10S | 10,0 | 3,0 | 18,5 | 24,5 | 12 | 230 | 32 | AE | X1440-10S | AG |
| C1440-12L | 12,0 | 3,2 | 21,4 | 28 | 12 | 240 | 36 | AF | X1440-12L | AH |
| C1440-12S | 12,0 | 3,6 | 22,2 | 29 | 12 | 240 | 40 | AF | X1440-12S | AH |
| C1440-16L | 16,0 | 4,0 | 28,0 | 36,4 | 15 | 250 | 40 | AG | X1440-16L | AJ |
| C1440-16S | 16,0 | 4,5 | 29,0 | 37,5 | 18 | 270 | 45 | AG | X1440-16S | AJ |
| C1440-20L | 20,0 | 5,0 | 35,0 | 46 | 18 | 280 | 40 | AH | X1440-20L | AK |
| C1440-20S | 20,0 | 6,0 | 37,0 | 50 | 20 | 300 | 50 | AJ | X1440-20S | AL |
| C1440-25L | 25,0 | 6,3 | 43,6 | 56 | 20 | 280 | 63 | AK | X1440-25L | AM |
| C1440-25S | 25,0 | 6,8 | 44,0 | 58 | 22 | 300 | 65 | AK | X1440-25S | AM |
| C1440-30L | 30,0 | 7,0 | 50,0 | 65 | 25 | 350 | 70 | AL | X1440-30L | AN |
| C1440-30S | 30,0 | 7,5 | 51,0 | 68 | 28 | 380 | 80 | AM | X1440-30S | AO |
| C1440-35L | 35,0 | 8,0 | 59,0 | 77 | 30 | 400 | 80 | AN | X1440-35L | AP |
| C1440-35S | 35,0 | 8,5 | 60,0 | 80 | 35 | 400 | 80 | AN | X1440-35S | AQ |
| C1440-42L | 42,0 | 9,0 | 68,0 | 90 | 40 | 500 | 100 | AO | X1440-42L | AR |
| C1440-42S | 42,0 | 10,0 | 70,0 | 100 | 50 | 500 | 100 | AR | X1440-42S | AS |

Cable/hose protection coil 1430

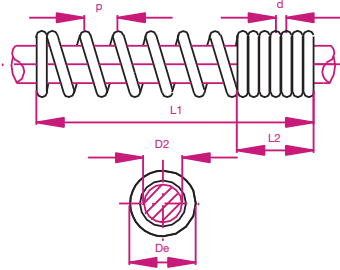
Parts in the table with the initial letter "C" are manufactured from galvanised music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).



| article no. music wire DH/SH | cable up to D2 | wire dia- meter d | outer dia- meter De | pitch P | total length L1 | length L2 | price group | article no. stainless | price group |
|------------------------------------|----------------------|-------------------------|---------------------------|------------|-----------------------|--------------|----------------|--------------------------|----------------|
| C1430-3L | 3,0 | 0,8 | 5,6 | 2,5 | 130 | 6 | AA | X1430-3L | AC |
| C1430-3S | 3,0 | 0,9 | 5,8 | 2,8 | 140 | 8 | AA | X1430-3S | AC |
| C1430-4L | 4,0 | 1,0 | 7,1 | 4 | 145 | 10 | AA | X1430-4L | AC |
| C1430-4S | 4,0 | 1,0 | 7,3 | 4,5 | 150 | 11 | AA | X1430-4S | AC |
| C1430-5L | 5,0 | 1,2 | 8,8 | 5 | 160 | 12 | AB | X1430-5L | AD |
| C1430-5S | 5,0 | 1,4 | 9,2 | 5,5 | 170 | 13 | AB | X1430-5S | AD |
| C1430-6L | 6,0 | 1,6 | 11,2 | 6 | 175 | 16 | AC | X1430-6L | AE |
| C1430-6S | 6,0 | 1,8 | 11,6 | 7 | 185 | 18 | AC | X1430-6S | AE |
| C1430-8L | 8,0 | 2,0 | 14,0 | 8 | 200 | 20 | AD | X1430-8L | AF |
| C1430-8S | 8,0 | 2,2 | 14,4 | 9 | 210 | 24 | AD | X1430-8S | AF |
| C1430-10L | 10,0 | 2,5 | 17,5 | 10 | 220 | 32 | AE | X1430-10L | AF |
| C1430-10S | 10,0 | 3,0 | 18,5 | 12 | 230 | 32 | AE | X1430-10S | AG |
| C1430-12L | 12,0 | 3,2 | 21,4 | 12 | 240 | 36 | AF | X1430-12L | AH |
| C1430-12S | 12,0 | 3,6 | 22,2 | 12 | 240 | 40 | AF | X1430-12S | AH |
| C1430-16L | 16,0 | 4,0 | 28,0 | 15 | 250 | 40 | AG | X1430-16L | AJ |
| C1430-16S | 16,0 | 4,5 | 29,0 | 18 | 270 | 45 | AG | X1430-16S | AJ |
| C1430-20L | 20,0 | 5,0 | 35,0 | 18 | 280 | 40 | AH | X1430-20L | AK |
| C1430-20S | 20,0 | 6,0 | 37,0 | 20 | 300 | 50 | AJ | X1430-20S | AL |
| C1430-25L | 25,0 | 6,3 | 43,6 | 20 | 280 | 63 | AK | X1430-25L | AM |
| C1430-25S | 25,0 | 6,8 | 44,0 | 22 | 300 | 65 | AK | X1430-25S | AM |
| C1430-30L | 30,0 | 7,0 | 50,0 | 25 | 350 | 70 | AL | X1430-30L | AN |
| C1430-30S | 30,0 | 7,5 | 51,0 | 28 | 380 | 80 | AM | X1430-30S | AO |
| C1430-35L | 35,0 | 8,0 | 59,0 | 30 | 400 | 80 | AN | X1430-35L | AP |
| C1430-35S | 35,0 | 8,5 | 60,0 | 35 | 400 | 80 | AN | X1430-35S | AQ |
| C1430-42L | 42,0 | 9,0 | 68,0 | 40 | 500 | 100 | AO | X1430-42L | AR |
| C1430-42S | 42,0 | 10,0 | 70,0 | 50 | 500 | 90 | AR | X1430-42S | AS |

Cable/hose protection coil 1420

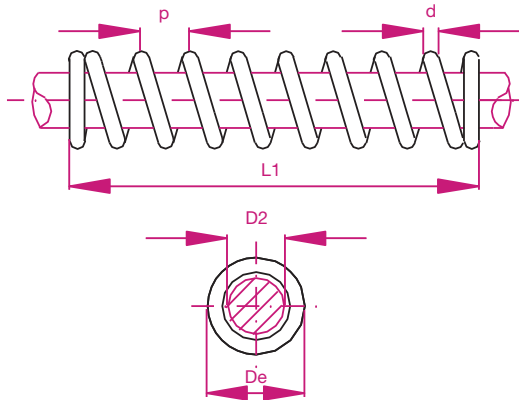
Parts in the table with the initial letter "C" are manufactured from galvanised music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).



| article no. music wire DH/SH | cable up to D2 | wire dia- meter d | outer dia- meter De | pitch P | total length L1 | length L2 | price group | article no. stainless | price group |
|------------------------------------|----------------------|-------------------------|---------------------------|------------|--------------------|--------------|----------------|--------------------------|----------------|
| C1420-3L | 3,0 | 0,8 | 5,6 | 2,5 | 130 | 6 | AA | X1420-3L | AC |
| C1420-3S | 3,0 | 0,9 | 5,8 | 2,8 | 140 | 8 | AA | X1420-3S | AC |
| C1420-4L | 4,0 | 1,0 | 7,1 | 4 | 145 | 10 | AA | X1420-4L | AC |
| C1420-4S | 4,0 | 1,0 | 7,3 | 4,5 | 150 | 11 | AA | X1420-4S | AC |
| C1420-5L | 5,0 | 1,2 | 8,8 | 5 | 160 | 12 | AB | X1420-5L | AD |
| C1420-5S | 5,0 | 1,4 | 9,2 | 5,5 | 170 | 13 | AB | X1420-5S | AD |
| C1420-6L | 6,0 | 1,6 | 11,2 | 6 | 160 | 16 | AC | X1420-6L | AE |
| C1420-6S | 6,0 | 1,8 | 11,6 | 7 | 170 | 18 | AC | X1420-6S | AE |
| C1420-8L | 8,0 | 2,0 | 14,0 | 8 | 200 | 20 | AD | X1420-8L | AF |
| C1420-8S | 8,0 | 2,2 | 14,4 | 9 | 210 | 24 | AD | X1420-8S | AF |
| C1420-10L | 10,0 | 2,5 | 17,5 | 10 | 220 | 32 | AE | X1420-10L | AF |
| C1420-10S | 10,0 | 3,0 | 18,5 | 12 | 230 | 32 | AE | X1420-10S | AG |
| C1420-12L | 12,0 | 3,2 | 21,4 | 12 | 240 | 36 | AF | X1420-12L | AH |
| C1420-12S | 12,0 | 3,6 | 22,2 | 12 | 240 | 40 | AF | X1420-12S | AH |
| C1420-16L | 16,0 | 4,0 | 28,0 | 15 | 200 | 40 | AG | X1420-16L | AJ |
| C1420-16S | 16,0 | 4,5 | 29,0 | 18 | 200 | 45 | AG | X1420-16S | AJ |
| C1420-20L | 20,0 | 5,0 | 35,0 | 18 | 200 | 40 | AH | X1420-20L | AK |
| C1420-20S | 20,0 | 6,0 | 37,0 | 20 | 250 | 50 | AJ | X1420-20S | AL |
| C1420-25L | 25,0 | 6,3 | 43,6 | 20 | 250 | 63 | AK | X1420-25L | AM |
| C1420-25S | 25,0 | 6,8 | 44,0 | 22 | 280 | 65 | AK | X1420-25S | AM |
| C1420-30L | 30,0 | 7,0 | 50,0 | 25 | 250 | 70 | AL | X1420-30L | AN |
| C1420-30S | 30,0 | 7,5 | 51,0 | 28 | 280 | 80 | AM | X1420-30S | AO |
| C1420-35L | 35,0 | 8,0 | 59,0 | 30 | 300 | 80 | AN | X1420-35L | AP |
| C1420-35S | 35,0 | 8,5 | 60,0 | 35 | 300 | 80 | AN | X1420-35S | AQ |
| C1420-42L | 42,0 | 9,0 | 68,0 | 40 | 400 | 100 | AO | X1420-42L | AR |
| C1420-42S | 42,0 | 10,0 | 70,0 | 50 | 400 | 110 | AR | X1420-42S | AS |

Cable/hose protection coil 1410

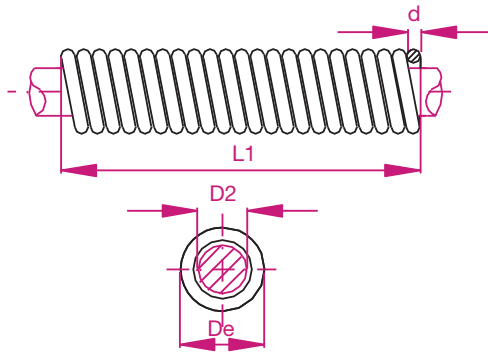
Parts in the table with the initial letter “C” are manufactured from galvanised music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter “X” are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).



| article no. music wire DH/SH | cable up to D2 | wire dia- meter d | outer dia- meter De | pitch P | total length L1 | price group | article no. stainless | price group |
|------------------------------------|----------------------|-------------------------|---------------------------|------------|-----------------------|----------------|--------------------------|----------------|
| C1410-3L | 3,0 | 0,8 | 5,6 | 2,5 | 120 | AA | X1410-3L | AC |
| C1410-3S | 3,0 | 0,9 | 5,8 | 2,8 | 125 | AA | X1410-3S | AC |
| C1410-4L | 4,0 | 1,0 | 7,1 | 4 | 135 | AA | X1410-4L | AC |
| C1410-4S | 4,0 | 1,0 | 7,3 | 4,5 | 140 | AA | X1410-4S | AC |
| C1410-5L | 5,0 | 1,2 | 8,8 | 5 | 150 | AB | X1410-5L | AD |
| C1410-5S | 5,0 | 1,4 | 9,2 | 5,5 | 155 | AB | X1410-5S | AD |
| C1410-6L | 6,0 | 1,6 | 11,2 | 6 | 160 | AC | X1410-6L | AE |
| C1410-6S | 6,0 | 1,8 | 11,6 | 7 | 170 | AC | X1410-6S | AE |
| C1410-8L | 8,0 | 2,0 | 14,0 | 8 | 180 | AD | X1410-8L | AF |
| C1410-8S | 8,0 | 2,2 | 14,4 | 9 | 190 | AD | X1410-8S | AF |
| C1410-10L | 10,0 | 2,5 | 17,5 | 10 | 190 | AE | X1410-10L | AF |
| C1410-10S | 10,0 | 3,0 | 18,5 | 12 | 200 | AE | X1410-10S | AG |
| C1410-12L | 12,0 | 3,2 | 21,4 | 12 | 200 | AF | X1410-12L | AH |
| C1410-12S | 12,0 | 3,6 | 22,2 | 12 | 200 | AF | X1410-12S | AH |
| C1410-16L | 16,0 | 4,0 | 28,0 | 15 | 200 | AG | X1410-16L | AJ |
| C1410-16S | 16,0 | 4,5 | 29,0 | 18 | 200 | AG | X1410-16S | AJ |
| C1410-20L | 20,0 | 5,0 | 35,0 | 18 | 200 | AH | X1410-20L | AK |
| C1410-20S | 20,0 | 6,0 | 37,0 | 20 | 250 | AJ | X1410-20S | AL |
| C1410-25L | 25,0 | 6,3 | 43,6 | 20 | 250 | AK | X1410-25L | AM |
| C1410-25S | 25,0 | 6,8 | 44,0 | 22 | 250 | AK | X1410-25S | AM |
| C1410-30L | 30,0 | 7,0 | 50,0 | 25 | 250 | AL | X1410-30L | AN |
| C1410-30S | 30,0 | 7,5 | 51,0 | 28 | 280 | AM | X1410-30S | AO |
| C1410-35L | 35,0 | 8,0 | 59,0 | 30 | 300 | AN | X1410-35L | AP |
| C1410-35S | 35,0 | 8,5 | 60,0 | 35 | 300 | AN | X1410-35S | AQ |
| C1410-42L | 42,0 | 9,0 | 68,0 | 40 | 400 | AO | X1410-40L | AR |
| C1410-42S | 42,0 | 10,0 | 70,0 | 50 | 400 | AR | X1410-42S | AS |

Cable/hose protection coil 1400

Parts in the table with the initial letter "C" are manufactured from galvanised music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).

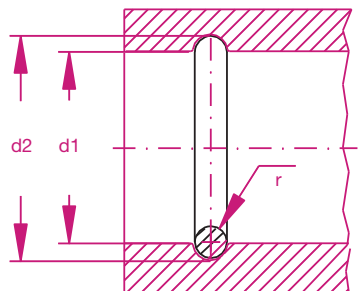
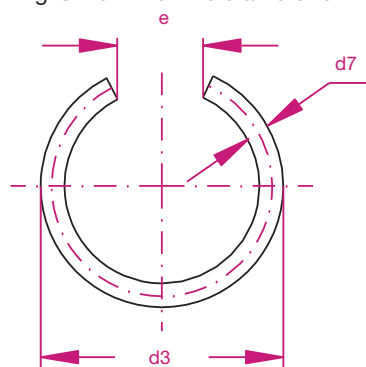


| article no. music wire DH/SH | cable up to D2 | wire diameter d | outer diameter De | total length L1 | price group | article no. stainless | price group |
|------------------------------------|----------------------|-----------------------|-------------------------|-----------------------|----------------|--------------------------|----------------|
| C1400-3L | 3,0 | 0,8 | 5,6 | 120 | AA | X1400-3L | AC |
| C1400-3S | 3,0 | 0,9 | 5,8 | 125 | AA | X1400-3S | AC |
| C1400-4L | 4,0 | 1,0 | 7,1 | 135 | AA | X1400-4L | AC |
| C1400-4S | 4,0 | 1,1 | 7,3 | 140 | AA | X1400-4S | AC |
| C1400-5L | 5,0 | 1,2 | 8,8 | 150 | AB | X1400-5L | AD |
| C1400-5S | 5,0 | 1,4 | 9,2 | 155 | AB | X1400-5S | AD |
| C1400-6L | 6,0 | 1,6 | 11,2 | 160 | AC | X1400-6L | AE |
| C1400-6S | 6,0 | 1,8 | 11,6 | 170 | AC | X1400-6S | AE |
| C1400-8L | 8,0 | 2,0 | 14,0 | 180 | AD | X1400-8L | AF |
| C1400-8S | 8,0 | 2,2 | 14,4 | 190 | AD | X1400-8S | AF |
| C1400-10L | 10,0 | 2,5 | 17,5 | 190 | AE | X1400-10L | AG |
| C1400-10S | 10,0 | 3,0 | 18,5 | 200 | AE | X1400-10S | AG |
| C1400-12L | 12,0 | 3,2 | 21,4 | 200 | AF | X1400-12L | AH |
| C1400-12S | 12,0 | 3,6 | 22,2 | 200 | AF | X1400-12S | AH |
| C1400-16L | 16,0 | 4,0 | 28,0 | 200 | AG | X1400-16L | AJ |
| C1400-16S | 16,0 | 4,5 | 29,0 | 200 | AG | X1400-16S | AJ |
| C1400-20L | 20,0 | 5,0 | 35,0 | 200 | AH | X1400-20L | AK |
| C1400-20S | 20,0 | 6,0 | 37,0 | 250 | AJ | X1400-20S | AL |
| C1400-25L | 25,0 | 6,3 | 43,6 | 250 | AK | X1400-25L | AM |
| C1400-25S | 25,0 | 6,8 | 44,6 | 250 | AK | X1400-25S | AM |
| C1400-30L | 30,0 | 7,0 | 50,0 | 250 | AL | X1400-30L | AN |
| C1400-30S | 30,0 | 7,5 | 51,0 | 280 | AM | X1400-30S | AO |
| C1400-35L | 35,0 | 8,0 | 59,0 | 300 | AN | X1400-35L | AP |
| C1400-35S | 35,0 | 8,5 | 60,0 | 300 | AN | X1400-35S | AQ |
| C1400-42L | 42,0 | 9,0 | 68,0 | 400 | AO | X1400-42L | AR |
| C1400-42S | 42,0 | 10,0 | 70,0 | 400 | AP | X1400-42S | AS |

Bore ring 7993 type B

Parts in the table with the initial letter "C" are manufactured from music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).

The maximum unevenness of the ring is 1.5 x the wire diameter d7.

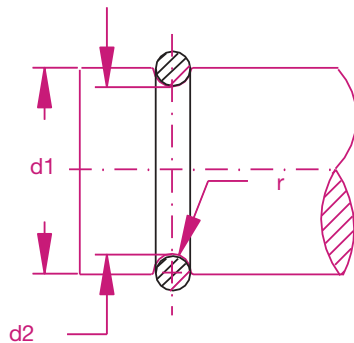
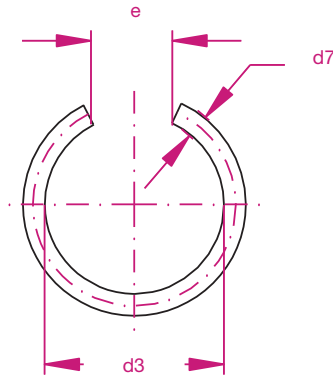


| article no. music wire DH/SH | d1 | ring d7 | d3 | tolerance + | e ≈ | weight g/pc | groove d2 | tolerance +/- | r | price group | article no. stainless | price group |
|------------------------------------|-----|------------|-------|----------------|--------|----------------|--------------|------------------|-----|----------------|--------------------------|----------------|
| C430-7 | 7 | 0,8 | 7,9 | 0,3 | 4 | 0,071 | 7,8 | 0,05 | 0,5 | A | X430-7 | C |
| C430-8 | 8 | 0,8 | 8,9 | 0,3 | 4 | 0,083 | 8,8 | 0,05 | 0,5 | A | X430-8 | C |
| C430-10 | 10 | 0,8 | 10,9 | 0,3 | 4 | 0,108 | 10,8 | 0,05 | 0,5 | A | X430-10 | C |
| C430-12 | 12 | 1,0 | 13,2 | 0,4 | 6 | 0,196 | 13,0 | 0,05 | 0,6 | A | X430-12 | C |
| C430-14 | 14 | 1,0 | 15,2 | 0,4 | 6 | 0,234 | 15,0 | 0,05 | 0,6 | A | X430-14 | C |
| C430-16 | 16 | 1,6 | 17,8 | 0,4 | 8 | 0,706 | 17,6 | 0,05 | 0,9 | A | X430-16 | C |
| C430-18 | 18 | 1,6 | 19,8 | 0,4 | 8 | 0,804 | 19,6 | 0,05 | 0,9 | A | X430-18 | C |
| C430-20 | 20 | 2,0 | 22,3 | 0,5 | 10 | 1,32 | 22,0 | 0,10 | 1,1 | A | X430-20 | C |
| C430-22 | 22 | 2,0 | 24,3 | 0,5 | 10 | 1,47 | 24,0 | 0,10 | 1,1 | B | X430-22 | D |
| C430-24 | 24 | 2,0 | 26,3 | 0,5 | 10 | 1,63 | 26,0 | 0,10 | 1,1 | B | X430-24 | D |
| C430-25 | 25 | 2,0 | 27,3 | 0,5 | 10 | 1,70 | 27,0 | 0,10 | 1,1 | B | X430-25 | D |
| C430-26 | 26 | 2,0 | 28,3 | 0,5 | 10 | 1,79 | 28,0 | 0,10 | 1,1 | B | X430-26 | D |
| C430-28 | 28 | 2,0 | 30,3 | 0,5 | 10 | 1,94 | 30,0 | 0,10 | 1,1 | B | X430-28 | D |
| C430-30 | 30 | 2,5 | 32,3 | 0,5 | 10 | 2,10 | 32,0 | 0,10 | 1,1 | B | X430-30 | D |
| C430-32 | 32 | 2,5 | 34,9 | 0,6 | 12 | 3,47 | 34,5 | 0,10 | 1,4 | B | X430-32 | D |
| C430-35 | 35 | 2,5 | 37,9 | 0,6 | 12 | 3,85 | 37,5 | 0,10 | 1,4 | B | X430-35 | D |
| C430-38 | 38 | 2,5 | 40,9 | 0,6 | 12 | 4,20 | 40,5 | 0,10 | 1,4 | B | X430-38 | D |
| C430-40 | 40 | 2,5 | 42,9 | 0,6 | 12 | 4,43 | 42,5 | 0,10 | 1,4 | C | X430-40 | E |
| C430-42 | 42 | 2,5 | 45,0 | 0,8 | 16 | 4,54 | 44,5 | 0,10 | 1,4 | C | X430-42 | E |
| C430-45 | 45 | 2,5 | 48,0 | 0,8 | 16 | 4,89 | 47,5 | 0,10 | 1,4 | C | X430-45 | E |
| C430-48 | 48 | 2,5 | 51,0 | 0,8 | 16 | 5,24 | 50,5 | 0,10 | 1,4 | C | X430-48 | E |
| C430-50 | 50 | 2,5 | 53,0 | 0,8 | 16 | 5,51 | 52,5 | 0,10 | 1,4 | C | X430-50 | E |
| C430-55 | 55 | 3,2 | 58,9 | 0,8 | 20 | 9,77 | 58,2 | 0,15 | 1,8 | C | X430-55 | E |
| C430-60 | 60 | 3,2 | 63,9 | 0,8 | 20 | 10,76 | 63,2 | 0,15 | 1,8 | C | X430-60 | E |
| C430-65 | 65 | 3,2 | 68,9 | 0,8 | 20 | 11,75 | 68,2 | 0,15 | 1,8 | C | X430-65 | E |
| C430-70 | 70 | 3,2 | 74,0 | 1,0 | 25 | 12,44 | 73,2 | 0,15 | 1,8 | C | X430-70 | E |
| C430-75 | 75 | 3,2 | 79,0 | 1,0 | 25 | 13,43 | 78,2 | 0,15 | 1,8 | C | X430-75 | E |
| C430-80 | 80 | 3,2 | 84,0 | 1,0 | 25 | 14,42 | 83,2 | 0,15 | 1,8 | C | X430-80 | E |
| C430-85 | 85 | 3,2 | 89,0 | 1,0 | 25 | 15,41 | 88,2 | 0,15 | 1,8 | C | X430-85 | E |
| C430-90 | 90 | 3,2 | 94,0 | 1,0 | 25 | 16,40 | 93,2 | 0,15 | 1,8 | C | X430-90 | E |
| C430-95 | 95 | 3,2 | 99,0 | 1,0 | 25 | 17,39 | 98,2 | 0,15 | 1,8 | C | X430-95 | E |
| C430-100 | 100 | 3,2 | 104,2 | 1,2 | 32 | 17,98 | 103,2 | 0,15 | 1,8 | D | X430-100 | F |
| C430-105 | 105 | 3,2 | 109,2 | 1,2 | 32 | 18,98 | 108,2 | 0,15 | 1,8 | D | X430-105 | F |
| C430-110 | 110 | 3,2 | 114,2 | 1,2 | 32 | 19,97 | 113,2 | 0,15 | 1,8 | D | X430-110 | F |
| C430-115 | 115 | 3,2 | 119,2 | 1,2 | 32 | 20,96 | 118,2 | 0,15 | 1,8 | D | X430-115 | F |
| C430-120 | 120 | 3,2 | 124,2 | 1,2 | 32 | 21,95 | 123,2 | 0,15 | 1,8 | D | X430-120 | F |
| C430-125 | 125 | 3,2 | 129,2 | 1,2 | 32 | 22,94 | 128,2 | 0,15 | 1,8 | D | X430-125 | F |

Shaft ring DIN 7993 type A

Parts in the table with the initial letter "C" are manufactured from music wire EN 10270-1 type DH or SH (A 228, BS 5216). Parts with the initial letter "X" are manufactured from stainless steel wire EN 10270-3-1.4310 (A301, BS 301S21).

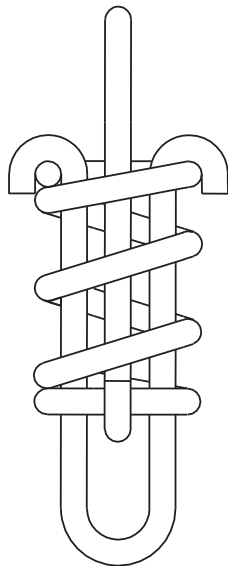
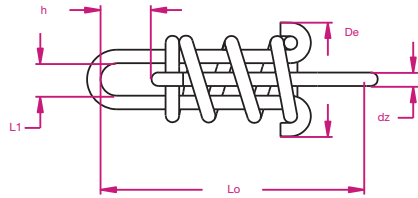
The maximum unevenness of the ring is 1.5 x the wire diameter d7.



| article no. music wire DH/SH | d1 | ring d7 | d3 | tolerance - | e ≈ | weight g/pc | groove d2 | tolerance +/- | r | price group | article no. stainless | price group |
|------------------------------------|-----|------------|-------|----------------|--------|----------------|--------------|------------------|-----|----------------|--------------------------|----------------|
| C420-4 | 4 | 0,8 | 3,1 | 0,2 | 1 | 0,044 | 3,2 | 0,05 | 0,5 | A | X420-4 | C |
| C420-5 | 5 | 0,8 | 4,1 | 0,2 | 1 | 0,057 | 4,2 | 0,05 | 0,5 | A | X420-5 | C |
| C420-6 | 6 | 0,8 | 5,1 | 0,2 | 1 | 0,069 | 5,2 | 0,05 | 0,5 | A | X420-6 | C |
| C420-7 | 7 | 0,8 | 6,1 | 0,3 | 2 | 0,077 | 6,2 | 0,05 | 0,5 | A | X420-7 | C |
| C420-8 | 8 | 0,8 | 7,1 | 0,3 | 2 | 0,090 | 7,2 | 0,05 | 0,5 | A | X420-8 | C |
| C420-10 | 10 | 0,8 | 9,1 | 0,3 | 2 | 0,115 | 9,2 | 0,05 | 0,5 | A | X420-10 | C |
| C420-12 | 12 | 1,0 | 10,8 | 0,4 | 3 | 0,210 | 11,0 | 0,05 | 0,6 | A | X420-12 | C |
| C420-14 | 14 | 1,0 | 12,8 | 0,4 | 3 | 0,250 | 13,0 | 0,05 | 0,6 | A | X420-14 | C |
| C420-16 | 16 | 1,6 | 14,2 | 0,4 | 3 | 0,740 | 14,4 | 0,05 | 0,9 | B | X420-16 | D |
| C420-18 | 18 | 1,6 | 16,2 | 0,4 | 3 | 0,830 | 16,4 | 0,05 | 0,9 | B | X420-18 | D |
| C420-20 | 20 | 2,0 | 17,7 | 0,5 | 3 | 1,45 | 18,0 | 0,10 | 1,1 | B | X420-20 | D |
| C420-22 | 22 | 2,0 | 19,7 | 0,5 | 3 | 1,60 | 20,0 | 0,10 | 1,1 | B | X420-22 | D |
| C420-24 | 24 | 2,0 | 21,7 | 0,5 | 3 | 1,78 | 22,0 | 0,10 | 1,1 | B | X420-24 | D |
| C420-25 | 25 | 2,0 | 22,7 | 0,5 | 3 | 1,84 | 23,0 | 0,10 | 1,1 | B | X420-25 | D |
| C420-26 | 26 | 2,0 | 23,7 | 0,5 | 3 | 1,91 | 24,0 | 0,10 | 1,1 | B | X420-26 | D |
| C420-28 | 28 | 2,0 | 25,7 | 0,5 | 3 | 2,07 | 26,0 | 0,10 | 1,1 | B | X420-28 | D |
| C420-30 | 30 | 2,0 | 27,7 | 0,5 | 3 | 2,22 | 28,0 | 0,10 | 1,1 | B | X420-30 | D |
| C420-32 | 32 | 2,5 | 29,1 | 0,6 | 4 | 3,67 | 29,5 | 0,10 | 1,4 | C | X420-32 | E |
| C420-35 | 35 | 2,5 | 32,1 | 0,6 | 4 | 3,98 | 32,5 | 0,10 | 1,4 | C | X420-35 | E |
| C420-38 | 38 | 2,5 | 35,1 | 0,6 | 4 | 4,40 | 35,5 | 0,10 | 1,4 | C | X420-38 | E |
| C420-40 | 40 | 2,5 | 37,1 | 0,6 | 4 | 4,64 | 37,5 | 0,10 | 1,4 | C | X420-40 | E |
| C420-42 | 42 | 2,5 | 39,0 | 0,8 | 4 | 4,87 | 39,5 | 0,10 | 1,4 | C | X420-42 | E |
| C420-45 | 45 | 2,5 | 42,0 | 0,8 | 4 | 5,23 | 42,5 | 0,10 | 1,4 | C | X420-45 | E |
| C420-48 | 48 | 2,5 | 45,0 | 0,8 | 4 | 5,60 | 45,5 | 0,10 | 1,4 | C | X420-48 | E |
| C420-50 | 50 | 2,5 | 47,0 | 0,8 | 4 | 5,83 | 47,5 | 0,10 | 1,4 | C | X420-50 | E |
| C420-55 | 55 | 3,2 | 51,1 | 0,8 | 4 | 10,51 | 51,2 | 0,15 | 1,8 | C | X420-55 | E |
| C420-60 | 60 | 3,2 | 56,1 | 0,8 | 4 | 11,50 | 56,8 | 0,15 | 1,8 | C | X420-60 | E |
| C420-65 | 65 | 3,2 | 61,1 | 0,8 | 4 | 12,49 | 61,8 | 0,15 | 1,8 | C | X420-65 | E |
| C420-70 | 70 | 3,2 | 66,0 | 1,0 | 5 | 13,40 | 66,8 | 0,15 | 1,8 | C | X420-70 | E |
| C420-75 | 75 | 3,2 | 71,0 | 1,0 | 5 | 14,39 | 71,8 | 0,15 | 1,8 | C | X420-75 | E |
| C420-80 | 80 | 3,2 | 76,0 | 1,0 | 5 | 15,38 | 76,8 | 0,15 | 1,8 | C | X420-80 | E |
| C420-85 | 85 | 3,2 | 81,0 | 1,0 | 5 | 16,38 | 81,8 | 0,15 | 1,8 | C | X420-85 | E |
| C420-90 | 90 | 3,2 | 86,0 | 1,0 | 5 | 17,37 | 86,8 | 0,15 | 1,8 | C | X420-90 | E |
| C420-95 | 95 | 3,2 | 91,0 | 1,0 | 5 | 18,36 | 91,8 | 0,15 | 1,8 | C | X420-95 | E |
| C420-100 | 100 | 3,2 | 95,8 | 1,2 | 5 | 19,31 | 96,8 | 0,15 | 1,8 | D | X420-100 | F |
| C420-105 | 105 | 3,2 | 100,8 | 1,2 | 5 | 20,30 | 101,8 | 0,15 | 1,8 | D | X420-105 | F |
| C420-110 | 110 | 3,2 | 105,8 | 1,2 | 5 | 21,29 | 106,8 | 0,15 | 1,8 | D | X420-110 | F |
| C420-115 | 115 | 3,2 | 110,8 | 1,2 | 5 | 22,29 | 111,8 | 0,15 | 1,8 | D | X420-115 | F |
| C420-120 | 120 | 3,2 | 115,8 | 1,2 | 5 | 23,28 | 116,8 | 0,15 | 1,8 | D | X420-120 | F |
| C420-125 | 125 | 3,2 | 120,8 | 1,2 | 5 | 24,27 | 121,8 | 0,15 | 1,8 | D | X420-125 | F |

Draw bar spring

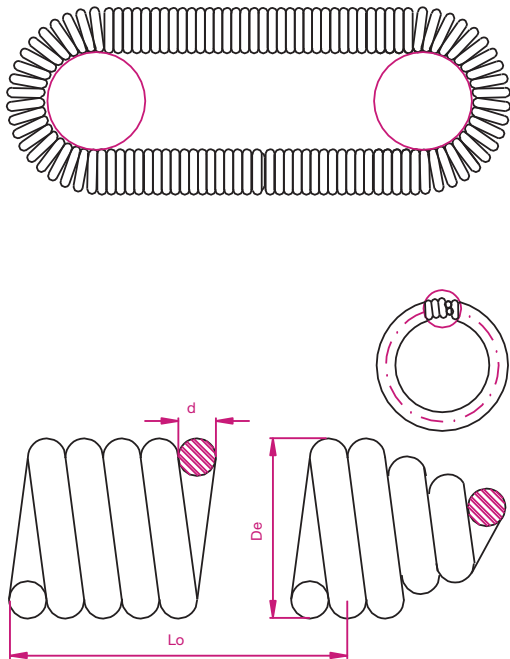
Stainless steel no. 1.4310 (A301, BS 301S21)



| article no. | L0 un-stressed spring length | sn max. spring deflection | R spring rate N/mm | Fn maximum force N | De outer diameter | dz wire diameter of draw bar | L1 inner diameter of draw bar | h length of draw bar | article no. Compression spring | price group |
|-------------|------------------------------|---------------------------|--------------------|--------------------|-------------------|------------------------------|-------------------------------|----------------------|--------------------------------|-------------|
| SZF-40 | 40 | 9,6 | 4,11 | 39,6 | 9,5 | 1 | 3,3 | 9,2 | VD-169 | AS |
| SZF-50 | 50 | 14,0 | 2,79 | 39,2 | 9,5 | 1 | 3,3 | 9,2 | VD-170 | AS |
| SZF-60 | 60 | 15,4 | 1,55 | 23,9 | 9,5 | 1 | 3,3 | 7,2 | VD-171A | AS |
| SZF-80 | 80 | 3,4 | 3,45 | 117 | 17,3 | 1,6 | 7,7 | 11,6 | VD-220 | AS |
| SZF-100 | 100 | 50 | 2,34 | 119 | 17,3 | 1,6 | 7,7 | 9,4 | VD-221 | AS |
| SZF-125 | 125 | 76 | 1,58 | 121 | 17,3 | 1,6 | 7,7 | 3,4 | VD-222 | AS |
| SZF-150 | 150 | 68 | 2,05 | 141 | 25 | 2 | 14 | 22 | VD-242 | AW |
| SZF-175 | 175 | 100 | 1,40 | 140 | 25 | 2 | 14 | 18 | VD-243 | AW |
| SZF-200 | 200 | 106 | 1,12 | 119 | 25 | 2 | 14 | 23 | VD-243B | AW |
| SZF-225 | 225 | 150 | 0,94 | 141 | 25 | 2 | 14 | 11 | VD-244 | AW |
| SZF-250 | 250 | 104 | 2,10 | 218 | 39 | 3 | 21 | 43 | VD-288Z-23 | AZ |
| SZF-275 | 275 | 120,9 | 1,41 | 217 | 39 | 3 | 16 | 52 | VD-272 | AZ |
| SZF-300 | 300 | 153 | 1,60 | 245 | 42,4 | 3,2 | 22 | 30 | VD-297B | AZ |
| SZF-350 | 350 | 170 | 1,90 | 335 | 47,2 | 3,6 | 25 | 48 | VD-313J | AZ |
| SZF-375 | 375 | 260 | 1,43 | 373 | 62 | 4 | 38 | 16 | VD-317 | AZ |
| SZF-400 | 400 | 180 | 4,61 | 828 | 55 | 5 | 25 | 45 | VD-354 | AZ |
| SZF-425 | 425 | 223 | 3,19 | 713 | 71 | 5 | 38 | 36 | VD-364J | AZ |
| SZF-450 | 450 | 246 | 2,34 | 579 | 89 | 6 | 53 | 36 | VD-364R-63 | BB |
| SZF-475 | 475 | 228 | 4,41 | 1009 | 82 | 6 | 44 | 61 | VD-373 | BB |
| SZF-500 | 500 | 256 | 4,31 | 1104 | 90 | 7 | 47 | 40 | VD-389J | BB |

Interlock garter springs

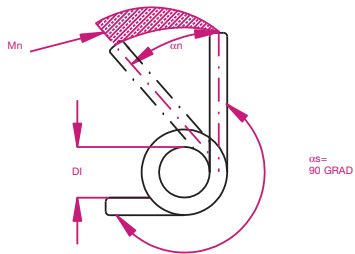
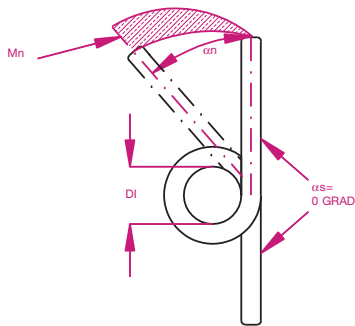
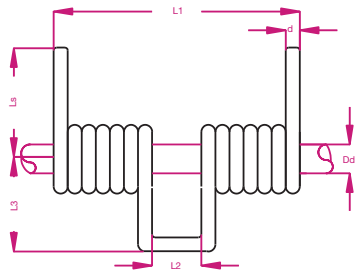
Stainless steel no. 1.4310 (A301, BS 301S21)



| article no. | d | De | L0 | price group |
|-------------|------|-----|-----|-------------|
| WF-005 | 0,2 | 1,2 | 300 | AX |
| WF-010 | 0,2 | 1,3 | 300 | AX |
| WF-015 | 0,2 | 1,5 | 300 | AO |
| WF-020 | 0,2 | 1,7 | 300 | AO |
| WF-025 | 0,2 | 2,0 | 300 | AO |
| WF-030 | 0,25 | 1,3 | 300 | AX |
| WF-035 | 0,25 | 1,5 | 300 | AX |
| WF-040 | 0,25 | 1,7 | 300 | AO |
| WF-045 | 0,25 | 2,0 | 300 | AO |
| WF-050 | 0,25 | 2,3 | 300 | AO |
| WF-055 | 0,25 | 2,5 | 300 | AF |
| WF-060 | 0,3 | 1,8 | 400 | AX |
| WF-065 | 0,3 | 2,0 | 400 | AX |
| WF-070 | 0,3 | 2,3 | 400 | AO |
| WF-075 | 0,3 | 2,5 | 400 | AO |
| WF-080 | 0,3 | 2,8 | 400 | AF |
| WF-085 | 0,3 | 3,0 | 400 | AF |
| WF-090 | 0,4 | 2,0 | 400 | AX |
| WF-095 | 0,4 | 2,3 | 400 | AX |
| WF-100 | 0,4 | 2,5 | 400 | AX |
| WF-105 | 0,4 | 2,8 | 400 | AO |
| WF-110 | 0,4 | 3,0 | 400 | AO |
| WF-115 | 0,4 | 3,3 | 400 | AO |
| WF-120 | 0,4 | 3,5 | 400 | AF |
| WF-125 | 0,4 | 4,0 | 400 | AF |
| WF-130 | 0,5 | 2,5 | 500 | AX |
| WF-135 | 0,5 | 2,8 | 500 | AX |
| WF-140 | 0,5 | 3,0 | 500 | AX |
| WF-145 | 0,5 | 3,3 | 500 | AO |
| WF-150 | 0,5 | 3,5 | 500 | AO |
| WF-155 | 0,5 | 3,8 | 500 | AF |
| WF-160 | 0,5 | 4,0 | 500 | AF |
| WF-165 | 0,5 | 4,5 | 500 | AF |
| WF-170 | 0,5 | 5,0 | 500 | AF |

Double torsion spring

Stainless steel no. 1.4310 (A301, BS 301S21)



| article no. | Dd max. mandrel | d wire diameter | Di inner coil diameter | n number of coils | Ln leg lengths | L1 width | L2 width of connecting bar | L3 distance from central coil to connecting bar | alpha n max. angle of rotation | Mn max. torsional moment | alpha s angle between leg and connecting bar | form pic. | price group |
|-------------|-----------------|-----------------|------------------------|-------------------|----------------|----------|----------------------------|---|--------------------------------|--------------------------|--|-----------|-------------|
| DSF-100 | 3,5 | 0,5 | 3,7 | 4,0 | 15 | 10 | 5 | 10 | 87,0 | 30,8 | 0 | A | AH |
| DSF-105 | 3,5 | 0,5 | 3,7 | 4,25 | 15 | 10,2 | 5 | 10 | 92,2 | 30,8 | 90 | B | AH |
| DSF-110 | 3,8 | 0,5 | 4,1 | 6,0 | 18 | 12,0 | 5 | 12 | 142 | 31,1 | 0 | A | AH |
| DSF-115 | 3,8 | 0,5 | 4,1 | 6,25 | 18 | 12,6 | 5 | 12 | 148 | 31,1 | 90 | B | AH |
| DSF-150 | 4,5 | 0,63 | 4,6 | 4,0 | 16 | 13,3 | 7 | 12 | 84,2 | 60,5 | 0 | A | AH |
| DSF-155 | 4,5 | 0,63 | 4,6 | 4,25 | 16 | 13,6 | 7 | 12 | 89,2 | 60,5 | 90 | B | AH |
| DSF-160 | 4,6 | 0,63 | 4,8 | 6,0 | 18 | 15,8 | 7 | 14 | 130 | 60,8 | 0 | A | AH |
| DSF-165 | 4,6 | 0,63 | 4,8 | 6,25 | 18 | 16,1 | 7 | 14 | 135 | 60,8 | 90 | B | AH |
| DSF-200 | 5,0 | 0,8 | 5,2 | 4,0 | 18 | 17,0 | 9 | 14 | 73,3 | 119 | 0 | A | AJ |
| DSF-205 | 5,0 | 0,8 | 5,2 | 4,25 | 18 | 17,1 | 9 | 14 | 77,7 | 119 | 90 | B | AJ |
| DSF-210 | 5,5 | 0,8 | 5,8 | 6,0 | 20 | 20,2 | 9 | 16 | 120 | 120 | 0 | A | AJ |
| DSF-215 | 5,5 | 0,8 | 5,8 | 6,25 | 20 | 20,6 | 9 | 16 | 125 | 120 | 90 | B | AJ |
| DSF-250 | 6,0 | 1,0 | 6,2 | 4,0 | 22 | 22 | 12 | 16 | 67,8 | 225 | 0 | A | AK |
| DSF-255 | 6,0 | 1,0 | 6,2 | 4,25 | 22 | 22,5 | 12 | 16 | 71,8 | 225 | 90 | B | AK |
| DSF-260 | 6,5 | 1,0 | 6,8 | 6,0 | 24 | 26,0 | 12 | 18 | 109 | 227 | 0 | A | AK |
| DSF-265 | 6,5 | 1,0 | 6,8 | 6,25 | 24 | 26,5 | 12 | 18 | 114 | 227 | 90 | B | AK |
| DSF-300 | 7,1 | 1,25 | 7,4 | 4,0 | 25 | 27,5 | 15 | 18 | 62,8 | 426 | 0 | A | AL |
| DSF-305 | 7,1 | 1,25 | 7,4 | 4,25 | 25 | 28,1 | 15 | 18 | 66,6 | 426 | 90 | B | AL |
| DSF-310 | 8,0 | 1,25 | 8,2 | 6,0 | 28 | 32,5 | 15 | 20 | 102 | 431 | 0 | A | AL |
| DSF-315 | 8,0 | 1,25 | 8,2 | 6,25 | 28 | 33,1 | 15 | 20 | 106 | 431 | 90 | B | AL |
| DSF-350 | 8,5 | 1,6 | 8,8 | 4,0 | 28 | 34,0 | 18 | 20 | 56,0 | 852 | 0 | A | AM |
| DSF-355 | 8,5 | 1,6 | 8,8 | 4,25 | 28 | 34,8 | 18 | 20 | 59,4 | 852 | 90 | B | AM |
| DSF-360 | 9,5 | 1,6 | 9,8 | 6,0 | 30 | 40,3 | 18 | 22 | 92,0 | 863 | 0 | A | AM |
| DSF-365 | 9,5 | 1,6 | 9,8 | 6,25 | 30 | 41,2 | 18 | 22 | 95,7 | 863 | 90 | B | AM |
| DSF-400 | 10,4 | 2,0 | 10,6 | 4,0 | 30 | 40,0 | 20 | 22 | 51,3 | 1581 | 0 | A | AN |
| DSF-405 | 10,4 | 2,0 | 10,6 | 4,25 | 30 | 41,0 | 20 | 22 | 54,4 | 1581 | 90 | B | AN |
| DSF-410 | 11,3 | 2,0 | 11,6 | 6,0 | 35 | 48,0 | 20 | 24 | 83,0 | 1598 | 0 | A | AN |
| DSF-415 | 11,3 | 2,0 | 11,6 | 6,25 | 35 | 49 | 20 | 24 | 86,3 | 1598 | 90 | B | AN |

Double torsion spring

Stainless steel no. 1.4310 (A301, BS 301S21)

Stainless double torsion spring material no. 1.4310 (EN 10270-3, A301, BS 301S21) available with 2 leg positions, 0° and 90°.

d = wire diameter
 Di = inner diameter
 Dd = mandrel diameter
 L1 = total length
 L2 = inside length of connecting bar
 L3 = measurement from mid-coil to outer edge of connecting bar
 αn = maximum angle of rotation
 Mn = maximum torsional moment
 αs = angle between leg and connecting bar
 R = leverage

To calculate the maximum load (Fn) which a spring can take the maximum torsional moment (Mn) must be divided by the length of leverage (R). $F_n = M_n/R$.
 (Leverage = Distance from center of spring body to the point of incoming strenght)

| article no. | Dd max. mandrel | d wire diameter | Di inner coil diameter | n number of coils | Ls leg lengths | L1 width | L2 width of connecting bar | L3 distance from central coil to connecting bar | αn max. angle of rotation | Mn max. torsional moment | αs angle between leg and connecting bar | form pic. | price group |
|-------------|-----------------|-----------------|------------------------|-------------------|----------------|----------|----------------------------|---|-----------------------------------|--------------------------|---|-----------|-------------|
| DSF-450 | 12,5 | 2,5 | 12,8 | 4,0 | 35 | 50 | 25 | 24 | 47 | 2926 | 0 | A | AP |
| DSF-455 | 12,5 | 2,5 | 12,8 | 4,25 | 35 | 51 | 25 | 24 | 49 | 2926 | 90 | B | AP |
| DSF-460 | 14,5 | 2,5 | 14,8 | 6 | 40 | 60 | 25 | 26 | 80 | 2978 | 0 | A | AP |
| DSF-465 | 14,5 | 2,5 | 14,8 | 6,25 | 40 | 61 | 25 | 26 | 83 | 2978 | 90 | B | AP |
| DSF-500 | 15,5 | 3,2 | 15,8 | 4 | 40 | 60 | 28 | 26 | 43 | 5839 | 0 | A | AR |
| DSF-505 | 15,5 | 3,2 | 15,8 | 4,25 | 40 | 61 | 28 | 26 | 45 | 5839 | 90 | B | AR |
| DSF-510 | 18,2 | 3,2 | 18,8 | 6 | 45 | 72 | 28 | 28 | 75 | 5964 | 0 | A | AR |
| DSF-515 | 18,2 | 3,2 | 18,8 | 6,25 | 45 | 74 | 28 | 28 | 78 | 5964 | 90 | B | AR |
| DSF-550 | 20 | 3,6 | 20,6 | 4 | 45 | 66 | 30 | 28 | 48 | 8354 | 0 | A | AS |
| DSF-555 | 20 | 3,6 | 20,6 | 4,25 | 45 | 67 | 30 | 28 | 51 | 8354 | 90 | B | AS |
| DSF-560 | 21 | 3,6 | 21,8 | 6 | 50 | 80 | 30 | 30 | 76 | 8409 | 0 | A | AS |
| DSF-565 | 21 | 3,6 | 21,8 | 6,25 | 50 | 82 | 30 | 30 | 79 | 8409 | 90 | B | AS |
| DSF-600 | 26 | 4 | 26,6 | 4 | 50 | 76 | 36 | 30 | 55 | 11497 | 0 | A | AT |
| DSF-605 | 26 | 4 | 26,6 | 4,25 | 50 | 78 | 36 | 30 | 58 | 11497 | 90 | B | AT |
| DSF-610 | 32 | 4 | 33,1 | 6 | 60 | 92 | 36 | 32 | 102 | 11741 | 0 | A | AT |
| DSF-615 | 32 | 4 | 33,1 | 6,25 | 60 | 94 | 36 | 32 | 106 | 11741 | 90 | B | AT |

Custom springs according to dimensional data, drawing, CAD data and samples

Custom **compression springs** from 0.08 to 12.0 mm wire thickness.

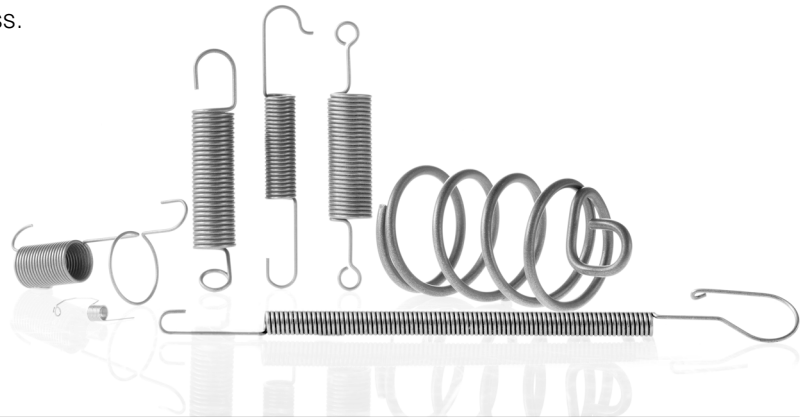
+ Application form page 416 and 417



Custom **extension springs** from 0.08 to 12.0 mm wire thickness.

+ Application form page 418 and 419

+ Selection of loops page 415



Custom **torsion springs** from 0.08 to 8.0 mm wire thickness.

+ Application form page 420 and 421

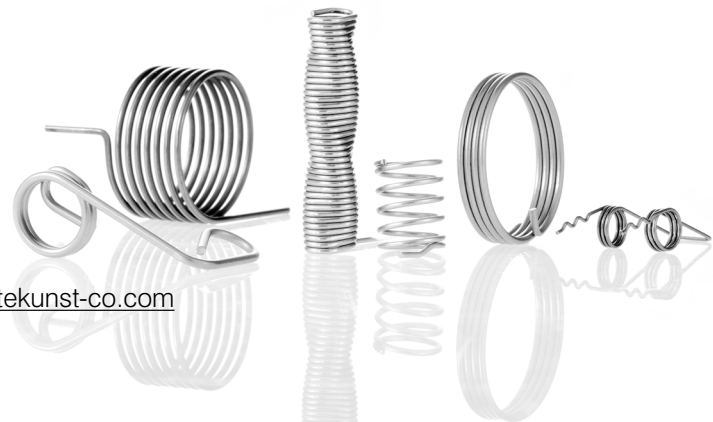
+ Examples for leg shapes page 422

Spring inquiry and calculation online > www.federnshop.com

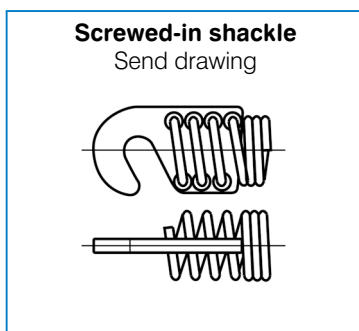
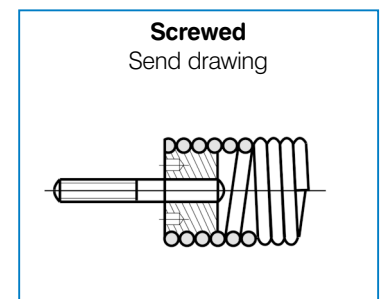
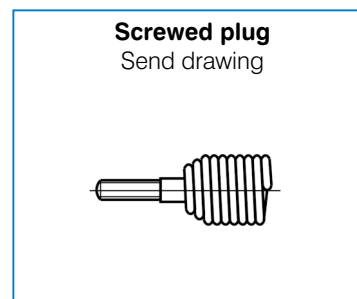
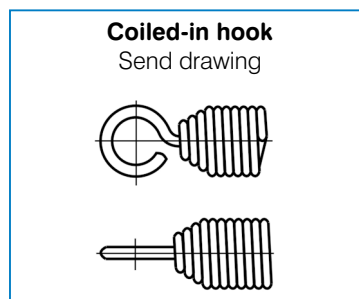
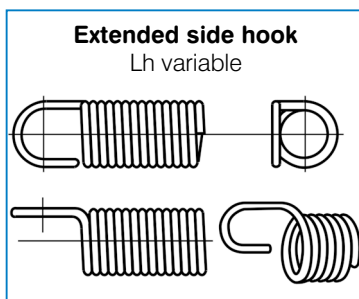
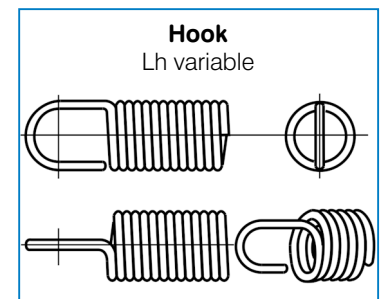
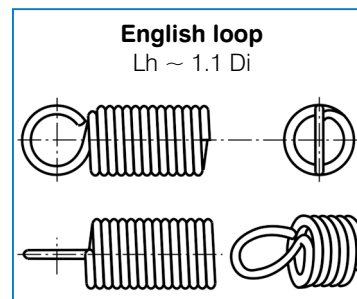
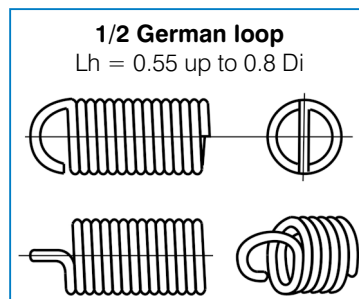
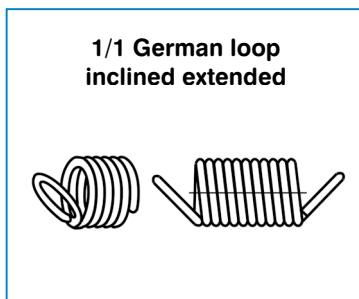
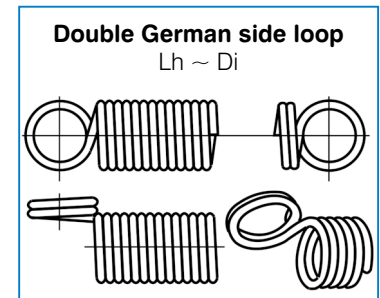
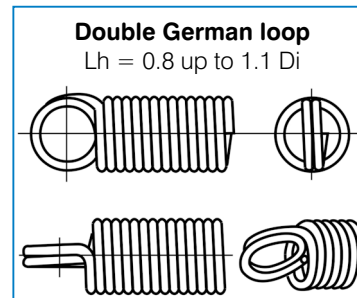
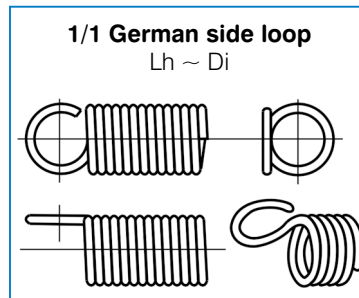
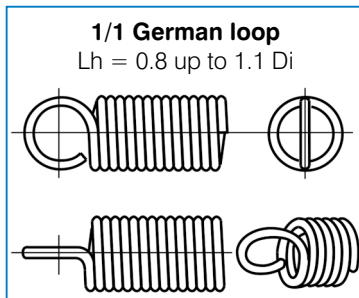
Gutekunst + Co.KG Spring Factories

Carl-Zeiss-Straße 15 · D-72555 Metzingen

Phone 0049 (0)7123 960-193 · Fax 0049 (0)7123 960-150 · order@gutekunst-co.com



Loop shapes



Choose a suitable loop form for the custom extension spring. Please heed the additional specifications "Lh" (distance between the inner loop and the spring body) and "m" (loop opening width) if required. For example, with the "1/1 German loop", the "Lh" value may only be between 0.8 and 1.1 times the inner coil diameter "Di" [$Di = De - (2 \cdot d)$]. Where extension springs have screwed or rolled in spring ends, the number of spring coils "n" must be stated separately from the total coils "nt".

Gutekunst + Co.KG Spring Factories

Carl-Zeiss-Straße 15 · D-72555 Metzingen

Phone 0049 (0)7123 960-193 · Fax 0049 (0)7123 960-150

order@gutekunst-co.com

Compression springs

Please fax to 0049 (0)7123 960-150

Inquiry

Order

Spring values

| | | |
|-----------|------|----|
| d | mm | |
| Di | mm | or |
| De | mm | |
| Dd | mm | |
| Dh | mm | |
| L0 | mm | |
| n | pc. | |
| nt | pc. | |
| S | mm | |
| L1 | N | |
| s1 | N | |
| F1 | N | |
| L2 | mm | |
| s2 | mm | |
| F2 | mm | |
| sh | mm | |
| R | N/mm | |
| | | |

We manufacture compression springs up to a wire thickness of 12.00 mm. Minimum specifications for compression spring design are:

Di or De, F2, L2 Di or De, F2, s2
 Di or De, F2, R Di or De, L1, L2, R
 Di or De, d, L0, nt

Material

EN 10270-1-DH/-SH 1.4310

Other _____

Coiling direction

left right

Spring ends

not closed closed ground

Determine application

Load total _____ pc.
 Load frequency _____ pc./min.
 Excursion (sh) _____ mm
 Working environment _____
 Application temperature _____ °C

Surface treatment

Guidance and seat

mandrel bush

pic 1 pic 2 pic 3 pic 4 pic 5
 v=2,0 v=1,0 v=1,0 v=0,7 v=0,5

Production compensation

1. L0 2. n,d 3. n,De,Di 4. L0,n,d 5. L0,n,De,Di

Tolerances EN 15800

grade 1 grade 2 grade 3

Test certificate

Notes

Address / Contact data

Reference number

Quantities

| | | |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|----------------------|

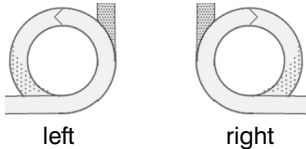
Date _____

Compression springs

Material

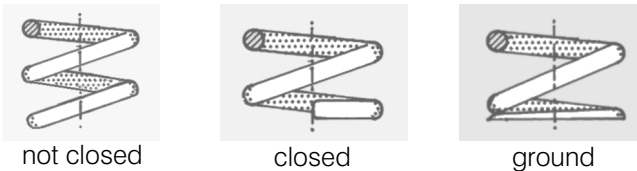
Please select one of the materials given or enter another material from the material table on page 8.

Coiling direction



Spring ends

Select the spring ends you require. Compression springs with a wire diameter of less than 0.5 mm cannot be delivered in a "ground" version, or only at significantly increased expense.



Determine application

To be able to determine the spring characteristics exactly, please complete all 5 boxes.

Load total = Total number of stress reversals

Load frequency = Number of stress reversals per minute

Excursion = Length of working travel "sh" (stroke)

Working environment = Around the spring (water, oil, air...)

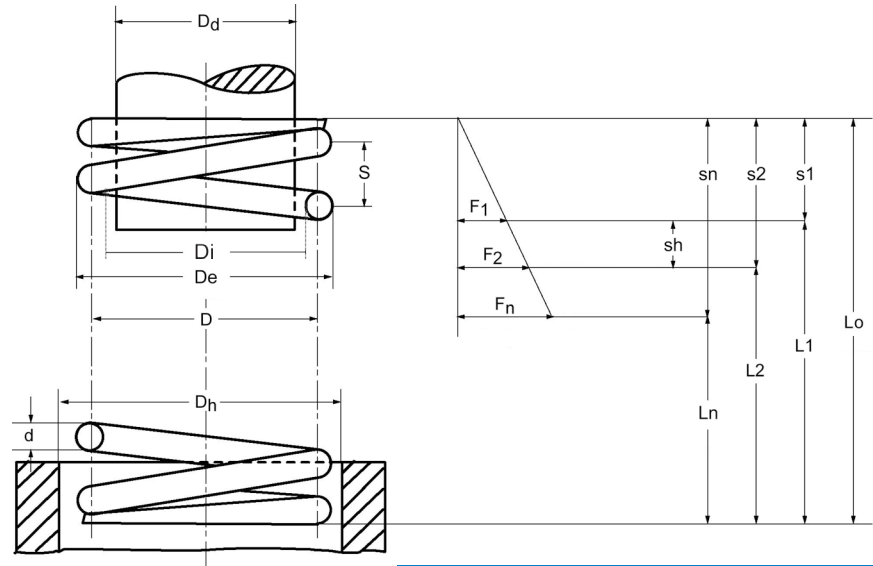
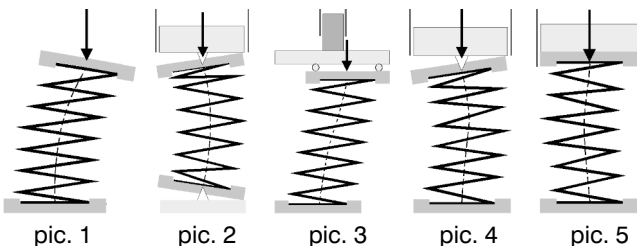
Application temperature = Temperature the spring is exposed to

Surface treatment

Select a surface treatment from page 13 if required.

Guidance and seat

When a spring is guided through a mandrel or bush it cannot buckle. In other cases it depends buckling depends on the design of the seat.



Tolerances

Select the quality grade for the compression springs. Our compression springs are usually manufactured to EN 15800 Grade 2 as standard. If you select Grade 1, your compression spring is manufactured according to the smallest tolerance range, and for Grade 3 with the largest tolerance range.

Test certificate

DIN EN 10204-2.1 free of charge

DIN EN 10204-2.2 EUR 15,34

DIN EN 10204-3.1 EUR 30,68

| | | |
|-------|------|-------------------------------|
| d | mm | wire diameter |
| D | mm | mean coil diameter |
| D_i | mm | inner coil diameter |
| D_e | mm | outer coil diameter |
| D_d | mm | maximum diameter of mandrel |
| D_h | mm | minimum diameter of bush |
| L_0 | mm | unstressed spring length |
| n | pc. | number of active coils |
| nt | pc. | total number of coils |
| S | mm | pitch of spring |
| F_1 | N | prestressed spring force |
| F_2 | N | loaded spring force |
| L_1 | mm | prestressed spring length |
| L_2 | mm | loaded spring length |
| s_1 | mm | prestressed spring deflection |
| s_2 | mm | loaded spring deflection |
| sh | mm | excursion |
| R | N/mm | spring rate |

Production compensation

As standard, we compensate the number of spring coils (n) in order to meet requirements.

Fixed parameters

One spring force and respective length of the tensioned spring

One spring force, respective length of the tensioned spring and L_0

One spring force, respective length of the tensioned spring and L_0

Two spring forces and respective lengths of the tensioned springs

Two spring forces and respective lengths of the tensioned springs

Compensated by

1. L_0

2. n,d

3. n, D_e , D_i

4. L_0 ,n,d

5. L_0 ,n, D_e , D_i

Extension springs

Please fax to 0049 (0)7123 960-150

Inquiry

Order

Spring values

| | | |
|-----------|------|--|
| d | mm | |
| De | mm | |
| Dh | mm | |
| Lk | mm | |
| L0 | mm | |
| n | pc. | |
| nt | pc. | |
| F0 | N | |
| L1 | mm | |
| s1 | mm | |
| F1 | N | |
| L2 | mm | |
| s2 | mm | |
| F2 | N | |
| Sh | mm | |
| R | N/mm | |
| | | |
| | | |
| | | |

We manufacture extension springs up to a wire thickness of 12.00 mm. Minimum specifications for extension spring design are:

De, F2, L2 De, F2, s2
De, F2, R De, L1, L2, R
De, d, L0, Lk, nt

Material

EN 10270-1-DH/-SH 1.4310
Other _____

Coiling direction

left right

Loop shape right

_____ mm
Lh = _____ mm m = _____ mm

Loop shape left

_____ mm
Lh = _____ mm m = _____ mm

Loop position

_____ degree

Determine application

Loads total _____ pc.
Load frequency _____ pc./min.
Excursion (sh) _____ mm
Working environment _____
Application temperature _____ °C

Surface treatment

Produktion compensation

1. F0 2. L0,n,d 3. L0,D 4. L0,n,d 5. F0,D

Tolerances DIN 2097

grade 1 grade 2 grade 3

Test certificate

Notes

Reference number

Quantities

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

Date _____

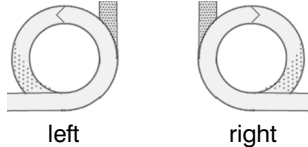
Address / Contact data

Extension springs

Material

Please select one of the materials given or enter another material from the material table on page 8.

Coiling direction

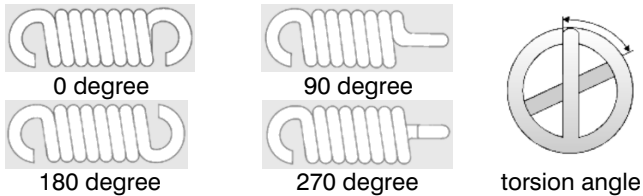


Loop shape

Go to page 415 of the catalogue to select the loop shape. Please do not forget to specify the additional information for the individual loop shapes e.g. for the "1/1 German loop" the values for "Lh" and "m".

Loop position

Please enter one of the four loop positions (0°, 90°, 180°, 270°) or the required torsion angle between the loops.



Determine application

To be able to determine the spring characteristics exactly, please complete all 5 boxes.

Load total = Total number of stress reversals

Load frequency = Number of stress reversals per minute

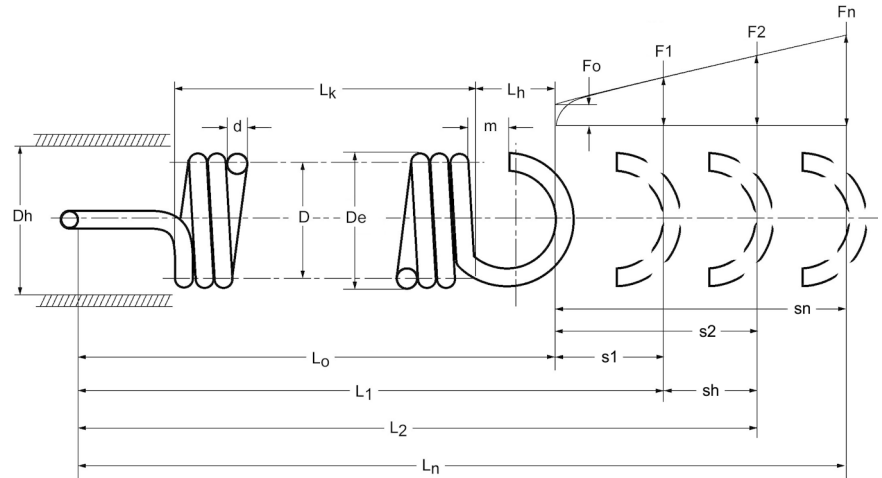
Excursion = Length of working travel "sh" (stroke)

Working environment = Around the spring (water, oil, air...)

Application temperature = Temperature the spring is exposed to

Surface treatment

The disadvantage of all later surface treatment methods for the extension springs is that application of a protective coating to the coils is only possible at extremely high cost due to the initial stress of the spring body. Here, the selection of a suitable material should be preferred to later surface treatment. Select a surface treatment from page 13 if required.



| | | |
|----|------|-------------------------------|
| d | mm | wire diameter |
| De | mm | outer coil diameter |
| Dh | mm | minimum bush diameter |
| Lk | mm | length of relaxed spring body |
| L0 | mm | unstressed spring length |
| Lh | mm | loop height |
| m | mm | loop opening width |
| n | pc. | number of active coils |
| nt | pc. | total number of coils |
| F0 | N | initial tension |
| F1 | N | prestressed spring force |
| F2 | N | loaded spring force |
| Fn | N | maximum spring force |
| L1 | mm | prestressed spring length |
| L2 | mm | loaded spring length |
| Ln | mm | maximum spring length |
| s1 | mm | prestressed spring deflection |
| s2 | mm | loaded spring deflection |
| sn | mm | maximum spring deflection |
| sh | mm | excursion |
| R | N/mm | spring rate |

Tolerances

Select the quality grade for the extension springs. Our extension springs are usually manufactured to DIN 2097 Grade 2 as standard. If you select Grade 1, your extension spring is manufactured according to the smallest tolerance range, and for Grade 3 with the largest tolerance range.

Test certificate

DIN EN 10204-2.1 free of charge

DIN EN 10204-2.2 EUR 15,34

DIN EN 10204-3.1 EUR 30,68

Production compensation

Normally we use the initial tension "F0" to compensate to be able to meet the extension spring requirements.

Fixed parameters

One spring force, respective length of tensioned spring and L0

One spring force, respective length of the tensioned spring and F0

One spring force, respective length of the tensioned spring and F0

Two spring forces and respective lengths of the tensioned springs

Two spring forces and respective lengths of the tensioned springs

Compensated by

1. F0

2. L0,n,d

3. L0,D

4. L0,n,d

5. F0,D

Torsion springs

Please fax to 0049 (0)7123 960-150

Inquiry

Order

Spring values

| | | |
|------------------------------|-----|--|
| d | mm | |
| Di | mm | |
| Dd | mm | |
| Lk0 | mm | |
| LSH | mm | |
| LSR | mm | |
| nt | pc. | |
| $\alpha 1$ | ° | |
| M1 | Nmm | |
| F1 | N | |
| $\alpha 2$ | ° | |
| M2 | Nmm | |
| F2 | N | |
| αh | ° | |
| RH | mm | |
| | | |
| | | |
| | | |

We manufacture torsion springs up to a wire thickness of 8.00 mm. Minimum specifications for torsion spring design are:

Di, $\alpha 2$, M2 (M2 = F2 · RH)

Di, $\alpha 2$, F2, RH

Di, d, Lk0, LSH, LSR, nt

Material

EN 10270-1-DH/-SH 1.4310

Other _____

Coiling direction

left right

Unstressed leg position (α)

0° 90° 180° 270°

Other _____°

Leg form



TS1 The legs extend at a tangent from the spring body, are straight and do not have any bends.

Other _____ (see page 422)

Drawing number _____

Determine application

Loads total _____ pc.

Load frequency _____ pc./min.

Working angle (αh) _____ °

Working environment _____

Application temperature _____ °C

Surface treatment

Production compensation

1. α 2. n,d 3. α, n, Di

Tolerances DIN 2194

grade 1 grade 2 grade 3

Test certificate

Notes

Address / Contact data

Reference number

Quantities

| | | |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|----------------------|

Date _____

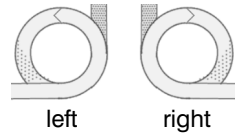
Torsion springs

Material

Please select one of the materials given or enter another material from the material table on page 8.

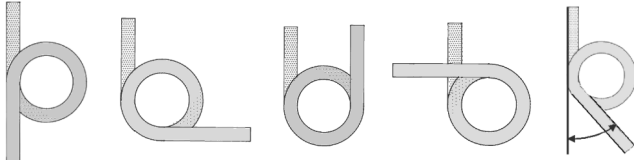
Coiling direction

Please make sure that the torsion springs are only stressed in the direction of coil.



Unstressed leg position (α)

Select one of the given leg positions or enter the desired angle under "Other".



0 degree 90 degree 180 degree 270 degree other

Leg form

We can deliver torsion springs with all kinds of different leg forms. You will find a small selection of different leg forms on page 422. Only leg form "TS1" can be made through specification of the rest of the data without enclosing a drawing. For all other leg forms, including the "TS2 to TS25" shown, the inquiry must be accompanied by a detailed drawing of your leg form.

Determine application

To be able to determine the spring characteristics exactly, please complete all 5 boxes.

Load total = Total number of stress reversals

Load frequency = Number of stress reversals per minute

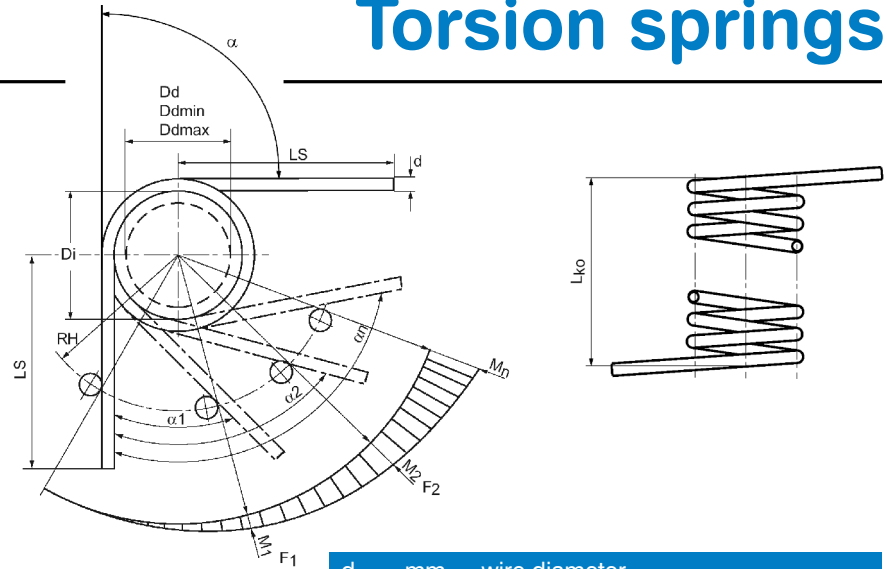
Working angle = Size of angle of rotation " α " (stroke)

Working environment = Around the spring (water, oil, air...)

Application temperature = Temperature the spring is exposed to

Surface treatment

The disadvantage of later surface treatment for the majority of torsion springs is that application of a protective coating to the coils is only possible at extremely high cost on account of the spring body. Here, the selection of a suitable material should usually be preferred to later surface treatment. Select a surface treatment from page 13 if required.



Tolerances

Select the quality grade for the torsion springs. Our torsion springs are usually manufactured to DIN 2094 Grade 2 as standard. If you select Grade 1, your torsion spring is manufactured according to the smallest tolerance range, and for Grade 3 with the largest tolerance range.

Test certificate

DIN EN10204-2.1 free

DIN EN10204-2.2 EUR 15,34

DIN EN10204-3.1 EUR 30,68

| | | |
|------------|-----|--|
| d | mm | wire diameter |
| Di | mm | inner coil diameter |
| Dd | mm | diameter of mandrel |
| Lk0 | mm | length of spring body |
| LSH | mm | leg length of the lever leg |
| LSR | mm | leg length of the recumbent leg |
| nt | pc. | total number of coils |
| α | ° | unstressed leg position |
| $\alpha 1$ | ° | prestressed rotational angle |
| $\alpha 2$ | ° | loaded rotational angle |
| αn | ° | maximum rotational angle |
| αh | ° | Excursion |
| M1 | Nmm | prestressed torque |
| M2 | Nmm | loaded torque |
| Mn | Nmm | maximum torque |
| F1 | N | prestressed spring force |
| F2 | N | loaded spring force |
| Fn | N | maximum spring force |
| RH | mm | leverage (distance power flow point from centre) |

Production compensation

Normally we compensate through the spring's unloaded leg position (α) to be able to meet the torsion spring requirements.

Fixed parameters

One spring torque, the respective angle of rotation of the tensioned spring.

One spring torque, the respective angle of rotation of the tensioned spring and α .

Two spring torques, the respective angle of rotation of the tensioned spring.

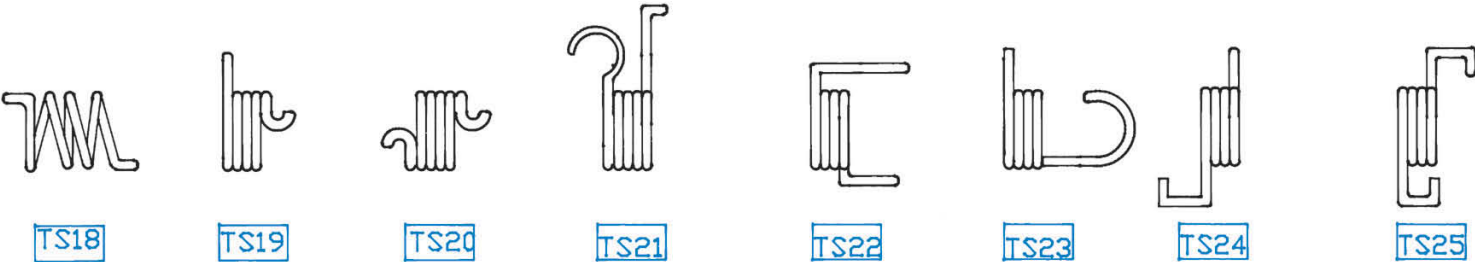
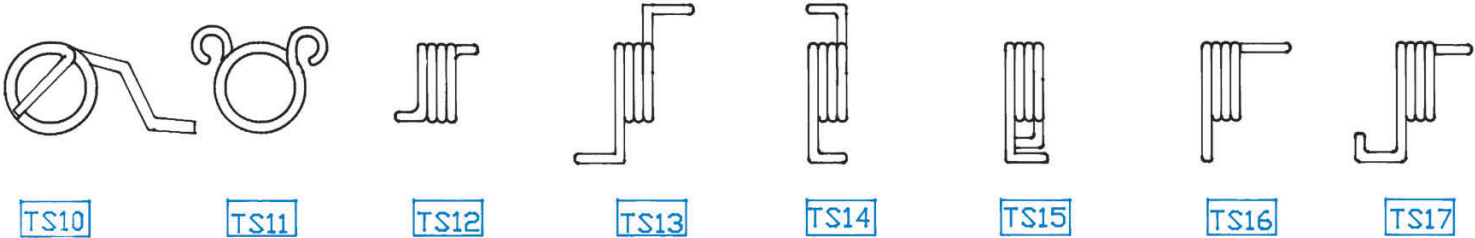
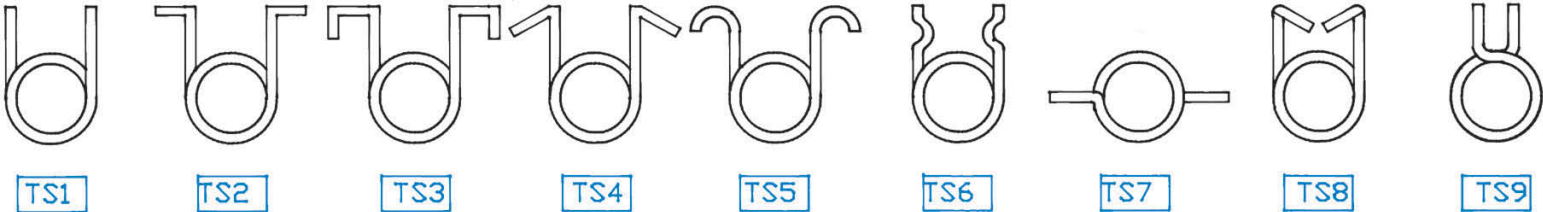
Compensated by

1. α

2. n,d

3. α ,n,Di

Examples of leg types



Gutekunst Stahlverformung KG

Flat springs, sheet metal parts, wireforms and laser parts



As an independent company of the Gutekunst group of companies we produce and develop custom springs, punched parts, bent parts and laser-cut blanks for you in an endless variety of shapes. We use cutting-edge laser, bending and folding machines to guarantee extremely high part precision and repeat accuracy. Alongside numerous materials kept in stock, we can also manufacture items with any steel material and surface treatment you may require. Our team of



engineers supports and develops the optimum solution for your application right from the word go. Certified to the European EFQM directive, we offer complete quality management taking different sector guidelines into account. Simply send us your technical requirements or drawing (sketch, print, CAD) and we will be happy to prepare a tailor-made quotation for you.

Product range

- ▶ Leaf springs, flat springs, punched-bent parts, wire parts, laser-cut blanks, roller springs, square springs.

Product range

- ▶ Thickness flat material 0.1 to 3.0 mm
- ▶ Width flat material 2.0 to 150.0 mm (slab material 200 x 600 cm)
- ▶ Diameter round wire 0.2 to 4.0 mm

Gutekunst



Stahlverformung KG

Siemensstraße 11

D-72285 Pfalzgrafenweiler

Phone 0049 (0)7445 8516-0

Fax 0049 (0)7445 8516-12

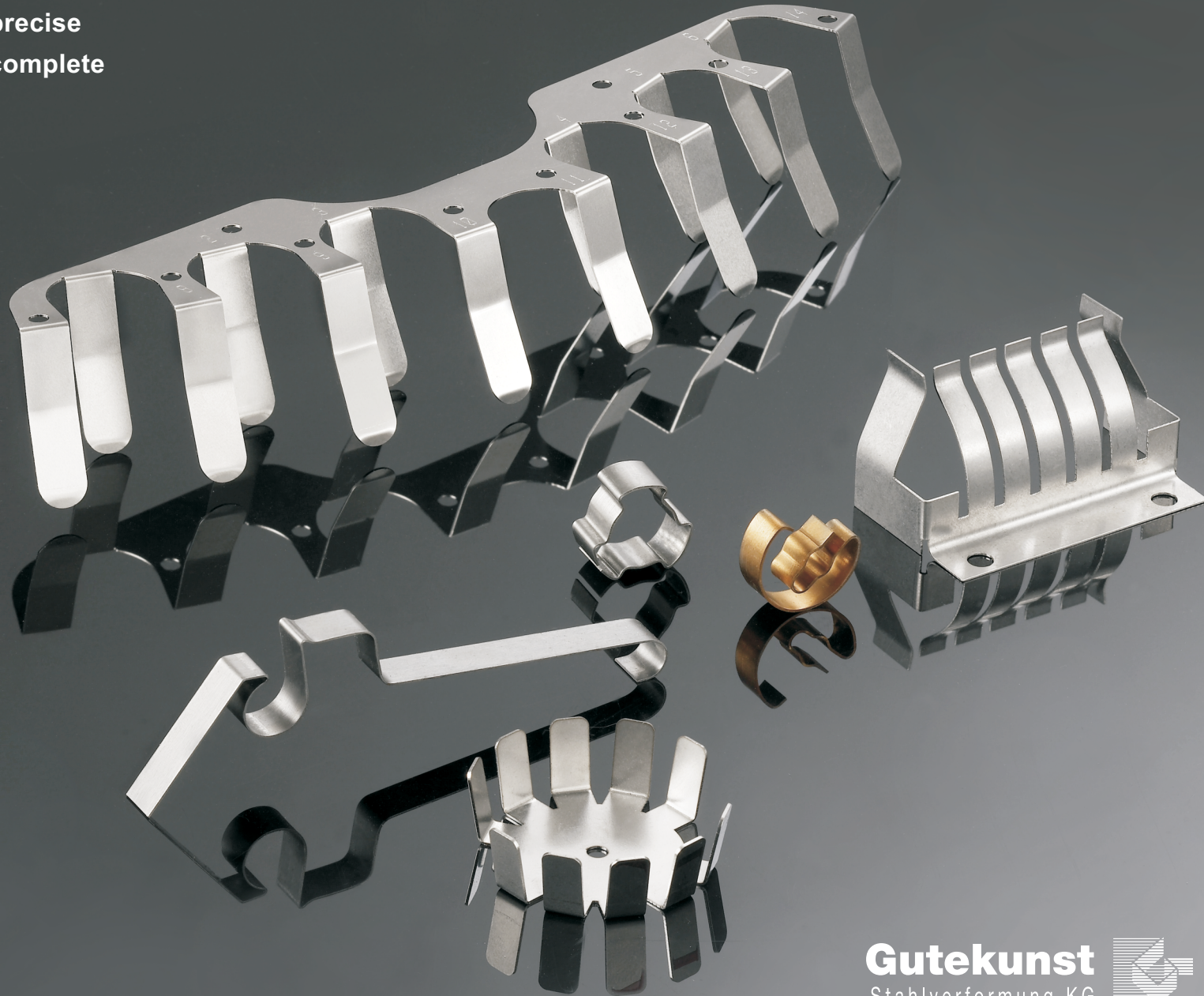
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- ▶ customised
- ▶ precise
- ▶ complete



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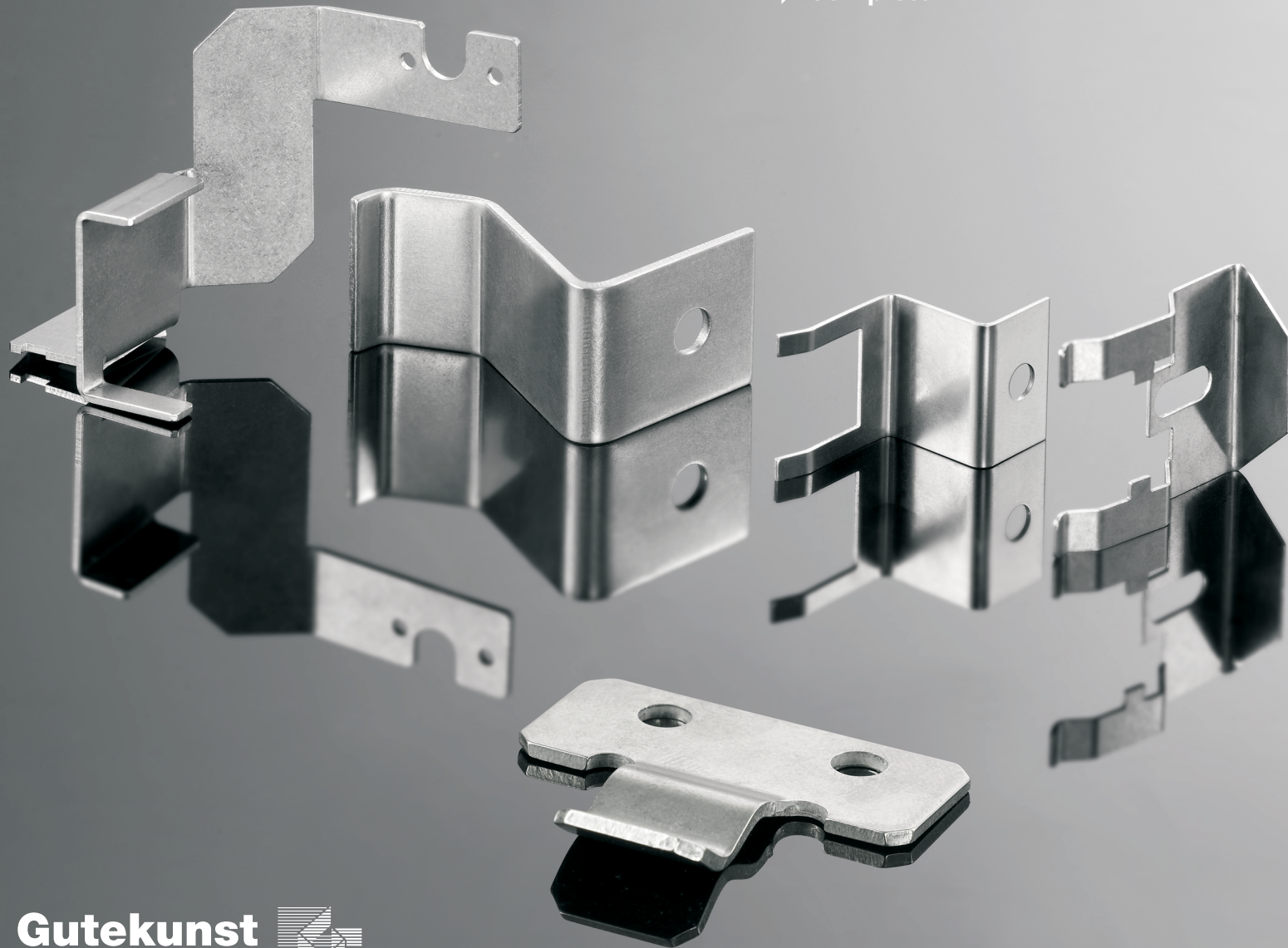


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- ▶ precise
- ▶ complete



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Wire forming parts manufactured from diagram

or original sample

Wire diameters 0.2 – 8.0 mm



Conditions of delivery

1. Sales are subject to the following conditions. Any other conditions which may be requested need to be approved by us in advance.

2. The prices stated are net prices and are quoted ex warehouse. The method of transport is left up to our discretion, unless otherwise prescribed by the customer. Delivery costs are recorded in the invoice and are to be borne by the customer. We reserve the right to deliver COD (cash on delivery) to customers with whom we have no regular business.

3. Payment should be made within 30 days of the invoice date. Bank interest rates will be charged for every day after the 30th where payment has not been received. If payment is made within 10 days 2 % discount will be granted.

4. All goods remain the property of Gutekunst until complete payment has been received.

5. Delivery contracts are issued in Metzingen, and payment must be received in Metzingen. The court of jurisdiction is in Bad Urach in the case of any dispute concerning payment or non-payment, regardless of the amount of the disputed sum.

6. Packaging costs are to be borne by the customer.

7. We reserve the right to the interim sale of all listed springs.

8. Any complaints which arise concerning the amount or quality of the consignment, or resulting from inadequate packaging must be made within 8 days of receiving the goods. We reserve the right to modify quantities by + 10 % for custom goods.

Order

to be delivered on:

- article number required
- Compression springs/catalogue number
- Extension springs/catalogue number
- Spring assortments
- Loop pliers/quantity
- Gutekunst CD (software)

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Inquiry

- Please submit non-binding offer for springs manufactured from diagram or original sample.

Date / stamp / signature



Order

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Inquiry

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Date / stamp / signature

Company/name and address:

Stamp:

**Gutekunst + Co. KG
Federnfabrik
Carl-Zeiss-Straße 15

D-72555 Metzingen**

Company/name and address:

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