



Springs



Springs

Springs for dies, fixtures, moulds, machines, mechanisms. For various industrial uses.

FIBRO Compression Springs – a comprehensive range, rooted in the resolute quality consciousness on which our reputation was built. Applied equally to the selection and inspection of raw materials as well as to every step in manufacture.

Springs – a simple product by comparison. But a demanding one also if new standards are to be set by its reliability and performance.

A product whose failure in service always is very expensive, even disastrous in some cases.

A product therefore where it pays . . . to pay for the difference. Whose faults or qualities remain hidden at first. They prove themselves in the long run –!

FIBRO high performance springs – in four duty ranges. Made from selected grades of chrome-vanadium spring steel. Cold-formed from special rolled wire sections. Capable of sustaining service loadings of exceptional severity.

Identical fitting dimensions for all springs of common nominal size, facilitating development work. Packing a maximum of spring action into a minimum of design space

Up and down in endless repetition: FIBRO Compression Springs. From the tough stable of tool- and diemaking, where no quarters are given.

A spring range of almost 400 sizes. Each spring strictly to specification. Ends flattened and ground parallel. Surfaces ball shot peened for even greater spring resilience.

FIBRO Springs – for fit-and-forget performance. For confined spaces. For virtually no space at all. For aircraft · tractors · harvesters · dies jigs · fixtures · for machines from A to Z.

For all uses where the going is hard. A choice without regrets.

A special spring range for demanding applications in the manufacture of tools, machinery and jigs & fixtures.

Our spring systems are constantly being developed to cover the most varied requirements.

The spring type is selected to match specific customer requirements.

Special helical springs

Manufactured to DIN ISO 10243, the springs are available in four grades for high cyclic and constant loads.

The specially rolled wire profile is manufactured from high quality heat treated alloy steel.

FIBROFLEX® Springs

These rubber-elastic spring elements in Shore hardness ratings 80, 90, 95, are made from polyurethane elastomers. Benefits include high spring forces and good resilient damping behaviour.

FIBROELAST® Springs

As a superior alternative to rubber springs we offer polyurethane elastomer springs in Shore A hardness rating of 70.



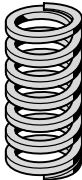
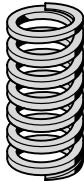
Disc Springs

The required spring characteristics result from various laminations with multiple settings and combinations.

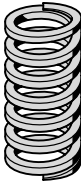



FIBRO Gas springs

close a gap where ever the accent is on accommodation of the utmost force component within a minimum of space – or where exceedingly large travel is demanded: FIBRO Gas springs take care of both demands, even in combination.

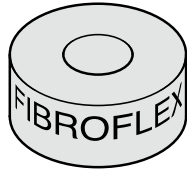
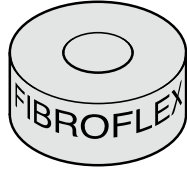


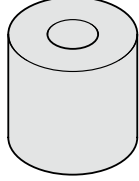

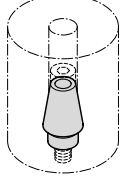
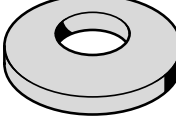
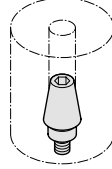
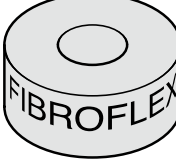
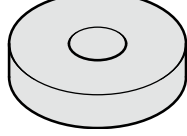
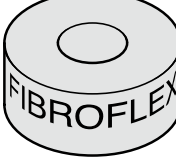
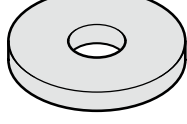
Contents

		F22			241.16.13.	F27
	High performance compression springs - Description				High performance compression spring DIN ISO 10243	
		F23			241.17.13.	F27
	High performance compression springs - Cyclic stress maxima/minima as applicable to extended/limited life				High performance compression spring DIN ISO 10243	
	241.14.10.	F24		241.14.16.	F28	
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243		
	241.15.10.	F24		241.15.16.	F29	
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243		
	241.16.10.	F25		241.16.16.	F30	
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243		
	241.17.10.	F25		241.17.16.	F31	
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243		
	241.14.13.	F26		241.14.20.	F32	
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243		
	241.15.13.	F26		241.15.20.	F33	
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243		


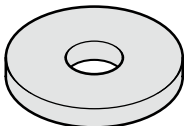
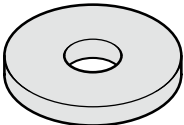

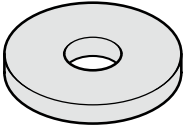

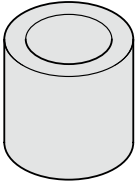

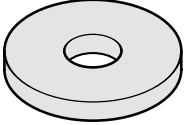

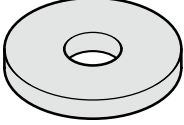
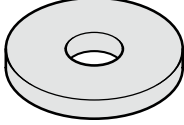
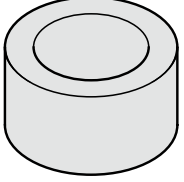
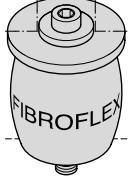
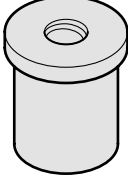

Contents

	241.16.20.	F34		241.16.32.	F42
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.17.20.	F35		241.17.32.	F43
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.14.25.	F36		241.14.40.	F44
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.15.25.	F37		241.15.40.	F45
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.16.25.	F38		241.16.40.	F46
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.17.25.	F39		241.17.40.	F47
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.14.32.	F40		241.14.50.	F48
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	
	241.15.32.	F41		241.15.50.	F49
	High performance compression spring DIN ISO 10243			High performance compression spring DIN ISO 10243	

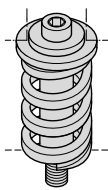
Contents

	241.16.50.	F50		246.6.	F62-81
	High performance compression spring DIN ISO 10243			FIBROFLEX®-Tubular spring element 90 Shore A, to DIN ISO 10069-1	
	241.17.50.	F51		246.7.	F64
	High performance compression spring DIN ISO 10243			FIBROFLEX®-Tubular spring element 95 Shore A, to DIN ISO 10069-1	
	241.14.63.	F52		2461.4.	F66
High performance compression spring DIN ISO 10243				FIBROELAST® Tubular spring element 70 Shore A	
	241.15.63.	F53		2461.2.	F68
High performance compression spring DIN ISO 10243				Tubular Spring Element, Rubber 70 Shore A	
	241.02.	F54		2441.5.	F70
Round wire compression spring				Locating bolt	
	242.01.	F55		2441.6.	F70
Disc spring DIN 2093				Locating bolt, threaded	
	244.1.	F58		2441.3.	F71
FIBROFLEX®-Elastomer spring for FIBROFLEX®-Spring system				Stacking washer DIN ISO 10069-2	
	246.5.	F60		244.4.	F71
FIBROFLEX®-Tubular spring element 80 Shore A, to DIN ISO 10069-1				Thrust washer	

Contents

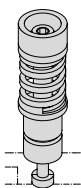
	244.5. Guide pin	F72		244.13. Adjusting washer	F77
	244.6. Trust washer for elastomer springs	F72		2441.14. Threaded disc for elastomer springs	F78
	244.7. Trust washer for compression springs	F73		2441.15. Threaded disc for compression springs	F78
	244.9. Spacer tube	F74		2450. Shock absorbing washer	F79
	244.10.15. Stop washer	F75		2441.18. Retaining bolt	F80
	244.10. Disc	F76		2441.16. Thrust washer	F80
	244.11. Spacer sleeve	F76		244.14.0. Spring unit for elastomer spring	F82
	244.12. Spacer plug	F77		2441.14.1. Spring unit for elastomer spring	F82

Contents



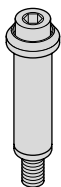
244.15.0. F83
Spring unit for helical spring

2441.15.1. F83
Spring unit for helical spring



244.20./25./32./40. F84-85
Spring- and spacer unit

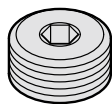
244.20./25./32./40.3. F86
Spring- and spacer unit, low installation space



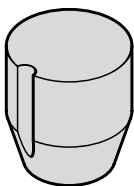
244.16. F87
Spring and spacer unit



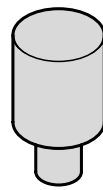
244.17. F88
Shoulder screw



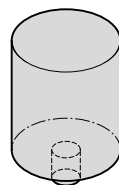
241.00.1. F89
Compression spring set screw



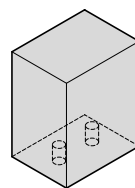
2471.6. F90
Compression Pad



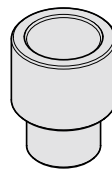
247.6. F90
Shedder insert



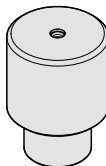
2531.7. F91
Setting-up bumper, round



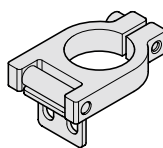
252.7. F92
Setting-up bumper, square



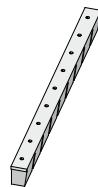
2533.10. F93
Spacer for die release



2533.20. F94
Spacer with spring for die release



2533.00.01. F95
Hinge for spacer


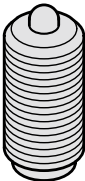













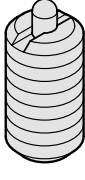


2532.2. F96
Strippers for blanking dies

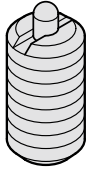
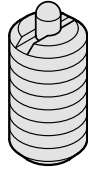
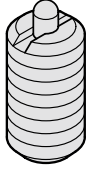
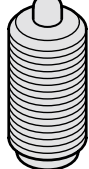
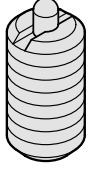
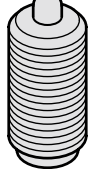
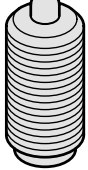
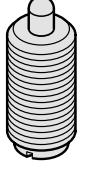
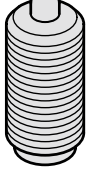
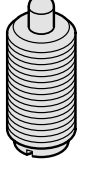
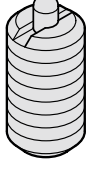
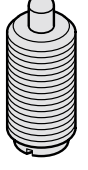
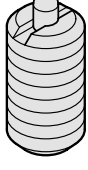
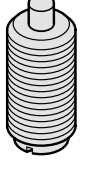
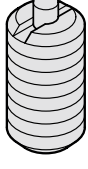
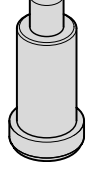


2470.10. .1 F98
Spring plunger, standard spring force, VDI 3004, Colour marking: yellow

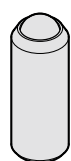
Contents

	2470.10. .016. .1	F99			2471.32.	F105
	Spring plunger, standard spring force, VDI 3004, Colour marking: yellow				Spring plunger, with spring loaded ball, with slot, increased spring force	
	2470.10. .3	F100			2471.03.	F106
	Spring plunger, medium spring force, VDI 3004, Colour marking: white				Spring plunger, with spring loaded ball, with hexagon socket, standard spring force	
	2470.10. .016. .3	F101			2471.33.	F106
	Spring plunger, medium spring force, VDI 3004, Colour marking: white				Spring plunger, with spring loaded ball, with hexagon socket, standard spring force	
	2470.10. .2	F102			2471.04.	F107
	Spring plunger, increased spring force, VDI 3004, Colour marking: red				Spring plunger, with spring loaded ball, with hexagon socket, increased spring force	
	2470.10. .016. .2	F103			2471.34.	F107
	Spring plunger, increased spring force, VDI 3004, Colour marking: red				Spring plunger, with spring loaded ball, with hexagon socket, increased spring force	
	2471.01.	F104			2471.05.	F108
	Spring plunger, with spring loaded ball, with slot, standard spring force				Spring plunger, with spring loaded ball, with slot, standard spring force	
	2471.31.	F104			2471.35.	F108
	Spring plunger, with spring loaded ball, with slot, standard spring force				Spring plunger, with spring loaded ball, with slot, standard spring force	
	2471.02.	F105			2472.01.	F109
	Spring plunger, with spring loaded ball, with slot, increased spring force				Spring plunger, with spring loaded pin, with slot, standard spring force	

Contents

	2472.31.	F109		2472.08.	F113
	Spring plunger, with spring loaded pin, with slot, standard spring force			Spring plunger, with spring loaded pin and seal, with hexagon socket, increased spring force	
	2472.21.	F110		2472.04.	F114
	Spring plunger, with spring loaded pin, with slot, standard spring force			Spring plunger, with spring loaded pin, with hexagon socket, increased spring force	
	2472.22.	F110		2472.34.	F114
	Spring plunger, with spring loaded pin, with slot, standard spring force			Spring plunger, with spring loaded pin, with hexagon socket, increased spring force	
	2472.03.	F111		2472.05.	F115
	Spring plunger, with spring loaded pin, with hexagon socket, standard spring force			Spring plunger, with spring loaded pin, with slot, standard spring force	
	2472.33.	F111		2472.35.	F115
	Spring plunger, with spring loaded pin, with hexagon socket, standard spring force			Spring plunger, with spring loaded pin, with slot, standard spring force	
	2472.07.	F112		2472.06.	F116
	Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force			Spring plunger, with spring loaded pin, with slot, increased spring force	
	2472.37.	F112		2472.36.	F116
	Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force			Spring plunger, with spring loaded pin, with slot, increased spring force	
	2472.02.	F113		2473.01.	F117
	Spring plunger, with spring loaded pin, with slot, increased spring force			Spring plunger, with spring loaded pin, straight version, with collar	

Contents



2473.02. **F117**

Spring plunger, with spring loaded ball, straight version



2475.01. **F118**

Spring plunger, with spring loaded ball, straight version, with collar



2475.02. **F118**

Spring plunger, with spring loaded ball, straight version, with collar



2475.03. **F119**

Spring plunger, with spring loaded ball, straight version, with collar



2475.04. **F119**

Spring plunger, with spring loaded ball, straight version, with collar



2470.10.11 **F120**

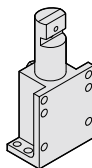
Insertion tool

2470.12.010.017 **F120**

Insertion tool

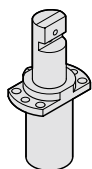
2472.11. **F120**

Thrust pad driver



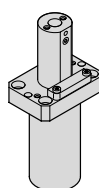
2477. .1.01 **F122**

Stripping unit, wall and bottom mounting



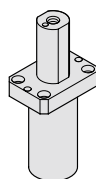
2477. .1.02 **F123**

Stripping unit, flanged mounting



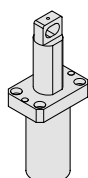
2478.10. **F124**

Stock lifter



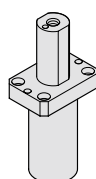
2478.30. .1 **F125**

Stock lifter



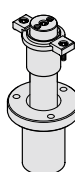
2478.30. .2 **F126**

Stock lifter with attachment lug



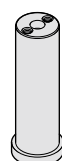
2478.30. .3 **F127**

Stripper



2478.20.20. **F129**

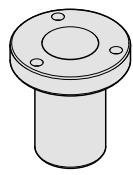
Lifting unit (not damped/damped) to Mercedes-Benz



2478.20.20.1. **F130**

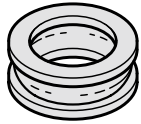
Guide pillar for lifting unit to Mercedes-Benz

Contents



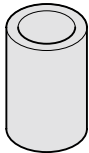
2478.20.20.2. F131

Sleeve for lifting unit to Mercedes-Benz



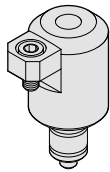
2478.20.20.3 F132

Damper for lifting units to Mercedes-Benz



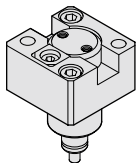
2478.20.20.4 F133

Spacer sleeve for lifting units to Mercedes-Benz



2478.20.15.10 F134

Lifter, round with pilot pin hole to BMW standard



2478.20.15.20. F135

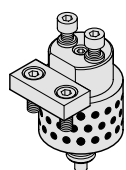
Lifter unit with installation block to BMW standard

2478.20.15.23. F136

Lifter rail for lifter units to BMW standard

2478.20.15.24. F136

Holding sleeve for lifter units to BMW standard



2478.20.15.30. F137

Universal lifter unit according to BMW standard



2478. F138

Spring ram with gas spring

2478.20. .1 F139

Spring ram with gas spring to VW standard



2052.71. F140

Guide bush for spring ram 2478.20. .1

Gas springs - Description F142-145

Gas springs - Mounting Directions F146-147

Gas springs from FIBRO - The Safer Choice F148


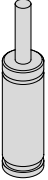
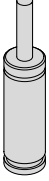
Gas springs - General overview F149-151

2479.030. F154




Gas spring (Spring plunger), with hexagon socket, VDI 3004



Contents

	2479.031.	F155		2480.23.	F170-171
	Gas spring (Spring plunger), with hexagon socket, VDI 3004			Gas spring, small dimension and low force	
	2479.032.	F156		2480.13.00250.	F174-175
	Gas spring (Spring plunger), with hexagon socket, VDI 3004			Gas spring, Standard	
	2479.034.	F157		2480.13.00500.	F176-177
	Gas spring (Spring plunger), to WDX			Gas spring, Standard	
	2482.72.	F160-161		2480.13.00750.	F178-179
	Gas spring, small dimension and low force			Gas Spring, Standard	
	2482.73. .1	F162-163		2480.12.01500.	F180-181
	Gas spring, small dimension and low force			Gas spring, Standard	
	2482.74. .2	F164-165		2480.13.03000.	F182-183
	Gas spring, small dimension and low force			Gas spring, Standard	
	2480.21.	F166-167		2480.13.05000.	F184-185
	Gas spring, small dimension and low force			Gas spring, Standard	
	2480.22. .1	F168-169		2480.13.07500.	F186-187
	Gas spring, small dimension and low force			Gas spring, Standard	





Contents

	2480.12.10000. Gas spring, Standard	F188-189		2496.12.01060. Gas spring with through bore passage	F208-209
	2488.13.01000. Gas spring HEAVY DUTY	F192-193		2487.12.00170. Gas spring POWERLINE	F212-213
	2488.13.02400. Gas spring HEAVY DUTY	F194-195		2487.12.00320. Gas spring POWERLINE	F214-215
	2488.13.04200. Gas Spring HEAVY DUTY	F196-197		2487.12.00350. Gas spring POWERLINE	F216-217
	2488.13.06600. Gas spring HEAVY DUTY	F198-199		2487.12.00500. Gas spring POWERLINE	F218-219
	2488.13.09500. Gas spring HEAVY DUTY	F200-201		2487.12.00750. .1 Gas spring POWERLINE	F220-221
	2496.12.00270. Gas spring with through bore passage	F204-205		2487.12.01000. .1 Gas spring POWERLINE	F222-223
	2496.12.00490. Gas spring with through bore passage	F206-207		2487.12.01500. Gas spring POWERLINE	F224-225

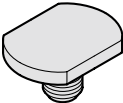
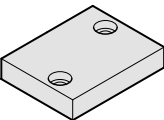
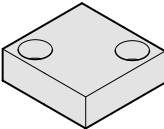
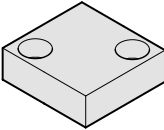
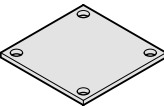
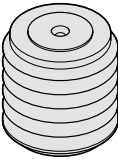
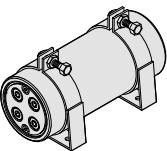
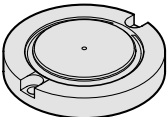
Contents

	2487.12.02400.	F226-227		2490.14.01800.	F244-245
	Gas spring POWERLINE			Compact gas spring	
	2487.12.04200.	F228-229		2490.14.03000.	F246-247
	Gas spring POWERLINE			Compact gas spring	
	2487.12.06600.	F230-231		2490.14.04700.	F248-249
	Gas spring POWERLINE			Compact gas spring	
	2487.12.09500.	F232-233		2490.14.07500.	F250-251
	Gas spring POWERLINE			Compact gas spring	
	2487.12.20000.	F234-235		2490.14.11800.	F252-253
	Gas spring POWERLINE			Compact gas spring	
	2490.14.00420.	F238-239		2490.14.18300.	F254-255
	Compact gas spring			Compact gas spring	
	2490.14.00750.	F240-241		2485.12.00500.	F260-261
	Compact gas spring			Gas spring, with low build height	
	2490.14.01000.	F242-243		2485.12.00750.	F262-263
	Compact gas spring			Gas spring, with low build height	


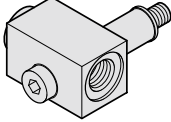
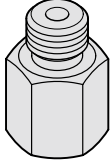
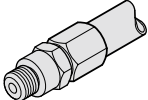
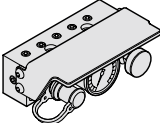
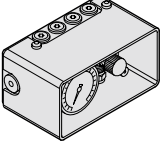
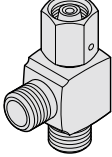
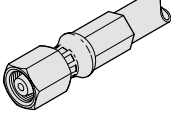
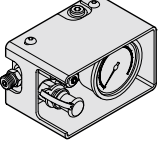
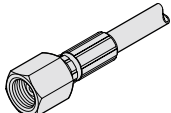
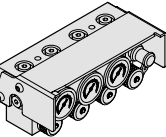
Contents

	2485.12.01500. Gas spring, with low build height	F264- 265		2480.32. Gas spring with external thread	F292- 293
	2486.12.00750. Gas spring SPEED CONTROL, cushioned	F270- 271		2480.32.00250. Gas spring with external thread	F294- 295
	2486.12.01500. Gas spring SPEED CONTROL, cushioned	F272- 273		2480.82.00250. Gas spring with external thread	F296- 297
	2486.12.03000. Gas spring SPEED CONTROL, cushioned	F274- 275		2487.82.01000. Gas spring with male fixing thread, POWERLINE	F299
	2486.12.05000. Gas spring SPEED CONTROL, cushioned	F276- 277		2480.33. Gas spring with hexagonal flange	F300
	2486.22.03000. Gas spring DS	F282- 283		2484.13.00750. LCF Gas Spring, damped	F308- 309
	2486.22.05000. Gas spring DS	F284- 285		2484.12.01500. LCF Gas Spring, damped	F310- 311
	2486.22.07500. Gas spring DS	F286- 287		2484.13.03000. LCF Gas Spring, damped	F312- 313

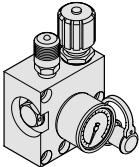
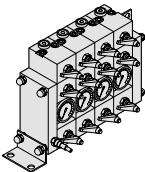
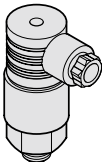
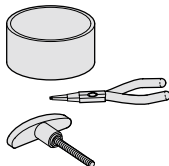
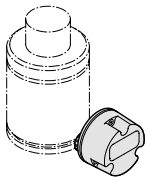

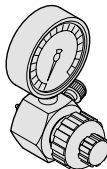
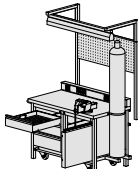
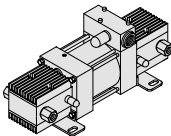
Contents

2484.13.05000. LCF Gas Spring, damped	F314-315		2480.004. Thrust Pad	F326
2484.13.07500. LCF Gas Spring, damped	F316-317		2480.009. Thrust plate	F326
Controllable gas springs	F318		2480.018. Thrust plate	F326
Air springs to VW standard	F319		2480.019. Thrust plate	F327
Manifoldsystems	F320		2480.019.45. Thrust plate to Renault standard	F327
Gas springs - Accessories	F321		2480.080. Concertina shroud for gas springs	F328-329
	2480.00.70. Pressure reservoir	F322-324	Gas spring connection systems	F330
	2480.015. Pressure plate, shock absorbing	F325	Mounting arrangement for gas springs in the Minimess system	F331-335

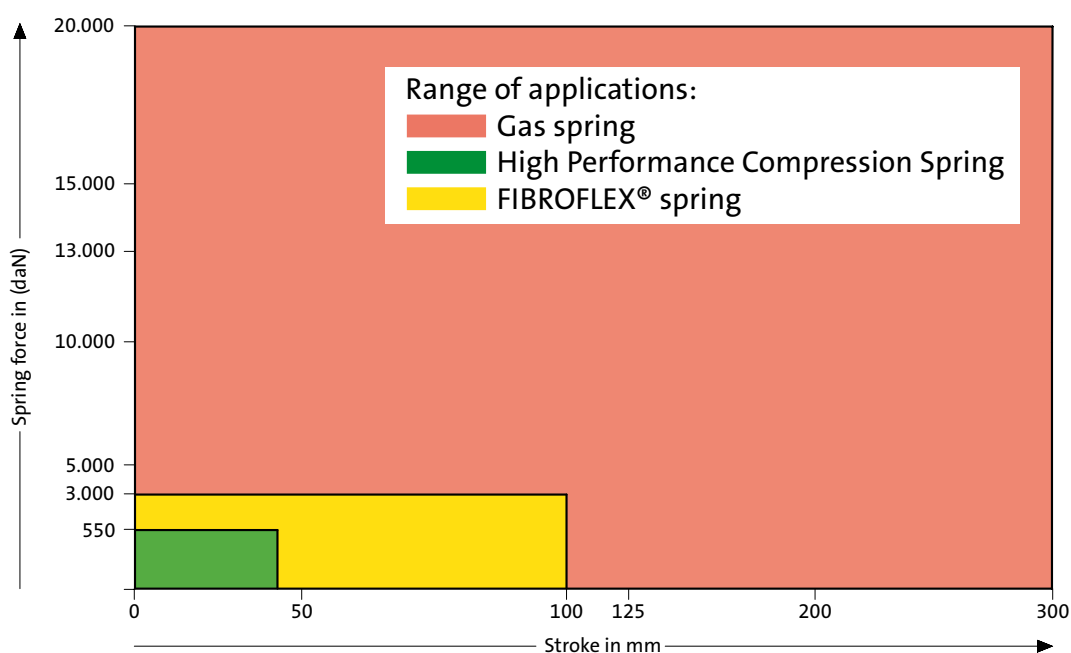
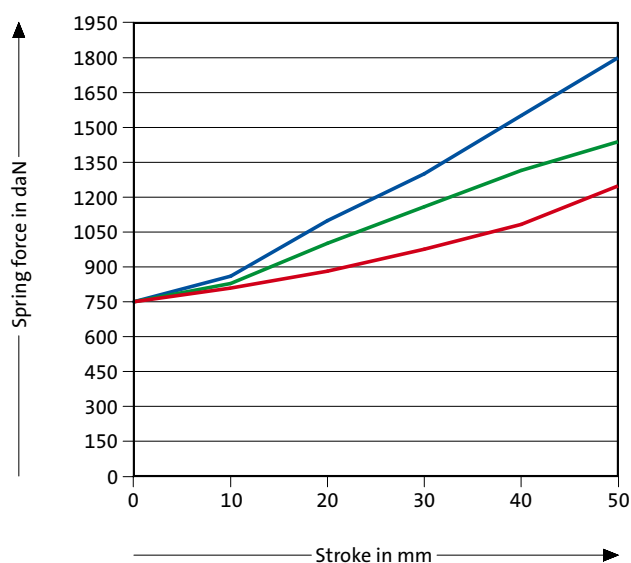
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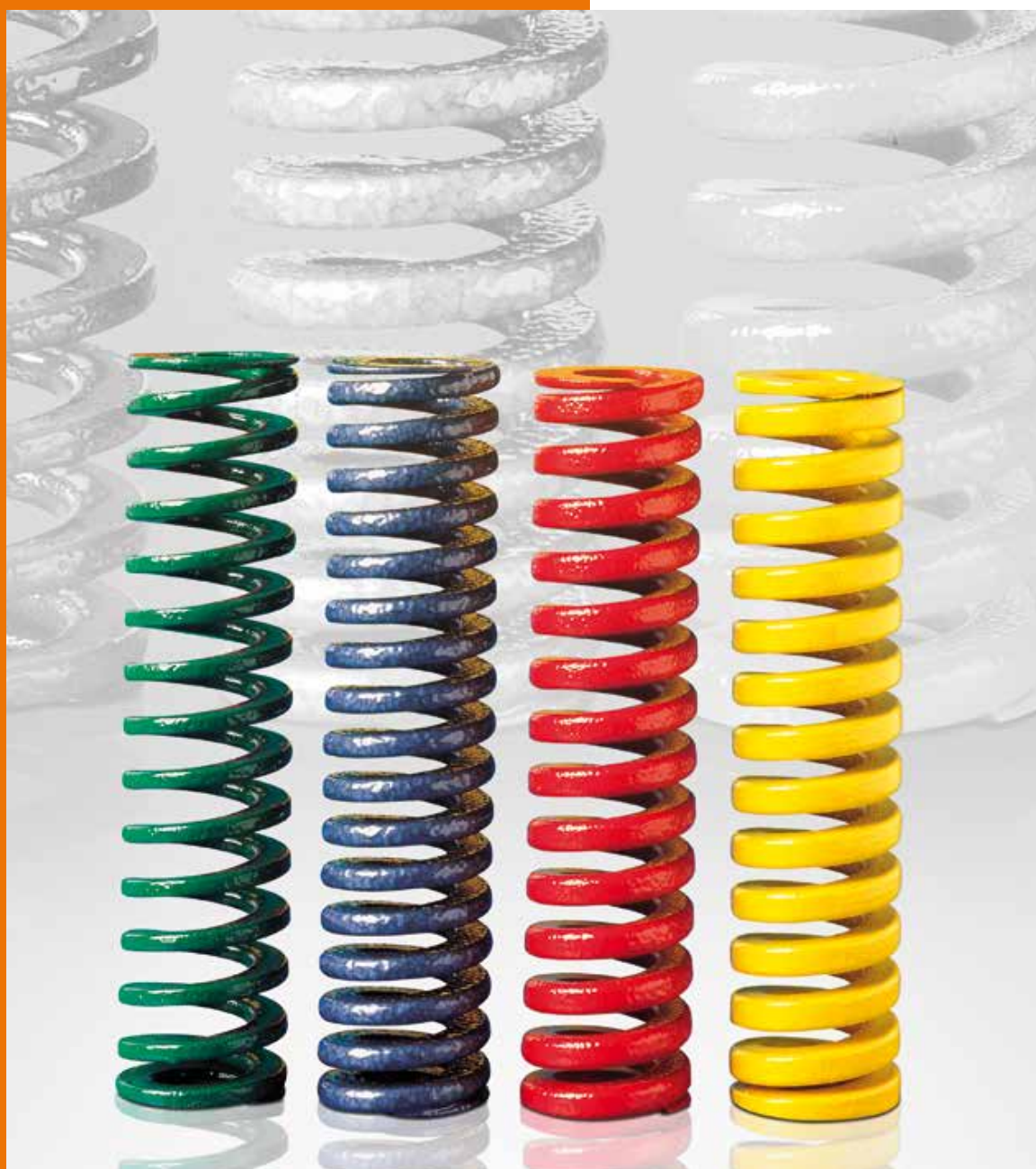
		F331		2480.00.27.	F348
	Instruction for hose assembly in the Minimess system			Connector system 24° conus micro	
	2480.00.23.	F336		2480.00.28.	F349-351
	Minimess – Compound Threaded Joints			Connector system 24° conus micro	
	2480.00.24.	F337-340		2480.00.22.	F350
	Minimess - Compound Threaded Joints			Connector system micro	
	2480.00.10.	F341-342		2480.00.34.	F352
	Compression Fitting – Compound Threaded Joints			Micro control fitting	
		F343		2480.00.30.	F353
	Assembly Arrangement of Gas Springs in Serial Connection Compression Fitting			Control fitting	
	2480.00.26.	F344-346		2480.00.31.	F353
	24°-cone-threaded Joint			Control fitting for gas springs	
	2480.00.25.	F345		2480.00.30.13	F354
	Connecting hose with 24° cone			Control fitting	
	2480.00.27.01.	F347		2480.00.39.04.	F355
	Connector system 24° conus micro			Multiple control fitting	

Contents

	2480.00.31.11 Control fitting	F356	2480.00.35. Dynamometer for gas springs	F366
	2480.00.39.01. Stacked control fitting for individual control	F357	2480.00.35.04 Dynamometer for gas springs	F367
	2480.00.45. Diaphragm pressure switch	F358		2480.00.50.11 Toolkit for assembling gas springs
	2480.00.90. Wireless Pressure Monitoring - wireless monitoring of gas springs	F360-362		2480.00.50.04 Assembling cone
	2480.00.32.21 Filling and control fitting	F363		2480.00.50.20. Service station, mobile, for gas springs
	2480.00.31.02 Filling hose	F363		2480.00.54.10 Hose press, pneumatic
	2480.00.32.07 Cylinder pressure regulator	F363		2480.00.54.03 Hose shears
	2480.00.32.71. Compact Nitrogen Booster	F364-365		F373-380 Gas springs - Application examples

General overview of Gas springs - High Performance Compression Spring - FIBROFLEX® springs





Compression Springs DIN ISO 10243



High Performance Compression Springs

Service Data for Limited-/Extended Spring Life

The achievable service life of helical compression springs depends to a large extent on the composition of the spring wire, the operating conditions, and on design parameters.

In all applications with oscillating spring displacement, careful selection of both preload values and compressive displacement are prerequisites for extended spring life, as confirmed by the permissible stress values in the loading data tables and the stress/spring life diagram.

Shear stress maxima and spring oscillation stress differentials are a direct function of the quality of the spring wire. FIBRO High Performance Compression Springs are made exclusively from special 50 Cr V4. The superlative characteristics of this material are further enhanced by heat treatment under optimal conditions, followed by a ball shot peening process.

For extended spring life under oscillating load changes, the maximal shear stress τ_{zul} is 800 N/mm², of which some 400 N/mm² = (τ_h) may be taken up by the stress differential between spring oscillations.

Higher stress levels are permissible only under the proviso of limited life expectancy, or in cases of static and quasi-static load conditions.

Springs subjected to dynamic load conditions also suffer impairment to their life expectancy through influences such as extreme operating temperatures, transversal stress components, shock loads, and resonant vibration frequencies. In all these instances, a lowering of the stress levels assists towards better spring life.

Working temperature

The spring material has a working temperature of up to 250 °C. This rating is an approximation since the actual approved working temperature will also depend on factors such as load. It is worth noting that above 100 °C the modulus of elasticity decreases and with a reduction in tension setting starts to occur.

Extended Spring Life: Spring Displacement Values

The largest permissible displacement is indicated by S6 – offering about 62 % of the “total” displacement of the wire-to-wire compacted spring (= S_n). This displacement will induce a shear stress of τ_{zul} of 800 N/mm². The associated stress differential during oscillations should not exceed 400 N/mm² (= τ_h).

Calculation of Spring Forces

Simple multiplication of the spring coefficient R with the applicable displacement S (mm) yields the spring force value (N).

Spring Force versus Spring Displacement

The relevant tables show the force values for selected displacements of 30, 40, 45, 55, 62, 80 and 100 % compression, designated by S1...S7.

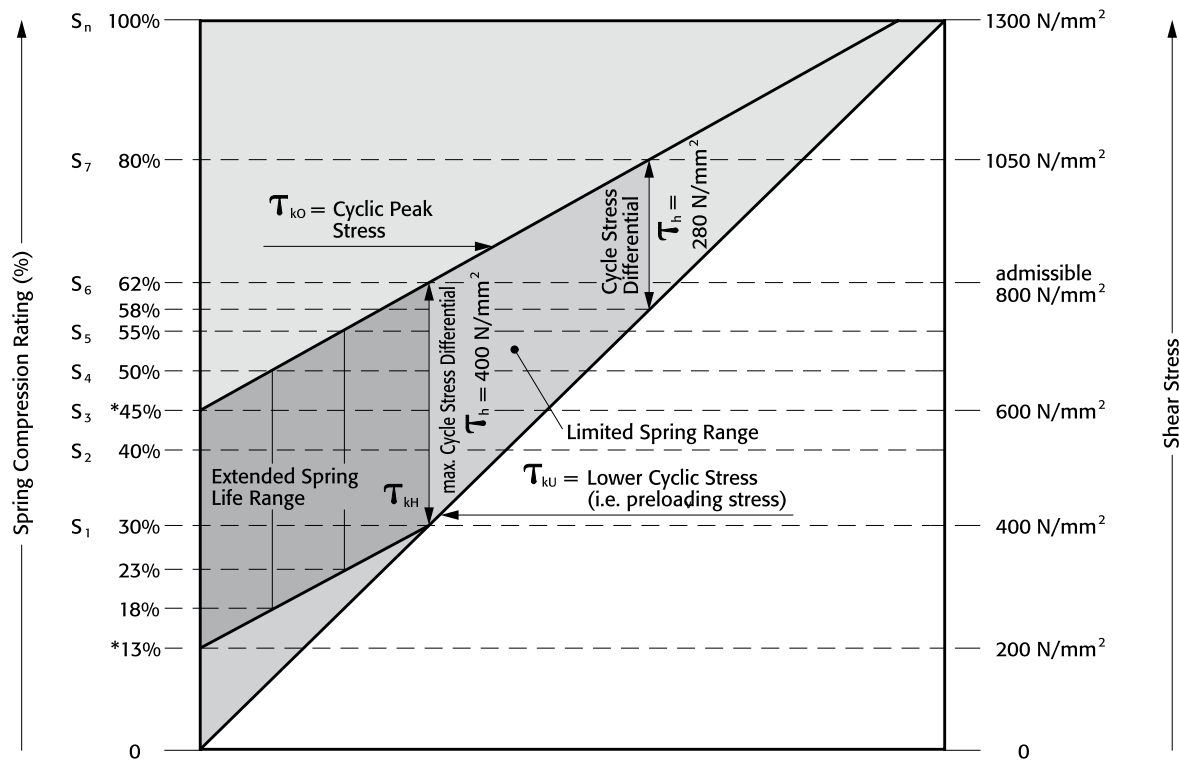
Intermediate force values can be extra-polated from the Stress/Spring Life Diagram.

Cyclic stress maxima/minima as applicable to extended/limited life of FIBRO High-Performance Compression Springs



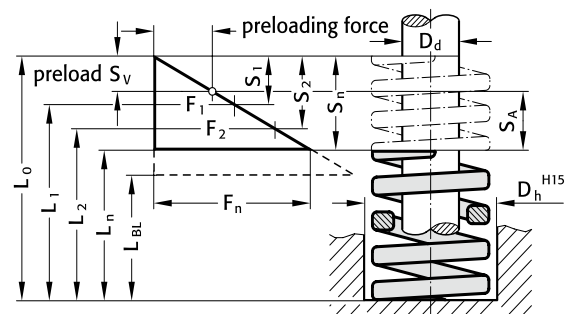
FIBRO

241.



* For application within Extended Spring Life:
up to a compression rating of 45%, a preloading compression of 13% applies.
e. g.: up to a compression rating of 55% a preloading compression of 23% is required.

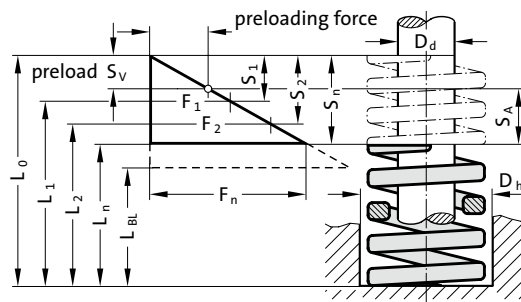
- D_h = diameter of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1 \dots L_n$ = length of loaded spring (mm), as related to spring
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1 \dots F_n$ = forces (N) as related to length of spring $L_1 \dots L_n$
- $S_{v1} \dots S_{v7}$ = recommended preload compression, as related to compress. $S_1 \dots S_7$
- $S_1 \dots S_n$ = compression, as related to spring forces $F_1 \dots F_n$
- R = spring rate (N/mm)
- $S_{A1} \dots S_{A7}$ = working stroke (mm)



Working strokes $S_{A1} \dots S_{A7}$ = compress. ($S_1 \dots S_7$) – minus preloading compression ($S_{v1} \dots S_{v7}$)

Notice: 80% compression must not be exceeded!

High performance compression spring, XSF, Colour "Violet"

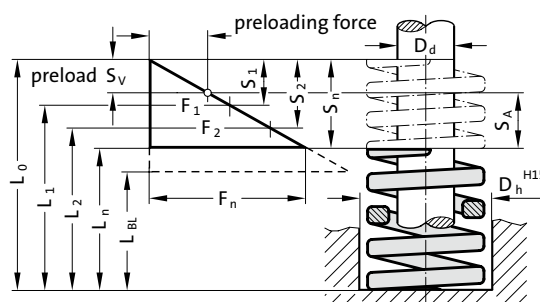


- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1 \dots L_n$ = length of loaded spring (mm) as related to spring forces $F_1 \dots F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1 \dots F_n$ = forces (N) as related to length of spring $L_1 \dots L_n$
- $S_{V1} \dots S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1 \dots S_7$
- $S_1 \dots S_n$ = compr. as related to spring forces $F_1 \dots F_n$
- R = spring rate (N/mm)
- $S_{A1} \dots S_{A7}$ = working stroke (mm)

241.13. High performance compression spring, XSF, Colour "Violet"

Order No	D_h	D_d	L_0	R	45%				62%				80%				100%			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_n	F_n		
241.13.20.025	20	10	25	32.1	6.3	1.8	4.5	202	8.7	4.2	4.5	279	11.2	8.1	3.1	360	14	449		
241.13.20.032	20	10	32	24.7	8.1	2.3	5.8	200	11.2	5.4	5.8	276	14.4	10.4	4	356	18	445		
241.13.20.038	20	10	38	20.7	9.9	2.9	7	205	13.6	6.6	7	282	17.6	12.8	4.8	364	22	455		
241.13.20.044	20	10	44	17.8	11.7	3.4	8.3	208	16.1	7.8	8.3	287	20.8	15.1	5.7	370	26	463		
241.13.20.051	20	10	51	15.3	13.5	3.9	9.6	207	18.6	9	9.6	285	24	17.4	6.6	367	30	459		
241.13.20.064	20	10	64	12.1	17.1	4.9	12.2	207	23.6	11.4	12.2	285	30.4	22	8.4	368	38	460		
241.13.20.076	20	10	76	10.2	20.2	5.9	14.4	207	27.9	13.5	14.4	285	36	26.1	9.9	367	45	459		
241.13.20.089	20	10	89	8.6	23.9	6.9	17	205	32.9	15.9	17	283	42.4	30.7	11.7	365	53	456		
241.13.20.102	20	10	102	7.5	27.9	8.1	19.8	209	38.4	18.6	19.8	288	49.6	36	13.6	372	62	465		
241.13.20.115	20	10	115	6.7	31.5	9.1	22.4	211	43.4	21	22.4	291	56	40.6	15.4	375	70	469		
241.13.20.127	20	10	127	6.1	34.6	10	24.6	211	47.7	23.1	24.6	291	61.6	44.7	16.9	376	77	470		
241.13.20.139	20	10	139	5.5	38.2	11	27.2	210	52.7	25.5	27.2	290	68	49.3	18.7	374	85	468		
241.13.20.152	20	10	152	5.1	41.9	12.1	29.8	213	57.7	27.9	29.8	294	74.4	53.9	20.5	379	93	474		
241.13.20.305	20	10	305	2.5	84.6	24.4	60.2	212	116.6	56.4	60.2	291	150.4	109	41.4	376	188	470		
241.13.25.025	25	12.5	25	52.7	6.3	1.8	4.5	332	8.7	4.2	4.5	457	11.2	8.1	3.1	590	14	738		
241.13.25.032	25	12.5	32	40	8.1	2.3	5.8	324	11.2	5.4	5.8	446	14.4	10.4	4	576	18	720		
241.13.25.038	25	12.5	38	33.3	9.9	2.9	7	330	13.6	6.6	7	454	17.6	12.8	4.8	586	22	733		
241.13.25.044	25	12.5	44	28.6	11.2	3.2	8	322	15.5	7.5	8	443	20	14.5	5.5	572	25	715		
241.13.25.051	25	12.5	51	24.7	13.5	3.9	9.6	333	18.6	9	9.6	459	24	17.4	6.6	593	30	741		
241.13.25.064	25	12.5	64	19.4	17.1	4.9	12.2	332	23.6	11.4	12.2	457	30.4	22	8.4	590	38	737		
241.13.25.076	25	12.5	76	16.3	20.2	5.9	14.4	330	27.9	13.5	14.4	455	36	26.1	9.9	587	45	734		
241.13.25.089	25	12.5	89	15.9	23.9	6.9	17	379	32.9	15.9	17	522	42.4	30.7	11.7	674	53	843		
241.13.25.102	25	12.5	102	12.1	27.4	7.9	19.5	332	37.8	18.3	19.5	458	48.8	35.4	13.4	590	61	738		
241.13.25.115	25	12.5	115	10.8	31.5	9.1	22.4	340	43.4	21	22.4	469	56	40.6	15.4	605	70	756		
241.13.25.127	25	12.5	127	9.8	34.6	10	24.6	340	47.7	23.1	24.6	468	61.6	44.7	16.9	604	77	755		
241.13.25.139	25	12.5	139	8.9	38.2	11	27.2	340	52.7	25.5	27.2	469	68	49.3	18.7	605	85	756		
241.13.25.152	25	12.5	152	8.1	41.9	12.1	29.8	339	57.7	27.9	29.8	467	74.4	53.9	20.5	603	93	753		
241.13.25.178	25	12.5	178	6.9	49.1	14.2	34.9	338	67.6	32.7	34.9	466	87.2	63.2	24	602	109	752		
241.13.25.203	25	12.5	203	6.1	55.8	16.1	39.7	340	76.9	37.2	39.7	469	99.2	71.9	27.3	605	124	756		
241.13.25.305	25	12.5	305	4	84.6	24.4	60.2	338	116.6	56.4	60.2	466	150.4	109	41.4	602	188	752		
241.13.32.038	32	16	38	43.8	9.9	2.9	7	434	13.6	6.6	7	597	17.6	12.8	4.8	771	22	964		
241.13.32.044	32	16	44	37.5	11.7	3.4	8.3	439	16.1	7.8	8.3	604	20.8	15.1	5.7	780	26	975		
241.13.32.051	32	16	51	32.3	13.9	4	9.9	451	19.2	9.3	9.9	621	24.8	18	6.8	801	31	1001		
241.13.32.064	32	16	64	25.4	17.6	5.1	12.5	446	24.2	11.7	12.5	614	31.2	22.6	8.6	792	39	991		
241.13.32.076	32	16	76	21.3	21.1	6.1	15	450	29.1	14.1	15	621	37.6	27.3	10.3	801	47	1001		
241.13.32.089	32	16	89	18.1	25.2	7.3	17.9	456	34.7	16.8	17.9	628	44.8	32.5	12.3	811	56	1014		
241.13.32.102	32	16	102	15.8	28.8	8.3	20.5	455	39.7	19.2	20.5	627	51.2	37.1	14.1	809	64	1011		
241.13.32.115	32	16	115	13.9	32.9	9.5	23.4	457	45.3	21.9	23.4	629	58.4	42.3	16.1	812	73	1015		
241.13.32.127	32	16	127	12.6	36.5	10.5	25.9	459	50.2	24.3	25.9	633	64.8	47	17.8	816	81	1021		
241.13.32.139	32	16	139	11.4	40	11.6	28.5	457	55.2	26.7	28.5	629	71.2	51.6	19.6	812	89	1015		
241.13.32.152	32	16	152	10.5	43.6	12.6	31	458	60.1	29.1	31	631	77.6	56.3	21.3	815	97	1018		
241.13.32.178	32	16	178	8.9	51.3	14.8	36.5	457	70.7	34.2	36.5	629	91.2	66.1	25.1	812	114	1015		
241.13.32.203	32	16	203	7.8	59	17	41.9	460	81.2	39.3	41.9	634	104.8	76	28.8	817	131	1022		
241.13.32.254	32	16	254	6.2	73.3	21.2	52.2	455	101.1	48.9	52.2	627	130.4	94.5	35.9	808	163	1011		
241.13.32.305	32	16	305	5.2	88.7	25.6	63	461	122.1	59.1	63	635	157.6	114.3	43.3	820	197	1024		

High performance compression spring, XSF, Colour "Violet"



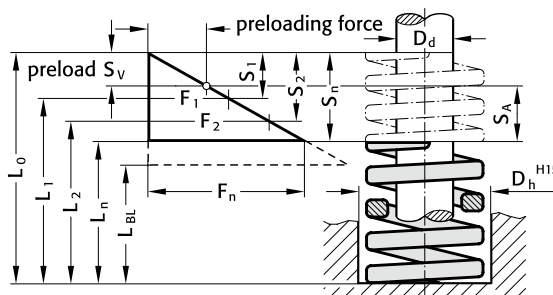
- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)



241.13. High performance compression spring, XSF, Colour "Violet"

Order No	D _h	D _d	L ₀	R	45%			62%			80%			100%				
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S _n	F _n
241.13.40.051	40	20	51	50.8	11.7	3.4	8.3	594	16.1	7.8	8.3	819	20.8	15.1	5.7	1057	26	1321
241.13.40.064	40	20	64	39.7	15.3	4.4	10.9	607	21.1	10.2	10.9	837	27.2	19.7	7.5	1080	34	1350
241.13.40.076	40	20	76	33.1	18	5.2	12.8	596	24.8	12	12.8	821	32	23.2	8.8	1059	40	1324
241.13.40.089	40	20	89	28.1	21.6	6.2	15.4	607	29.8	14.4	15.4	836	38.4	27.8	10.6	1079	48	1349
241.13.40.102	40	20	102	24.5	24.8	7.2	17.6	606	34.1	16.5	17.6	835	44	31.9	12.1	1078	55	1348
241.13.40.115	40	20	115	21.6	28.4	8.2	20.2	612	39.1	18.9	20.2	844	50.4	36.5	13.9	1089	63	1361
241.13.40.127	40	20	127	19.5	31.5	9.1	22.4	614	43.4	21	22.4	846	56	40.6	15.4	1092	70	1365
241.13.40.139	40	20	139	17.8	34.2	9.9	24.3	609	47.1	22.8	24.3	839	60.8	44.1	16.7	1082	76	1353
241.13.40.152	40	20	152	16.3	37.8	10.9	26.9	616	52.1	25.2	26.9	849	67.2	48.7	18.5	1095	84	1369
241.13.40.178	40	20	178	13.8	44.5	12.9	31.7	615	61.4	29.7	31.7	847	79.2	57.4	21.8	1093	99	1366
241.13.40.203	40	20	203	12.1	50.8	14.7	36.2	615	70.1	33.9	36.2	848	90.4	65.5	24.9	1094	113	1367
241.13.40.254	40	20	254	9.7	63.9	18.5	45.4	620	88	42.6	45.4	854	113.6	82.4	31.2	1102	142	1377
241.13.40.305	40	20	305	8	77	22.2	54.7	616	106	51.3	54.7	848	136.8	99.2	37.6	1094	171	1368
241.13.50.064	50	25	64	80.2	16.6	4.8	11.8	1335	22.9	11.1	11.8	1840	29.6	21.5	8.1	2374	37	2967
241.13.50.076	50	25	76	66.9	20.2	5.9	14.4	1355	27.9	13.5	14.4	1867	36	26.1	9.9	2408	45	3011
241.13.50.089	50	25	89	56.6	23.9	6.9	17	1350	32.9	15.9	17	1860	42.4	30.7	11.7	2400	53	3000
241.13.50.102	50	25	102	40.3	27.9	8.1	19.8	1124	38.4	18.6	19.8	1549	49.6	36	13.6	1999	62	2499
241.13.50.115	50	25	115	43.5	31.5	9.1	22.4	1370	43.4	21	22.4	1888	56	40.6	15.4	2436	70	3045
241.13.50.127	50	25	127	39.3	35.1	10.1	25	1379	48.4	23.4	25	1901	62.4	45.2	17.2	2452	78	3065
241.13.50.139	50	25	139	35.8	38.2	11	27.2	1369	52.7	25.5	27.2	1887	68	49.3	18.7	2434	85	3043
241.13.50.152	50	25	152	32.8	42.3	12.2	30.1	1387	58.3	28.2	30.1	1912	75.2	54.5	20.7	2467	94	3083
241.13.50.178	50	25	178	27.8	49.5	14.3	35.2	1376	68.2	33	35.2	1896	88	63.8	24.2	2446	110	3058
241.13.50.203	50	25	203	24.2	56.7	16.4	40.3	1372	78.1	37.8	40.3	1891	100.8	73.1	27.7	2439	126	3049
241.13.50.254	50	25	254	19.2	71.5	20.7	50.9	1374	98.6	47.7	50.9	1893	127.2	92.2	35	2442	159	3053
241.13.50.305	50	25	305	16	86.4	25	61.4	1382	119	57.6	61.4	1905	153.6	111.4	42.2	2458	192	3072

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green”



Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_4	S_{v4}	S_{A4}	F_4
241.14.10.025	10,0	5,0	25	10,0	3,9	1,7	2,2	39	5,2	1,7	3,5	52	5,9	1,7	4,2	59	6,5	2,3	4,2	65
241.14.10.032	10,0	5,0	32	8,5	4,8	2,1	2,7	41	6,4	2,1	4,3	54	7,2	2,1	5,1	61	8,0	2,9	5,1	68
241.14.10.038	10,0	5,0	38	6,8	6,0	2,6	3,4	41	8,0	2,6	5,4	54	9,0	2,6	6,4	61	10,0	3,6	6,4	68
241.14.10.044	10,0	5,0	44	6,0	6,9	3,0	3,9	41	9,2	3,0	6,2	55	10,4	3,0	7,4	62	11,5	4,1	7,4	69
241.14.10.051	10,0	5,0	51	5,0	8,1	3,5	4,6	41	10,8	3,5	7,3	54	12,2	3,5	8,7	61	13,5	4,9	8,6	68
241.14.10.064	10,0	5,0	64	4,3	10,2	4,4	5,8	44	13,6	4,4	9,2	58	15,3	4,4	10,9	66	17,0	6,1	10,9	73
241.14.10.076	10,0	5,0	76	3,2	12,0	5,2	6,8	38	16,0	5,2	10,8	51	18,0	5,2	12,8	58	20,0	7,2	12,8	64
241.14.10.305	10,0	5,0	305	1,1	48,9	21,2	27,7	54	65,2	21,2	44,0	72	73,4	21,2	52,2	81	81,5	29,3	52,2	90

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.14.10.025	10,0	5,0	25	10,0	7,2	3,0	4,2	72	8,1	3,9	4,2	81	10,4	7,5	2,9	104	13,0	12,0	130,0	
241.14.10.032	10,0	5,0	32	8,5	8,8	3,7	5,1	75	9,9	4,8	5,1	84	12,8	9,3	3,5	109	16,0	16,0	136,0	
241.14.10.038	10,0	5,0	38	6,8	11,0	4,6	6,4	75	12,4	6,0	6,4	84	16,0	11,6	4,4	109	20,0	18,0	136,0	
241.14.10.044	10,0	5,0	44	6,0	12,7	5,3	7,4	76	14,3	6,9	7,4	86	18,4	13,3	5,1	110	23,0	21,0	138,0	
241.14.10.051	10,0	5,0	51	5,0	14,9	6,2	8,7	75	16,7	8,1	8,6	84	21,6	15,7	5,9	108	27,0	24,0	135,0	
241.14.10.064	10,0	5,0	64	4,3	18,7	7,8	10,9	80	21,1	10,2	10,9	91	27,2	19,7	7,5	117	34,0	30,0	146,2	
241.14.10.076	10,0	5,0	76	3,2	22,0	9,2	12,8	70	24,8	12,0	12,8	79	32,0	23,2	8,8	102	40,0	36,0	128,0	
241.14.10.305	10,0	5,0	305	1,1	89,7	37,5	52,2	99	101,0	48,9	52,2	111	130,4	94,5	35,9	143	163,0	142,0	179,3	

241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue”

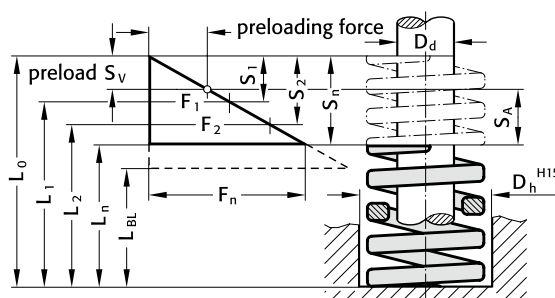


Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_4	S_{v4}	S_{A4}	F_4
241.15.10.025	10,0	5,0	25	16,0	3,3	1,4	1,9	53	4,4	1,4	3,0	70	5,0	1,4	3,6	80	5,5	2,0	3,5	88
241.15.10.032	10,0	5,0	32	13,1	3,9	1,7	2,2	51	5,2	1,7	3,5	68	5,9	1,7	4,2	77	6,5	2,3	4,2	85
241.15.10.038	10,0	5,0	38	11,9	4,8	2,1	2,7	57	6,4	2,1	4,3	76	7,2	2,1	5,1	86	8,0	2,9	5,1	95
241.15.10.044	10,0	5,0	44	10,3	5,7	2,5	3,2	59	7,6	2,5	5,1	78	8,6	2,5	6,1	89	9,5	3,4	6,1	98
241.15.10.051	10,0	5,0	51	8,9	6,3	2,7	3,6	56	8,4	2,7	5,7	75	9,5	2,7	6,8	85	10,5	3,8	6,7	93
241.15.10.064	10,0	5,0	64	7,6	8,1	3,5	4,6	62	10,8	3,5	7,3	82	12,2	3,5	8,7	93	13,5	4,9	8,6	103
241.15.10.076	10,0	5,0	76	5,3	9,9	4,3	5,6	52	13,2	4,3	8,9	70	14,9	4,3	10,6	79	16,5	5,9	10,6	87
241.15.10.305	10,0	5,0	305	1,6	40,8	17,7	23,1	65	54,4	17,7	36,7	87	61,2	17,7	43,5	98	68,0	24,5	43,5	109

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.15.10.025	10,0	5,0	25	16,0	6,1	2,5	3,6	98	6,8	3,3	3,5	109	8,8	6,4	2,4	141	11,0	14,0	176,0	
241.15.10.032	10,0	5,0	32	13,1	7,2	3,0	4,2	94	8,1	3,9	4,2	106	10,4	7,5	2,9	136	13,0	19,0	170,3	
241.15.10.038	10,0	5,0	38	11,9	8,8	3,7	5,1	105	9,9	4,8	5,1	118	12,8	9,3	3,5	152	16,0	22,0	190,4	
241.15.10.044	10,0	5,0	44	10,3	10,5	4,4	6,1	108	11,8	5,7	6,1	122	15,2	11,0	4,2	157	19,0	25,0	195,7	
241.15.10.051	10,0	5,0	51	8,9	11,6	4,8	6,8	103	13,0	6,3	6,7	116	16,8	12,2	4,6	150	21,0	30,0	186,9	
241.15.10.064	10,0	5,0	64	7,6	14,9	6,2	8,7	113	16,7	8,1	8,6	127	21,6	15,7	5,9	164	27,0	37,0	205,2	
241.15.10.076	10,0	5,0	76	5,3	18,2	7,6	10,6	96	20,5	9,9	10,6	109	26,4	19,1	7,3	140	33,0	43,0	174,9	
241.15.10.305	10,0	5,0	305	1,6	74,8	31,3	43,5	120	84,3	40,8	43,5	135	108,8	78,9	29,9	174	136,0	169,0	217,6	

High Performance Compression Springs DIN ISO 10243

- D_h = dia. of guide sleeve
 D_d = diameter of guide pin
 L_0 = free length of spring
 $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
 L_{BL} = length of compacted-spring (i.e. wire-to-wire)
 $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
 $S_{v1}...S_{v7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
 $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
 R = spring rate (N/mm)
 $S_{A1}...S_{A7}$ = working stroke (mm)



241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

					30% stroke				40% stroke				45% stroke				50% stroke			
Order No	D _h	D _d	L ₀	R	S ₁	S _{v1}	S _{A1}	F ₁	S ₂	S _{v2}	S _{A2}	F ₂	S ₃	S _{v3}	S _{A3}	F ₃	S ₄	S _{v4}	S _{A4}	F ₄
241.16.10.025	10,0	5,0	25	22,6	2,7	1,2	1,5	61	3,6	1,2	2,4	81	4,0	1,2	2,8	90	4,5	1,6	2,9	102
241.16.10.032	10,0	5,0	32	17,7	3,5	1,5	2,0	62	4,7	1,5	3,2	83	5,3	1,5	3,8	94	5,9	2,1	3,8	104
241.16.10.038	10,0	5,0	38	16,7	4,2	1,8	2,4	70	5,6	1,8	3,8	94	6,3	1,8	4,5	105	7,0	2,5	4,5	117
241.16.10.044	10,0	5,0	44	14,7	5,1	2,2	2,9	75	6,8	2,2	4,6	100	7,7	2,2	5,5	113	8,5	3,1	5,4	125
241.16.10.051	10,0	5,0	51	12,8	5,7	2,5	3,2	73	7,6	2,5	5,1	97	8,6	2,5	6,1	110	9,5	3,4	6,1	122
241.16.10.064	10,0	5,0	64	10,8	7,5	3,3	4,2	81	10,0	3,3	6,7	108	11,3	3,3	8,0	122	12,5	4,5	8,0	135
241.16.10.076	10,0	5,0	76	7,8	8,7	3,8	4,9	68	11,6	3,8	7,8	90	13,1	3,8	9,3	102	14,5	5,2	9,3	113
241.16.10.305	10,0	5,0	305	2,0	36,0	15,6	20,4	72	48,0	15,6	32,4	96	54,0	15,6	38,4	108	60,0	21,6	38,4	120

					55% stroke				62% stroke				80% stroke				100% stroke			
Order No	D _h	D _d	L ₀	R	S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.16.10.025	10,0	5,0	25	22,6	4,9	2,0	2,9	111	5,5	2,7	2,8	124	7,1	5,2	1,9	160	8,9	16,1	201,1	
241.16.10.032	10,0	5,0	32	17,7	6,4	2,7	3,7	113	7,3	3,5	3,8	129	9,4	6,8	2,6	166	11,7	20,3	207,1	
241.16.10.038	10,0	5,0	38	16,7	7,7	3,2	4,5	129	8,7	4,2	4,5	145	11,2	8,1	3,1	187	14,0	24,0	233,8	
241.16.10.044	10,0	5,0	44	14,7	9,4	3,9	5,5	138	10,5	5,1	5,4	154	13,6	9,9	3,7	200	17,0	27,0	249,9	
241.16.10.051	10,0	5,0	51	12,8	10,5	4,4	6,1	134	11,8	5,7	6,1	151	15,2	11,0	4,2	195	19,0	32,0	243,2	
241.16.10.064	10,0	5,0	64	10,8	13,8	5,8	8,0	149	15,5	7,5	8,0	167	20,0	14,5	5,5	216	25,0	39,0	270,0	
241.16.10.076	10,0	5,0	76	7,8	16,0	6,7	9,3	125	18,0	8,7	9,3	140	23,2	16,8	6,4	181	29,0	47,0	226,2	
241.16.10.305	10,0	5,0	305	2,0	66,0	27,6	38,4	132	74,4	36,0	38,4	149	96,0	69,6	26,4	192	120,0	185,0	240,0	

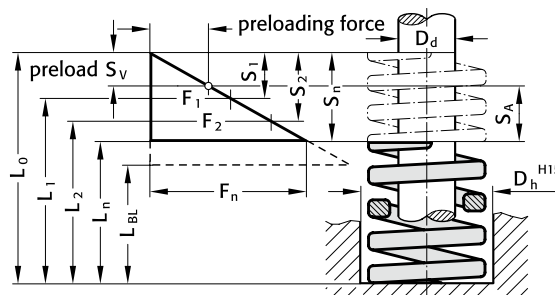


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

					30% stroke				40% stroke				45% stroke				50% stroke			
Order No	D _h	D _d	L ₀	R	S ₁	S _{v1}	S _{A1}	F ₁	S ₂	S _{v2}	S _{A2}	F ₂	S ₃	S _{v3}	S _{A3}	F ₃	S ₄	S _{v4}	S _{A4}	F ₄
241.17.10.025	10,0	5,0	25	34,3	2,1	0,9	1,2	72	2,8	0,9	1,9	96	3,1	0,9	2,2	106	3,5	1,4	2,1	120
241.17.10.032	10,0	5,0	32	25,5	2,4	1,0	1,4	61	3,2	1,0	2,2	82	3,6	1,0	2,6	92	4,0	1,5	2,5	102
241.17.10.038	10,0	5,0	38	21,6	3,5	1,5	2,0	76	4,6	1,5	3,1	99	5,2	1,5	3,7	112	5,8	2,2	3,6	125
241.17.10.044	10,0	5,0	44	17,9	3,9	1,7	2,2	70	5,2	1,7	3,5	93	5,8	1,7	4,1	104	6,5	2,5	4,0	116
241.17.10.051	10,0	5,0	51	15,1	4,5	1,9	2,6	68	6,0	1,9	4,1	91	6,7	1,9	4,8	101	7,5	2,9	4,6	113
241.17.10.064	10,0	5,0	64	12,3	6,4	2,8	3,6	78	8,5	2,8	5,7	104	9,6	2,8	6,8	118	10,7	4,1	6,6	131
241.17.10.076	10,0	5,0	76	10,2	7,4	3,2	4,2	75	9,8	3,2	6,6	100	11,1	3,2	7,9	113	12,3	4,7	7,6	125
241.17.10.305	10,0	5,0	305	2,5	31,2	13,5	17,7	76	41,6	13,5	28,1	102	46,8	13,5	33,3	115	52,0	20,0	32,0	127

					55% stroke				62% stroke				80% stroke				100% stroke			
Order No	D _h	D _d	L ₀	R	S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.17.10.025	10,0	5,0	25	34,3	3,8	1,7	2,1	130	4,3	2,2	2,1	148	5,6	4,1	1,5	192	7,0	18,0	240,4	
241.17.10.032	10,0	5,0	32	25,5	4,4	1,9	2,5	112	5,0	2,5	2,5	128	6,4	4,7	1,7	163	8,0	24,0	204,1	
241.17.10.038	10,0	5,0	38	21,6	6,4	2,8	3,6	138	7,2	3,6	3,6	155	9,3	6,8	2,5	201	11,6	26,4	250,3	
241.17.10.044	10,0	5,0	44	17,9	7,2	3,1	4,1	129	8,1	4,1	4,0	145	10,4	7,6	2,8	186	13,0	31,0	232,1	
241.17.10.051	10,0	5,0	51	15,1	8,2	3,6	4,6	124	9,3	4,7	4,6	141	12,0	8,8	3,2	181	15,0	36,0	226,7	
241.17.10.064	10,0	5,0	64	12,3	11,7	5,2	6,5	143	13,2	6,7	6,5	162	17,0	12,4	4,6	208	21,3	42,7	261,1	
241.17.10.076	10,0	5,0	76	10,2	13,5	6,0	7,5	138	15,2	7,7	7,5	155	19,7	14,4	5,3	201	24,6	51,4	250,9	
241.17.10.305	10,0	5,0	305	2,5	57,2	25,2	32,0	140	64,5	32,5	32,0	158	83,2	60,8	22,4	204	104,0	201,0	254,8	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)



241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green”

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_4	S_{v4}	S_{A4}	F_4
241.14.13.025	12,5	6,3	25	18,0	3,9	1,7	2,2	70	5,2	1,7	3,5	94	5,9	1,7	4,2	106	6,5	2,3	4,2	117
241.14.13.032	12,5	6,3	32	16,4	5,1	2,2	2,9	84	6,8	2,2	4,6	112	7,7	2,2	5,5	126	8,5	3,1	5,4	139
241.14.13.038	12,5	6,3	38	13,6	6,0	2,6	3,4	82	8,0	2,6	5,4	109	9,0	2,6	6,4	122	10,0	3,6	6,4	136
241.14.13.044	12,5	6,3	44	12,1	6,9	3,0	3,9	83	9,2	3,0	6,2	111	10,4	3,0	7,4	126	11,5	4,1	7,4	139
241.14.13.051	12,5	6,3	51	11,4	8,1	3,5	4,6	92	10,8	3,5	7,3	123	12,2	3,5	8,7	139	13,5	4,9	8,6	154
241.14.13.064	12,5	6,3	64	9,3	10,5	4,6	5,9	98	14,0	4,6	9,4	130	15,8	4,6	11,2	147	17,5	6,3	11,2	163
241.14.13.076	12,5	6,3	76	7,1	12,3	5,3	7,0	87	16,4	5,3	11,1	116	18,5	5,3	13,2	131	20,5	7,4	13,1	146
241.14.13.089	12,5	6,3	89	5,4	14,7	6,4	8,3	79	19,6	6,4	13,2	106	22,1	6,4	15,7	119	24,5	8,8	15,7	132
241.14.13.305	12,5	6,3	305	1,4	49,8	21,6	28,2	70	66,4	21,6	44,8	93	74,7	21,6	53,1	105	83,0	29,9	53,1	116

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.14.13.025	12,5	6,3	25	18,0	7,2	3,0	4,2	130	8,1	3,9	4,2	146	10,4	7,5	2,9	187	13,0	12,0	234,0	
241.14.13.032	12,5	6,3	32	16,4	9,4	3,9	5,5	154	10,5	5,1	5,4	172	13,6	9,9	3,7	223	17,0	15,0	278,8	
241.14.13.038	12,5	6,3	38	13,6	11,0	4,6	6,4	150	12,4	6,0	6,4	169	16,0	11,6	4,4	218	20,0	18,0	272,0	
241.14.13.044	12,5	6,3	44	12,1	12,7	5,3	7,4	154	14,3	6,9	7,4	173	18,4	13,3	5,1	223	23,0	21,0	278,3	
241.14.13.051	12,5	6,3	51	11,4	14,9	6,2	8,7	170	16,7	8,1	8,6	190	21,6	15,7	5,9	246	27,0	24,0	307,8	
241.14.13.064	12,5	6,3	64	9,3	19,3	8,1	11,2	179	21,7	10,5	11,2	202	28,0	20,3	7,7	260	35,0	29,0	325,5	
241.14.13.076	12,5	6,3	76	7,1	22,6	9,4	13,2	160	25,4	12,3	13,1	180	32,8	23,8	9,0	233	41,0	35,0	291,1	
241.14.13.089	12,5	6,3	89	5,4	27,0	11,3	15,7	146	30,4	14,7	15,7	164	39,2	28,4	10,8	212	49,0	40,0	264,6	
241.14.13.305	12,5	6,3	305	1,4	91,3	38,2	53,1	128	103,0	49,8	53,1	144	132,8	96,3	36,5	186	166,0	139,0	232,4	



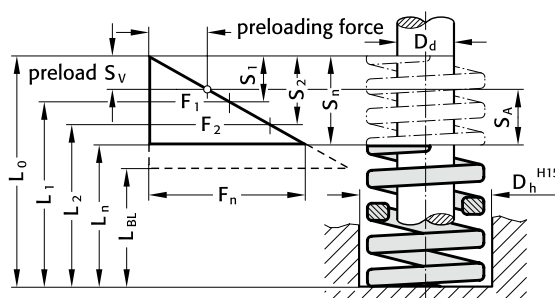
241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue”

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_4	S_{v4}	S_{A4}	F_4
241.15.13.025	12,5	6,3	25	30,0	3,3	1,4	1,9	99	4,4	1,4	3,0	132	5,0	1,4	3,6	150	5,5	2,0	3,5	165
241.15.13.032	12,5	6,3	32	24,8	3,9	1,7	2,2	97	5,2	1,7	3,5	129	5,9	1,7	4,2	146	6,5	2,3	4,2	161
241.15.13.038	12,5	6,3	38	21,4	4,8	2,1	2,7	103	6,4	2,1	4,3	137	7,2	2,1	5,1	154	8,0	2,9	5,1	171
241.15.13.044	12,5	6,3	44	18,5	5,7	2,5	3,2	105	7,6	2,5	5,1	141	8,6	2,5	6,1	159	9,5	3,4	6,1	176
241.15.13.051	12,5	6,3	51	15,5	6,6	2,9	3,7	102	8,8	2,9	5,9	136	9,9	2,9	7,0	153	11,0	4,0	7,0	171
241.15.13.064	12,5	6,3	64	12,1	8,4	3,6	4,8	102	11,2	3,6	7,6	136	12,6	3,6	9,0	152	14,0	5,0	9,0	169
241.15.13.076	12,5	6,3	76	10,2	10,2	4,4	5,8	104	13,6	4,4	9,2	139	15,3	4,4	10,9	156	17,0	6,1	10,9	173
241.15.13.089	12,5	6,3	89	8,4	12,3	5,3	7,0	103	16,4	5,3	11,1	138	18,5	5,3	13,2	155	20,5	7,4	13,1	172
241.15.13.305	12,5	6,3	305	2,1	43,2	18,7	24,5	91	57,6	18,7	38,9	121	64,8	18,7	46,1	136	72,0	25,9	46,1	151

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke		
					S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n
241.15.13.025	12,5	6,3	25	30,0	6,1	2,5	3,6	183	6,8	3,3	3,5	204	8,8	6,4	2,4	264	11,0	14,0	330,0
241.15.13.032	12,5	6,3	32	24,8	7,2	3,0	4,2	179	8,1	3,9	4,2	201	10,4	7,5	2,9	258	13,0	19,0	322,4
241.15.13.038	12,5	6,3	38	21,4	8,8	3,7	5,1	188	9,9	4,8	5,1	212	12,8	9,3	3,5	274	16,0	22,0	342,4
241.15.13.044	12,5	6,3	44	18,5	10,5	4,4	6,1	194	11,8	5,7	6,1	218	15,2	11,0	4,2	281	19,0	25,0	351,5
241.15.13.051	12,5	6,3	51	15,5	12,1	5,1	7,0	188	13,6	6,6	7,0	211	17,6	12,8	4,8	273	22,0	29,0	341,0
241.15.13.064	12,5	6,3	64	12,1	15,4	6,4	9,0	186	17,4	8,4	9,0	211	22,4	16,2	6,2	271	28,0	36,0	338,8
241.15.13.076	12,5	6,3	76	10,2	18,7	7,8	10,9	191	21,1	10,2	10,9	215	27,2	19,7	7,5	277	34,0	42,0	346,8
241.15.13.089	12,5	6,3	89	8,4	22,6	9,4	13,2	190	25,4	12,3	13,1	213	32,8	23,8	9,0	276	41,0	48,0	344,4
241.15.13.305	12,5	6,3	305	2,1	79,2	33,1	46,1	166	89,3	43,2	46,1	188	115,2	83,5	31,7	242	144,0	161,0	302,4

High Performance Compression Springs DIN ISO 10243

- D_h = dia. of guide sleeve
 D_d = diameter of guide pin
 L_0 = free length of spring
 $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
 L_{BL} = length of compacted spring (i.e. wire-to-wire)
 $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
 $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
 $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
 R = spring rate (N/mm)
 $S_{A1}...S_{A7}$ = working stroke (mm)



241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.16.13.025	12,5	6,3	25	42,2	2,6	1,1	1,5	110	3,5	1,1	2,4	148	3,9	1,1	2,8	165	4,4	1,6	2,8	186
241.16.13.032	12,5	6,3	32	33,4	3,3	1,4	1,9	110	4,4	1,4	3,0	147	5,0	1,4	3,6	167	5,5	2,0	3,5	184
241.16.13.038	12,5	6,3	38	29,4	4,1	1,8	2,3	121	5,4	1,8	3,6	159	6,1	1,8	4,3	179	6,8	2,4	4,4	200
241.16.13.044	12,5	6,3	44	24,5	4,8	2,1	2,7	118	6,4	2,1	4,3	157	7,2	2,1	5,1	176	8,0	2,9	5,1	196
241.16.13.051	12,5	6,3	51	19,6	5,7	2,5	3,2	112	7,6	2,5	5,1	149	8,6	2,5	6,1	169	9,5	3,4	6,1	186
241.16.13.064	12,5	6,3	64	14,7	7,2	3,1	4,1	106	9,6	3,1	6,5	141	10,8	3,1	7,7	159	12,0	4,3	7,7	176
241.16.13.076	12,5	6,3	76	13,7	8,7	3,8	4,9	119	11,6	3,8	7,8	159	13,1	3,8	9,3	179	14,5	5,2	9,3	199
241.16.13.089	12,5	6,3	89	11,8	9,9	4,3	5,6	117	13,2	4,3	8,9	156	14,9	4,3	10,6	176	16,5	5,9	10,6	195
241.16.13.305	12,5	6,3	305	2,9	36,0	15,6	20,4	104	48,0	15,6	32,4	139	54,0	15,6	38,4	157	60,0	21,6	38,4	174

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.16.13.025	12,5	6,3	25	42,2	4,8	2,0	2,8	203	5,4	2,6	2,8	228	7,0	5,0	2,0	295	8,7	16,3	367,1	
241.16.13.032	12,5	6,3	32	33,4	6,1	2,5	3,6	204	6,8	3,3	3,5	227	8,8	6,4	2,4	294	11,0	21,0	367,4	
241.16.13.038	12,5	6,3	38	29,4	7,4	3,1	4,3	218	8,4	4,1	4,3	247	10,8	7,8	3,0	318	13,5	24,5	396,9	
241.16.13.044	12,5	6,3	44	24,5	8,8	3,7	5,1	216	9,9	4,8	5,1	243	12,8	9,3	3,5	314	16,0	28,0	392,0	
241.16.13.051	12,5	6,3	51	19,6	10,5	4,4	6,1	206	11,8	5,7	6,1	231	15,2	11,0	4,2	298	19,0	32,0	372,4	
241.16.13.064	12,5	6,3	64	14,7	13,2	5,5	7,7	194	14,9	7,2	7,7	219	19,2	13,9	5,3	282	24,0	40,0	352,8	
241.16.13.076	12,5	6,3	76	13,7	16,0	6,7	9,3	219	18,0	8,7	9,3	247	23,2	16,8	6,4	318	29,0	47,0	397,3	
241.16.13.089	12,5	6,3	89	11,8	18,2	7,6	10,6	215	20,5	9,9	10,6	242	26,4	19,1	7,3	312	33,0	56,0	389,4	
241.16.13.305	12,5	6,3	305	2,9	66,0	27,6	38,4	191	74,4	36,0	38,4	216	96,0	69,6	26,4	278	120,0	185,0	348,0	

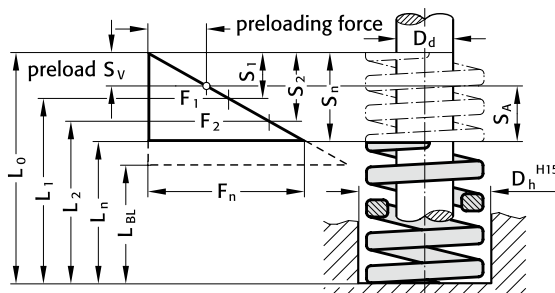


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.17.13.025	12,5	6,3	25	58,6	2,7	1,2	1,5	158	3,6	1,2	2,4	211	4,1	1,2	2,9	237	4,5	1,6	2,9	264
241.17.13.032	12,5	6,3	32	43,9	3,2	1,4	1,8	140	4,2	1,4	2,9	186	4,8	1,4	3,4	209	5,3	1,9	3,4	233
241.17.13.038	12,5	6,3	38	36,0	3,9	1,7	2,2	140	5,2	1,7	3,5	187	5,9	1,7	4,2	211	6,5	2,3	4,2	234
241.17.13.044	12,5	6,3	44	30,3	4,7	2,0	2,6	141	6,2	2,0	4,2	188	7,0	2,0	5,0	211	7,8	2,8	5,0	235
241.17.13.051	12,5	6,3	51	26,2	5,4	2,3	3,1	141	7,2	2,3	4,9	189	8,1	2,3	5,8	212	9,0	3,2	5,8	236
241.17.13.064	12,5	6,3	64	21,2	6,6	2,9	3,7	140	8,8	2,9	5,9	187	9,9	2,9	7,0	210	11,0	4,0	7,0	233
241.17.13.076	12,5	6,3	76	17,1	8,1	3,5	4,6	139	10,8	3,5	7,3	185	12,2	3,5	8,6	208	13,5	4,9	8,6	231
241.17.13.089	12,5	6,3	89	14,5	9,9	4,3	5,6	144	13,2	4,3	8,9	191	14,9	4,3	10,6	215	16,5	5,9	10,6	239
241.17.13.305	12,5	6,3	305	4,3	33,6	14,6	19,0	144	44,8	14,6	30,2	193	50,4	14,6	35,8	217	56,0	20,2	35,8	241

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.17.13.025	12,5	6,3	25	58,6	5,0	2,1	2,9	290	5,6	2,7	2,9	327	7,2	5,2	2,0	422	9,0	16,0	527,1	
241.17.13.032	12,5	6,3	32	43,9	5,8	2,4	3,4	256	6,6	3,2	3,4	289	8,5	6,1	2,3	372	10,6	21,4	465,3	
241.17.13.038	12,5	6,3	38	36,0	7,2	3,0	4,2	257	8,1	3,9	4,2	290	10,4	7,5	2,9	374	13,0	25,0	468,0	
241.17.13.044	12,5	6,3	44	30,3	8,5	3,6	5,0	258	9,6	4,7	5,0	291	12,4	9,0	3,4	376	15,5	28,5	469,7	
241.17.13.051	12,5	6,3	51	26,2	9,9	4,1	5,8	259	11,2	5,4	5,8	292	14,4	10,4	4,0	377	18,0	33,0	471,6	
241.17.13.064	12,5	6,3	64	21,2	12,1	5,1	7,0	257	13,6	6,6	7,0	289	17,6	12,8	4,8	373	22,0	42,0	466,4	
241.17.13.076	12,5	6,3	76	17,1	14,9	6,2	8,6	254	16,7	8,1	8,6	286	21,6	15,7	5,9	369	27,0	49,0	461,7	
241.17.13.089	12,5	6,3	89	14,5	18,2	7,6	10,6	263	20,5	9,9	10,6	297	26,4	19,1	7,3	383	33,0	56,0	478,5	
241.17.13.305	12,5	6,3	305	4,3	61,6	25,8	35,8	265	69,4	33,6	35,8	299	89,6	65,0	24,6	385	112,0	193,0	481,6	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

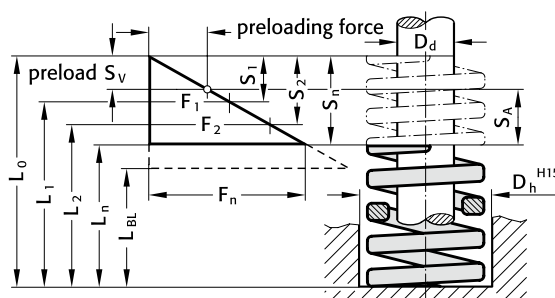
Order No	D_h	D_d	L_0	R	30% stroke			F_1	40% stroke			F_2	45% stroke			F_3	50% stroke			F_4
					S_1	S_{v1}	S_{A1}		S_2	S_{v2}	S_{A2}		S_3	S_{v3}	S_{A3}		S_4	S_{v4}	S_{A4}	
241.14.16.025	16,0	8,0	25	23,5	3,9	1,7	2,2	92	5,2	1,7	3,5	122	5,9	1,7	4,2	139	6,5	2,3	4,2	153
241.14.16.032	16,0	8,0	32	23,0	4,8	2,1	2,7	110	6,4	2,1	4,3	147	7,2	2,1	5,1	166	8,0	2,9	5,1	184
241.14.16.038	16,0	8,0	38	19,3	6,0	2,6	3,4	116	8,0	2,6	5,4	154	9,0	2,6	6,4	174	10,0	3,6	6,4	193
241.14.16.044	16,0	8,0	44	17,1	6,9	3,0	3,9	118	9,2	3,0	6,2	157	10,4	3,0	7,4	178	11,5	4,1	7,4	197
241.14.16.051	16,0	8,0	51	15,7	8,1	3,5	4,6	127	10,8	3,5	7,3	170	12,2	3,5	8,7	192	13,5	4,9	8,6	212
241.14.16.064	16,0	8,0	64	10,7	10,2	4,4	5,8	109	13,6	4,4	9,2	146	15,3	4,4	10,9	164	17,0	6,1	10,9	182
241.14.16.076	16,0	8,0	76	10,0	12,3	5,3	7,0	123	16,4	5,3	11,1	164	18,5	5,3	13,2	185	20,5	7,4	13,1	205
241.14.16.089	16,0	8,0	89	8,6	14,7	6,4	8,3	126	19,6	6,4	13,2	169	22,1	6,4	15,7	190	24,5	8,8	15,7	211
241.14.16.102	16,0	8,0	102	7,9	16,8	7,3	9,5	133	22,4	7,3	15,1	177	25,2	7,3	17,9	199	28,0	10,1	17,9	221
241.14.16.305	16,0	8,0	305	2,6	51,0	22,1	28,9	133	68,0	22,1	45,9	177	76,5	22,1	54,4	199	85,0	30,6	54,4	221

Order No	D_h	D_d	L_0	R	55% stroke			F_5	62% stroke			F_6	80% stroke			F_7	100% stroke			F_n
					S_5	S_{v5}	S_{A5}		S_6	S_{v6}	S_{A6}		S_7	S_{v7}	S_{A7}		S_n	L_n		
241.14.16.025	16,0	8,0	25	23,5	7,2	3,0	4,2	169	8,1	3,9	4,2	190	10,4	7,5	2,9	244	13,0	12,0		305,5
241.14.16.032	16,0	8,0	32	23,0	8,8	3,7	5,1	202	9,9	4,8	5,1	228	12,8	9,3	3,5	294	16,0	16,0		368,0
241.14.16.038	16,0	8,0	38	19,3	11,0	4,6	6,4	212	12,4	6,0	6,4	239	16,0	11,6	4,4	309	20,0	18,0		386,0
241.14.16.044	16,0	8,0	44	17,1	12,7	5,3	7,4	217	14,3	6,9	7,4	245	18,4	13,3	5,1	315	23,0	21,0		393,3
241.14.16.051	16,0	8,0	51	15,7	14,9	6,2	8,7	234	16,7	8,1	8,6	262	21,6	15,7	5,9	339	27,0	24,0		423,9
241.14.16.064	16,0	8,0	64	10,7	18,7	7,8	10,9	200	21,1	10,2	10,9	226	27,2	19,7	7,5	291	34,0	30,0		363,8
241.14.16.076	16,0	8,0	76	10,0	22,6	9,4	13,2	226	25,4	12,3	13,1	254	32,8	23,8	9,0	328	41,0	35,0		410,0
241.14.16.089	16,0	8,0	89	8,6	27,0	11,3	15,7	232	30,4	14,7	15,7	261	39,2	28,4	10,8	337	49,0	40,0		421,4
241.14.16.102	16,0	8,0	102	7,9	30,8	12,9	17,9	243	34,7	16,8	17,9	274	44,8	32,5	12,3	354	56,0	46,0		442,4
241.14.16.305	16,0	8,0	305	2,6	93,5	39,1	54,4	243	105,0	51,0	54,4	274	136,0	98,6	37,4	354	170,0	135,0		442,0

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

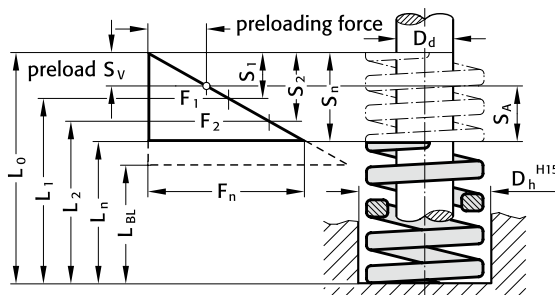


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_4	S_{V4}	S_{A4}	F_4
241.15.16.025	16,0	8,0	25	49,4	3,3	1,4	1,9	163	4,4	1,4	3,0	217	5,0	1,4	3,6	247	5,5	2,0	3,5	272
241.15.16.032	16,0	8,0	32	37,1	3,9	1,7	2,2	145	5,2	1,7	3,5	193	5,9	1,7	4,2	219	6,5	2,3	4,2	241
241.15.16.038	16,0	8,0	38	33,9	4,8	2,1	2,7	163	6,4	2,1	4,3	217	7,2	2,1	5,1	244	8,0	2,9	5,1	271
241.15.16.044	16,0	8,0	44	30,0	5,7	2,5	3,2	171	7,6	2,5	5,1	228	8,6	2,5	6,1	258	9,5	3,4	6,1	285
241.15.16.051	16,0	8,0	51	26,4	6,3	2,7	3,6	166	8,4	2,7	5,7	222	9,5	2,7	6,8	251	10,5	3,8	6,7	277
241.15.16.064	16,0	8,0	64	20,2	8,1	3,5	4,6	164	10,8	3,5	7,3	218	12,2	3,5	8,7	246	13,5	4,9	8,6	273
241.15.16.076	16,0	8,0	76	17,9	9,9	4,3	5,6	177	13,2	4,3	8,9	236	14,9	4,3	10,6	267	16,5	5,9	10,6	295
241.15.16.089	16,0	8,0	89	15,2	11,7	5,1	6,6	178	15,6	5,1	10,5	237	17,6	5,1	12,5	268	19,5	7,0	12,5	296
241.15.16.102	16,0	8,0	102	13,5	13,5	5,9	7,6	182	18,0	5,9	12,1	243	20,3	5,9	14,4	274	22,5	8,1	14,4	304
241.15.16.305	16,0	8,0	305	4,8	41,4	17,9	23,5	199	55,2	17,9	37,3	265	62,1	17,9	44,2	298	69,0	24,8	44,2	331

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke		
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n
241.15.16.025	16,0	8,0	25	49,4	6,1	2,5	3,6	301	6,8	3,3	3,5	336	8,8	6,4	2,4	435	11,0	14,0	543,4
241.15.16.032	16,0	8,0	32	37,1	7,2	3,0	4,2	267	8,1	3,9	4,2	301	10,4	7,5	2,9	386	13,0	19,0	482,3
241.15.16.038	16,0	8,0	38	33,9	8,8	3,7	5,1	298	9,9	4,8	5,1	336	12,8	9,3	3,5	434	16,0	22,0	542,4
241.15.16.044	16,0	8,0	44	30,0	10,5	4,4	6,1	315	11,8	5,7	6,1	354	15,2	11,0	4,2	456	19,0	25,0	570,0
241.15.16.051	16,0	8,0	51	26,4	11,6	4,8	6,8	306	13,0	6,3	6,7	343	16,8	12,2	4,6	444	21,0	30,0	554,4
241.15.16.064	16,0	8,0	64	20,2	14,9	6,2	8,7	301	16,7	8,1	8,6	337	21,6	15,7	5,9	436	27,0	37,0	545,4
241.15.16.076	16,0	8,0	76	17,9	18,2	7,6	10,6	326	20,5	9,9	10,6	367	26,4	19,1	7,3	473	33,0	43,0	590,7
241.15.16.089	16,0	8,0	89	15,2	21,5	9,0	12,5	327	24,2	11,7	12,5	368	31,2	22,6	8,6	474	39,0	50,0	592,8
241.15.16.102	16,0	8,0	102	13,5	24,8	10,4	14,4	335	27,9	13,5	14,4	377	36,0	26,1	9,9	486	45,0	57,0	607,5
241.15.16.305	16,0	8,0	305	4,8	75,9	31,7	44,2	364	85,6	41,4	44,2	411	110,4	80,0	30,4	530	138,0	167,0	662,4

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

Order No	D_h	D_d	L_0	R	30% stroke			F_1	40% stroke			F_2	45% stroke			F_3	50% stroke			F_4
					S_1	S_{v1}	S_{A1}		S_2	S_{v2}	S_{A2}		S_3	S_{v3}	S_{A3}		S_4	S_{v4}	S_{A4}	
241.16.16.025	16,0	8,0	25	75,5	2,6	1,1	1,5	196	3,5	1,1	2,4	264	3,9	1,1	2,8	294	4,4	1,6	2,8	332
241.16.16.032	16,0	8,0	32	53,0	3,3	1,4	1,9	175	4,4	1,4	3,0	233	5,0	1,4	3,6	265	5,5	2,0	3,5	292
241.16.16.038	16,0	8,0	38	49,1	4,1	1,8	2,3	201	5,5	1,8	3,7	270	6,2	1,8	4,4	304	6,9	2,5	4,4	339
241.16.16.044	16,0	8,0	44	43,2	4,7	2,0	2,7	203	6,3	2,0	4,3	272	7,1	2,0	5,1	307	7,9	2,8	5,1	341
241.16.16.051	16,0	8,0	51	37,3	5,6	2,4	3,2	209	7,4	2,4	5,0	276	8,3	2,4	5,9	310	9,3	3,3	6,0	347
241.16.16.064	16,0	8,0	64	30,4	7,1	3,1	4,0	216	9,4	3,1	6,3	286	10,6	3,1	7,5	322	11,8	4,2	7,6	359
241.16.16.076	16,0	8,0	76	25,5	8,7	3,8	4,9	222	11,6	3,8	7,8	296	13,1	3,8	9,3	334	14,5	5,2	9,3	370
241.16.16.089	16,0	8,0	89	21,6	10,4	4,5	5,9	225	13,8	4,5	9,3	298	15,5	4,5	11,0	335	17,3	6,2	11,1	374
241.16.16.102	16,0	8,0	102	19,6	12,0	5,2	6,8	235	16,0	5,2	10,8	314	18,0	5,2	12,8	353	20,0	7,2	12,8	392
241.16.16.305	16,0	8,0	305	6,9	36,6	15,9	20,7	253	48,8	15,9	32,9	337	54,9	15,9	39,0	379	61,0	22,0	39,0	421

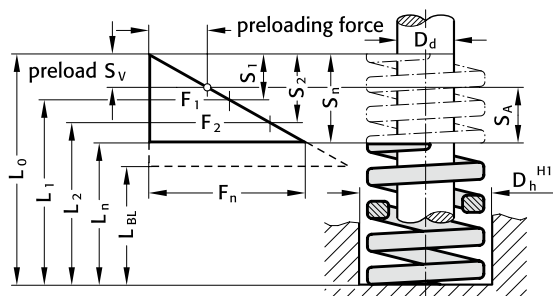
Order No	D_h	D_d	L_0	R	55% stroke			F_5	62% stroke			F_6	80% stroke			F_7	100% stroke			F_n
					S_5	S_{v5}	S_{A5}		S_6	S_{v6}	S_{A6}		S_7	S_{v7}	S_{A7}		S_n	L_n		
241.16.16.025	16,0	8,0	25	75,5	4,8	2,0	2,8	362	5,4	2,6	2,8	408	7,0	5,0	2,0	529	8,7	16,3		656,9
241.16.16.032	16,0	8,0	32	53,0	6,1	2,5	3,6	323	6,8	3,3	3,5	360	8,8	6,4	2,4	466	11,0	21,0		583,0
241.16.16.038	16,0	8,0	38	49,1	7,5	3,2	4,3	368	8,5	4,1	4,4	417	11,0	7,9	3,1	540	13,7	24,3		672,7
241.16.16.044	16,0	8,0	44	43,2	8,6	3,6	5,0	372	9,7	4,7	5,0	419	12,6	9,1	3,5	544	15,7	28,3		678,2
241.16.16.051	16,0	8,0	51	37,3	10,2	4,3	5,9	380	11,5	5,6	5,9	429	14,8	10,7	4,1	552	18,5	32,5		690,1
241.16.16.064	16,0	8,0	64	30,4	12,9	5,4	7,5	392	14,6	7,1	7,5	444	18,8	13,6	5,2	572	23,5	40,5		714,4
241.16.16.076	16,0	8,0	76	25,5	16,0	6,7	9,3	408	18,0	8,7	9,3	459	23,2	16,8	6,4	592	29,0	47,0		739,5
241.16.16.089	16,0	8,0	89	21,6	19,0	7,9	11,1	410	21,4	10,4	11,0	462	27,6	20,0	7,6	596	34,5	54,5		745,2
241.16.16.102	16,0	8,0	102	19,6	22,0	9,2	12,8	431	24,8	12,0	12,8	486	32,0	23,2	8,8	627	40,0	62,0		784,0
241.16.16.305	16,0	8,0	305	6,9	67,1	28,1	39,0	463	75,6	36,6	39,0	522	97,6	70,8	26,8	673	122,0	183,0		841,8

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

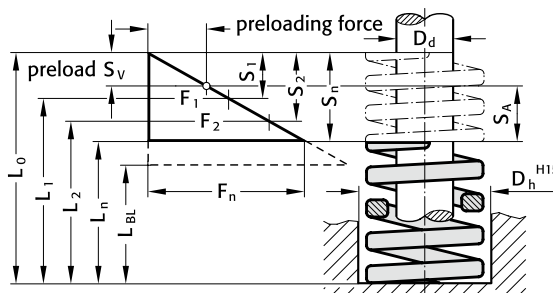


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_4	S_{v4}	S_{A4}	F_4
241.17.16.025	16,0	8,0	25	118	2,7	1,2	1,5	319	3,6	1,2	2,4	425	4,1	1,2	2,9	484	4,5	1,6	2,9	531
241.17.16.032	16,0	8,0	32	89,1	3,2	1,4	1,8	285	4,3	1,4	2,9	383	4,9	1,4	3,5	437	5,4	1,9	3,5	481
241.17.16.038	16,0	8,0	38	72,1	3,9	1,7	2,2	281	5,2	1,7	3,5	375	5,9	1,7	4,2	425	6,5	2,3	4,2	469
241.17.16.044	16,0	8,0	44	60,9	4,5	2,0	2,5	274	6,0	2,0	4,0	365	6,8	2,0	4,8	414	7,5	2,7	4,8	457
241.17.16.051	16,0	8,0	51	52,3	5,4	2,3	3,1	282	7,2	2,3	4,9	377	8,1	2,3	5,8	424	9,0	3,2	5,8	471
241.17.16.064	16,0	8,0	64	41,2	6,6	2,9	3,7	272	8,8	2,9	5,9	363	9,9	2,9	7,0	408	11,0	4,0	7,0	453
241.17.16.076	16,0	8,0	76	34,1	8,0	3,4	4,6	273	10,6	3,4	7,2	361	11,9	3,4	8,5	406	13,3	4,8	8,5	454
241.17.16.089	16,0	8,0	89	29,5	9,5	4,1	5,4	280	12,6	4,1	8,5	372	14,2	4,1	10,1	419	15,8	5,7	10,1	466
241.17.16.102	16,0	8,0	102	25,6	11,0	4,7	6,3	282	14,6	4,7	9,9	374	16,4	4,7	11,7	420	18,3	6,6	11,7	468
241.17.16.305	16,0	8,0	305	8,4	33,0	14,3	18,7	277	44,0	14,3	29,7	370	49,5	14,3	35,2	416	55,0	19,8	35,2	462

Order No					55% stroke				62% stroke				80% stroke				100% stroke			
	D _h	D _d	L ₀	R	S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.17.16.025	16,0	8,0	25	118	5,0	2,1	2,9	590	5,6	2,7	2,9	661	7,2	5,2	2,0	850	9,0	16,0	1062,0	
241.17.16.032	16,0	8,0	32	89,1	5,9	2,5	3,4	526	6,7	3,2	3,5	597	8,6	6,3	2,3	766	10,8	21,2	962,3	
241.17.16.038	16,0	8,0	38	72,1	7,2	3,0	4,2	519	8,1	3,9	4,2	584	10,4	7,5	2,9	750	13,0	25,0	937,3	
241.17.16.044	16,0	8,0	44	60,9	8,3	3,5	4,8	505	9,3	4,5	4,8	566	12,0	8,7	3,3	731	15,0	29,0	913,5	
241.17.16.051	16,0	8,0	51	52,3	9,9	4,1	5,8	518	11,2	5,4	5,8	586	14,4	10,4	4,0	753	18,0	33,0	941,4	
241.17.16.064	16,0	8,0	64	41,2	12,1	5,1	7,0	499	13,6	6,6	7,0	560	17,6	12,8	4,8	725	22,0	42,0	906,4	
241.17.16.076	16,0	8,0	76	34,1	14,6	6,1	8,5	498	16,4	8,0	8,4	559	21,2	15,4	5,8	723	26,5	49,5	903,7	
241.17.16.089	16,0	8,0	89	29,5	17,3	7,2	10,1	510	19,5	9,5	10,0	575	25,2	18,3	6,9	743	31,5	57,5	929,3	
241.17.16.102	16,0	8,0	102	25,6	20,1	8,4	11,7	515	22,6	11,0	11,6	579	29,2	21,2	8,0	748	36,5	65,5	934,4	
241.17.16.305	16,0	8,0	305	8,4	60,5	25,3	35,2	508	68,2	33,0	35,2	573	88,0	63,8	24,2	739	110,0	195,0	924,0	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_4	S_{V4}	S_{A4}	F_4
241.14.20.025	20,0	10,0	25	55,8	3,9	1,7	2,2	218	5,2	1,7	3,5	290	5,9	1,7	4,2	329	6,5	2,3	4,2	363
241.14.20.032	20,0	10,0	32	45,0	4,8	2,1	2,7	216	6,4	2,1	4,3	288	7,2	2,1	5,1	324	8,0	2,9	5,1	360
241.14.20.038	20,0	10,0	38	33,4	5,7	2,5	3,2	190	7,6	2,5	5,1	254	8,6	2,5	6,1	287	9,5	3,4	6,1	317
241.14.20.044	20,0	10,0	44	30,0	6,9	3,0	3,9	207	9,2	3,0	6,2	276	10,4	3,0	7,4	312	11,5	4,1	7,4	345
241.14.20.051	20,0	10,0	51	24,5	7,8	3,4	4,4	191	10,4	3,4	7,0	255	11,7	3,4	8,3	287	13,0	4,7	8,3	319
241.14.20.064	20,0	10,0	64	20,0	9,6	4,2	5,4	192	12,8	4,2	8,6	256	14,4	4,2	10,2	288	16,0	5,8	10,2	320
241.14.20.076	20,0	10,0	76	16,0	12,0	5,2	6,8	192	16,0	5,2	10,8	256	18,0	5,2	12,8	288	20,0	7,2	12,8	320
241.14.20.089	20,0	10,0	89	14,0	13,8	6,0	7,8	193	18,4	6,0	12,4	258	20,7	6,0	14,7	290	23,0	8,3	14,7	322
241.14.20.102	20,0	10,0	102	12,0	15,9	6,9	9,0	191	21,2	6,9	14,3	254	23,9	6,9	17,0	287	26,5	9,5	17,0	318
241.14.20.115	20,0	10,0	115	10,9	18,0	7,8	10,2	196	24,0	7,8	16,2	262	27,0	7,8	19,2	294	30,0	10,8	19,2	327
241.14.20.127	20,0	10,0	127	9,5	20,1	8,7	11,4	191	26,8	8,7	18,1	255	30,2	8,7	21,5	287	33,5	12,1	21,4	318
241.14.20.139	20,0	10,0	139	8,4	21,9	9,5	12,4	184	29,2	9,5	19,7	245	32,9	9,5	23,4	276	36,5	13,1	23,4	307
241.14.20.152	20,0	10,0	152	7,6	24,3	10,5	13,8	185	32,4	10,5	21,9	246	36,5	10,5	26,0	277	40,5	14,6	25,9	308
241.14.20.305	20,0	10,0	305	4,0	48,6	21,1	27,5	194	64,8	21,1	43,7	259	72,9	21,1	51,8	292	81,0	29,2	51,8	324

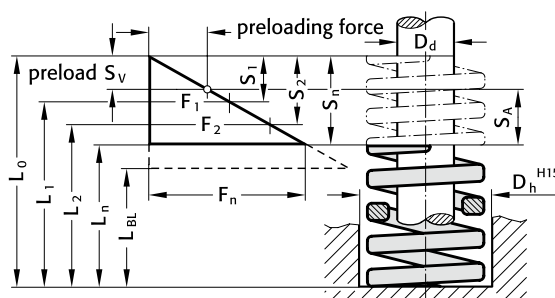
Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.14.20.025	20,0	10,0	25	55,8	7,2	3,0	4,2	402	8,1	3,9	4,2	452	10,4	7,5	2,9	580	13,0	12,0	725,4	
241.14.20.032	20,0	10,0	32	45,0	8,8	3,7	5,1	396	9,9	4,8	5,1	446	12,8	9,3	3,5	576	16,0	16,0	720,0	
241.14.20.038	20,0	10,0	38	33,4	10,5	4,4	6,1	351	11,8	5,7	6,1	394	15,2	11,0	4,2	508	19,0	19,0	634,6	
241.14.20.044	20,0	10,0	44	30,0	12,7	5,3	7,4	381	14,3	6,9	7,4	429	18,4	13,3	5,1	552	23,0	21,0	690,0	
241.14.20.051	20,0	10,0	51	24,5	14,3	6,0	8,3	350	16,1	7,8	8,3	394	20,8	15,1	5,7	510	26,0	25,0	637,0	
241.14.20.064	20,0	10,0	64	20,0	17,6	7,4	10,2	352	19,8	9,6	10,2	396	25,6	18,6	7,0	512	32,0	32,0	640,0	
241.14.20.076	20,0	10,0	76	16,0	22,0	9,2	12,8	352	24,8	12,0	12,8	397	32,0	23,2	8,8	512	40,0	36,0	640,0	
241.14.20.089	20,0	10,0	89	14,0	25,3	10,6	14,7	354	28,5	13,8	14,7	399	36,8	26,7	10,1	515	46,0	43,0	644,0	
241.14.20.102	20,0	10,0	102	12,0	29,2	12,2	17,0	350	32,9	15,9	17,0	395	42,4	30,7	11,7	509	53,0	49,0	636,0	
241.14.20.115	20,0	10,0	115	10,9	33,0	13,8	19,2	360	37,2	18,0	19,2	405	48,0	34,8	13,2	523	60,0	55,0	654,0	
241.14.20.127	20,0	10,0	127	9,5	36,9	15,4	21,5	351	41,5	20,1	21,4	394	53,6	38,9	14,7	509	67,0	60,0	636,5	
241.14.20.139	20,0	10,0	139	8,4	40,2	16,8	23,4	338	45,3	21,9	23,4	381	58,4	42,3	16,1	491	73,0	66,0	613,2	
241.14.20.152	20,0	10,0	152	7,6	44,6	18,6	26,0	339	50,2	24,3	25,9	382	64,8	47,0	17,8	492	81,0	71,0	615,6	
241.14.20.305	20,0	10,0	305	4,0	89,1	37,3	51,8	356	100,0	48,6	51,8	402	129,6	94,0	35,6	518	162,0	143,0	648,0	

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

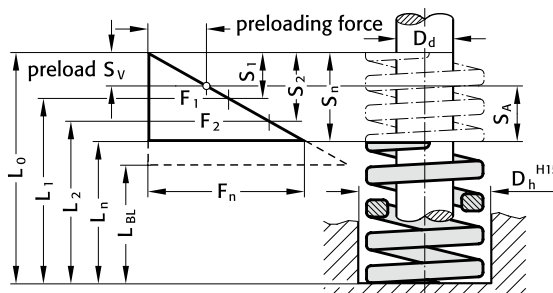


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_4	S_{V4}	S_{A4}	F_4
241.15.20.025	20,0	10,0	25	98,1	3,3	1,4	1,9	324	4,4	1,4	3,0	432	5,0	1,4	3,6	491	5,5	2,0	3,5	540
241.15.20.032	20,0	10,0	32	72,7	3,9	1,7	2,2	284	5,2	1,7	3,5	378	5,9	1,7	4,2	429	6,5	2,3	4,2	473
241.15.20.038	20,0	10,0	38	56,0	4,8	2,1	2,7	269	6,4	2,1	4,3	358	7,2	2,1	5,1	403	8,0	2,9	5,1	448
241.15.20.044	20,0	10,0	44	47,6	5,7	2,5	3,2	271	7,6	2,5	5,1	362	8,6	2,5	6,1	409	9,5	3,4	6,1	452
241.15.20.051	20,0	10,0	51	41,7	6,3	2,7	3,6	263	8,4	2,7	5,7	350	9,5	2,7	6,8	396	10,5	3,8	6,7	438
241.15.20.064	20,0	10,0	64	32,3	8,1	3,5	4,6	262	10,8	3,5	7,3	349	12,2	3,5	8,7	394	13,5	4,9	8,6	436
241.15.20.076	20,0	10,0	76	25,1	9,9	4,3	5,6	248	13,2	4,3	8,9	331	14,9	4,3	10,6	374	16,5	5,9	10,6	414
241.15.20.089	20,0	10,0	89	22,0	11,7	5,1	6,6	257	15,6	5,1	10,5	343	17,6	5,1	12,5	387	19,5	7,0	12,5	429
241.15.20.102	20,0	10,0	102	19,8	13,2	5,7	7,5	261	17,6	5,7	11,9	348	19,8	5,7	14,1	392	22,0	7,9	14,1	436
241.15.20.115	20,0	10,0	115	18,2	14,7	6,4	8,3	268	19,6	6,4	13,2	357	22,1	6,4	15,7	402	24,5	8,8	15,7	446
241.15.20.127	20,0	10,0	127	16,6	16,5	7,2	9,3	274	22,0	7,2	14,8	365	24,8	7,2	17,6	412	27,5	9,9	17,6	457
241.15.20.139	20,0	10,0	139	15,1	18,3	7,9	10,4	276	24,4	7,9	16,5	368	27,5	7,9	19,6	415	30,5	11,0	19,5	461
241.15.20.152	20,0	10,0	152	13,2	19,8	8,6	11,2	261	26,4	8,6	17,8	348	29,7	8,6	21,1	392	33,0	11,9	21,1	436
241.15.20.305	20,0	10,0	305	6,1	40,8	17,7	23,1	249	54,4	17,7	36,7	332	61,2	17,7	43,5	373	68,0	24,5	43,5	415

Order No	D_h	D_d	L_0	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S_5	S_{V5}	S_{A5}	F_5	S_6	S_{V6}	S_{A6}	F_6	S_7	S_{V7}	S_{A7}	F_7	S_n	L_n	F_n	
241.15.20.025	20,0	10,0	25	98,1	6,1	2,5	3,6	598	6,8	3,3	3,5	667	8,8	6,4	2,4	863	11,0	14,0	1079,1	
241.15.20.032	20,0	10,0	32	72,7	7,2	3,0	4,2	523	8,1	3,9	4,2	589	10,4	7,5	2,9	756	13,0	19,0	945,1	
241.15.20.038	20,0	10,0	38	56,0	8,8	3,7	5,1	493	9,9	4,8	5,1	554	12,8	9,3	3,5	717	16,0	22,0	896,0	
241.15.20.044	20,0	10,0	44	47,6	10,5	4,4	6,1	500	11,8	5,7	6,1	562	15,2	11,0	4,2	724	19,0	25,0	904,4	
241.15.20.051	20,0	10,0	51	41,7	11,6	4,8	6,8	484	13,0	6,3	6,7	542	16,8	12,2	4,6	701	21,0	30,0	875,7	
241.15.20.064	20,0	10,0	64	32,3	14,9	6,2	8,7	481	16,7	8,1	8,6	539	21,6	15,7	5,9	698	27,0	37,0	872,1	
241.15.20.076	20,0	10,0	76	25,1	18,2	7,6	10,6	457	20,5	9,9	10,6	515	26,4	19,1	7,3	663	33,0	43,0	828,3	
241.15.20.089	20,0	10,0	89	22,0	21,5	9,0	12,5	473	24,2	11,7	12,5	532	31,2	22,6	8,6	686	39,0	50,0	858,0	
241.15.20.102	20,0	10,0	102	19,8	24,2	10,1	14,1	479	27,3	13,2	14,1	541	35,2	25,5	9,7	697	44,0	58,0	871,2	
241.15.20.115	20,0	10,0	115	18,2	27,0	11,3	15,7	491	30,4	14,7	15,7	553	39,2	28,4	10,8	713	49,0	66,0	891,8	
241.15.20.127	20,0	10,0	127	16,6	30,3	12,7	17,6	503	34,1	16,5	17,6	566	44,0	31,9	12,1	730	55,0	72,0	913,0	
241.15.20.139	20,0	10,0	139	15,1	33,6	14,0	19,6	507	37,8	18,3	19,5	571	48,8	35,4	13,4	737	61,0	78,0	921,1	
241.15.20.152	20,0	10,0	152	13,2	36,3	15,2	21,1	479	40,9	19,8	21,1	540	52,8	38,3	14,5	697	66,0	86,0	871,2	
241.15.20.305	20,0	10,0	305	6,1	74,8	31,3	43,5	456	84,3	40,8	43,5	514	108,8	78,9	29,9	664	136,0	169,0	829,6	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.16.20.025	20,0	10,0	25	215,8	2,5	1,1	1,4	540	3,4	1,1	2,3	734	3,8	1,1	2,7	820
241.16.20.032	20,0	10,0	32	167,8	3,2	1,4	1,8	537	4,2	1,4	2,8	705	4,7	1,4	3,3	789
241.16.20.038	20,0	10,0	38	133,4	3,8	1,6	2,2	507	5,0	1,6	3,4	667	5,6	1,6	4,0	747
241.16.20.044	20,0	10,0	44	111,8	4,4	1,9	2,5	492	5,8	1,9	3,9	648	6,5	1,9	4,6	727
241.16.20.051	20,0	10,0	51	94,2	5,0	2,1	2,9	471	6,6	2,1	4,5	622	7,4	2,1	5,3	697
241.16.20.064	20,0	10,0	64	72,6	6,3	2,7	3,6	457	8,4	2,7	5,7	610	9,5	2,7	6,8	690
241.16.20.076	20,0	10,0	76	59,8	7,8	3,4	4,4	466	10,4	3,4	7,0	622	11,7	3,4	8,3	700
241.16.20.089	20,0	10,0	89	51,0	9,0	3,9	5,1	459	12,0	3,9	8,1	612	13,5	3,9	9,6	689
241.16.20.102	20,0	10,0	102	44,1	10,5	4,6	5,9	463	14,0	4,6	9,4	617	15,8	4,6	11,2	697
241.16.20.115	20,0	10,0	115	38,3	12,0	5,2	6,8	460	16,0	5,2	10,8	613	18,0	5,2	12,8	689
241.16.20.127	20,0	10,0	127	34,3	13,2	5,7	7,5	453	17,6	5,7	11,9	604	19,8	5,7	14,1	679
241.16.20.139	20,0	10,0	139	31,4	14,7	6,4	8,3	462	19,6	6,4	13,2	615	22,1	6,4	15,7	694
241.16.20.152	20,0	10,0	152	28,4	15,9	6,9	9,0	452	21,2	6,9	14,3	602	23,9	6,9	17,0	679
241.16.20.305	20,0	10,0	305	14,7	32,4	14,0	18,4	476	43,2	14,0	29,2	635	48,6	14,0	34,6	714

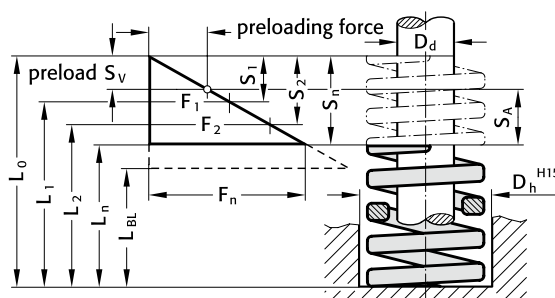
Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.16.20.025	20,0	10,0	25	215,8	4,6	1,9	2,7	993	5,2	2,5	2,7	1122	6,7	4,9	1,8	1446
241.16.20.032	20,0	10,0	32	167,8	5,8	2,4	3,4	973	6,5	3,2	3,3	1091	8,4	6,1	2,3	1410
241.16.20.038	20,0	10,0	38	133,4	6,9	2,9	4,0	920	7,8	3,8	4,0	1041	10,0	7,3	2,7	1334
241.16.20.044	20,0	10,0	44	111,8	8,0	3,3	4,7	894	9,0	4,4	4,6	1006	11,6	8,4	3,2	1297
241.16.20.051	20,0	10,0	51	94,2	9,1	3,8	5,3	857	10,2	5,0	5,2	961	13,2	9,6	3,6	1243
241.16.20.064	20,0	10,0	64	72,6	11,6	4,8	6,8	842	13,0	6,3	6,7	944	16,8	12,2	4,6	1220
241.16.20.076	20,0	10,0	76	59,8	14,3	6,0	8,3	855	16,1	7,8	8,3	963	20,8	15,1	5,7	1244
241.16.20.089	20,0	10,0	89	51,0	16,5	6,9	9,6	842	18,6	9,0	9,6	949	24,0	17,4	6,6	1224
241.16.20.102	20,0	10,0	102	44,1	19,3	8,1	11,2	851	21,7	10,5	11,2	957	28,0	20,3	7,7	1235
241.16.20.115	20,0	10,0	115	38,3	22,0	9,2	12,8	843	24,8	12,0	12,8	950	32,0	23,2	8,8	1226
241.16.20.127	20,0	10,0	127	34,3	24,2	10,1	14,1	830	27,3	13,2	14,1	936	35,2	25,5	9,7	1207
241.16.20.139	20,0	10,0	139	31,4	27,0	11,3	15,7	848	30,4	14,7	15,7	955	39,2	28,4	10,8	1231
241.16.20.152	20,0	10,0	152	28,4	29,2	12,2	17,0	829	32,9	15,9	17,0	934	42,4	30,7	11,7	1204
241.16.20.305	20,0	10,0	305	14,7	59,4	24,8	34,6	873	67,0	32,4	34,6	985	86,4	62,6	23,8	1270

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

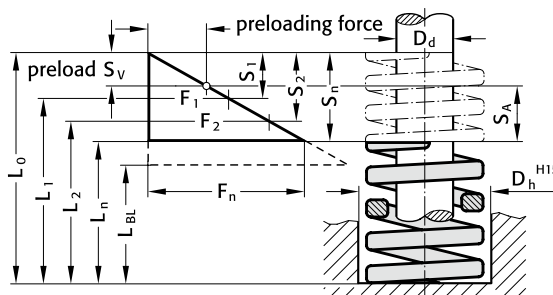


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_4	S_{V4}	S_{A4}	F_4
241.17.20.025	20,0	10,0	25	293	2,3	1,0	1,3	674	3,1	1,0	2,1	908	3,5	1,0	2,5	1026	3,9	1,4	2,5	1143
241.17.20.032	20,0	10,0	32	224	2,9	1,3	1,6	650	3,9	1,3	2,6	874	4,4	1,3	3,1	986	4,9	1,8	3,1	1098
241.17.20.038	20,0	10,0	38	177	3,6	1,6	2,0	637	4,8	1,6	3,2	850	5,4	1,6	3,8	956	6,0	2,2	3,8	1062
241.17.20.044	20,0	10,0	44	149	4,2	1,8	2,4	626	5,6	1,8	3,8	834	6,3	1,8	4,5	939	7,0	2,5	4,5	1043
241.17.20.051	20,0	10,0	51	128	4,8	2,1	2,7	614	6,4	2,1	4,3	819	7,2	2,1	5,1	922	8,0	2,9	5,1	1024
241.17.20.064	20,0	10,0	64	99,1	6,3	2,7	3,6	624	8,4	2,7	5,7	832	9,5	2,7	6,8	941	10,5	3,8	6,7	1041
241.17.20.076	20,0	10,0	76	86,6	7,5	3,3	4,2	650	10,0	3,3	6,7	866	11,3	3,3	8,0	979	12,5	4,5	8,0	1083
241.17.20.089	20,0	10,0	89	69,6	9,0	3,9	5,1	626	12,0	3,9	8,1	835	13,5	3,9	9,6	940	15,0	5,4	9,6	1044
241.17.20.102	20,0	10,0	102	60,6	10,2	4,4	5,8	618	13,6	4,4	9,2	824	15,3	4,4	10,9	927	17,0	6,1	10,9	1030
241.17.20.115	20,0	10,0	115	53,1	11,4	4,9	6,5	605	15,2	4,9	10,3	807	17,1	4,9	12,2	908	19,0	6,8	12,2	1009
241.17.20.127	20,0	10,0	127	47,6	12,9	5,6	7,3	614	17,2	5,6	11,6	819	19,4	5,6	13,8	923	21,5	7,7	13,8	1023
241.17.20.139	20,0	10,0	139	43,1	14,1	6,1	8,0	608	18,8	6,1	12,7	810	21,2	6,1	15,1	914	23,5	8,5	15,0	1013
241.17.20.152	20,0	10,0	152	39,0	15,3	6,6	8,7	597	20,4	6,6	13,8	796	23,0	6,6	16,4	897	25,5	9,2	16,3	995
241.17.20.305	20,0	10,0	305	21,2	31,5	13,7	17,8	668	42,0	13,7	28,3	890	47,3	13,7	33,6	1003	52,5	18,9	33,6	1113

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.17.20.025	20,0	10,0	25	293	4,2	1,8	2,4	1231	4,8	2,3	2,5	1406	6,2	4,5	1,7	1817	7,7	17,3	2256,1	
241.17.20.032	20,0	10,0	32	224	5,4	2,3	3,1	1210	6,1	2,9	3,2	1366	7,8	5,7	2,1	1747	9,8	22,2	2195,2	
241.17.20.038	20,0	10,0	38	177	6,6	2,8	3,8	1168	7,4	3,6	3,8	1310	9,6	7,0	2,6	1699	12,0	26,0	2124,0	
241.17.20.044	20,0	10,0	44	149	7,7	3,2	4,5	1147	8,7	4,2	4,5	1296	11,2	8,1	3,1	1669	14,0	30,0	2086,0	
241.17.20.051	20,0	10,0	51	128	8,8	3,7	5,1	1126	9,9	4,8	5,1	1267	12,8	9,3	3,5	1638	16,0	35,0	2048,0	
241.17.20.064	20,0	10,0	64	99,1	11,6	4,8	6,8	1150	13,0	6,3	6,7	1288	16,8	12,2	4,6	1665	21,0	43,0	2081,1	
241.17.20.076	20,0	10,0	76	86,6	13,8	5,8	8,0	1195	15,5	7,5	8,0	1342	20,0	14,5	5,5	1732	25,0	51,0	2165,0	
241.17.20.089	20,0	10,0	89	69,6	16,5	6,9	9,6	1148	18,6	9,0	9,6	1295	24,0	17,4	6,6	1670	30,0	59,0	2088,0	
241.17.20.102	20,0	10,0	102	60,6	18,7	7,8	10,9	1133	21,1	10,2	10,9	1279	27,2	19,7	7,5	1648	34,0	68,0	2060,4	
241.17.20.115	20,0	10,0	115	53,1	20,9	8,7	12,2	1110	23,6	11,4	12,2	1253	30,4	22,0	8,4	1614	38,0	77,0	2017,8	
241.17.20.127	20,0	10,0	127	47,6	23,7	9,9	13,8	1128	26,7	12,9	13,8	1271	34,4	24,9	9,5	1637	43,0	84,0	2046,8	
241.17.20.139	20,0	10,0	139	43,1	25,9	10,8	15,1	1116	29,1	14,1	15,0	1254	37,6	27,3	10,3	1621	47,0	92,0	2025,7	
241.17.20.152	20,0	10,0	152	39,0	28,1	11,7	16,4	1096	31,6	15,3	16,3	1232	40,8	29,6	11,2	1591	51,0	101,0	1989,0	
241.17.20.305	20,0	10,0	305	21,2	57,8	24,2	33,6	1225	65,1	31,5	33,6	1380	84,0	60,9	23,1	1781	105,0	200,0	2226,0	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1 \dots L_n$ = length of loaded spring (mm) as related to spring forces $F_1 \dots F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1 \dots F_n$ = forces (N) as related to length of spring $L_1 \dots L_n$
- $S_{v1} \dots S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1 \dots S_7$
- $S_1 \dots S_n$ = compr. as related to spring forces $F_1 \dots F_n$
- R = spring rate (N/mm)
- $S_{A1} \dots S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

Order No	D_h	D_d	L_0	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_4	S_{v4}	S_{A4}	F_4
241.14.25.025	25,0	12,5	25	100,0	3,9	1,7	2,2	390	5,2	1,7	3,5	520	5,9	1,7	4,2	590	6,5	2,3	4,2	650
241.14.25.032	25,0	12,5	32	80,3	4,8	2,1	2,7	385	6,4	2,1	4,3	514	7,2	2,1	5,1	578	8,0	2,9	5,1	642
241.14.25.038	25,0	12,5	38	62,0	5,7	2,5	3,2	353	7,6	2,5	5,1	471	8,6	2,5	6,1	533	9,5	3,4	6,1	589
241.14.25.044	25,0	12,5	44	53,0	6,9	3,0	3,9	366	9,2	3,0	6,2	488	10,4	3,0	7,4	551	11,5	4,1	7,4	610
241.14.25.051	25,0	12,5	51	44,1	7,5	3,3	4,2	331	10,0	3,3	6,7	441	11,3	3,3	8,0	498	12,5	4,5	8,0	551
241.14.25.064	25,0	12,5	64	35,2	9,3	4,0	5,3	327	12,4	4,0	8,4	436	14,0	4,0	10,0	493	15,5	5,6	9,9	546
241.14.25.076	25,0	12,5	76	28,1	11,7	5,1	6,6	329	15,6	5,1	10,5	438	17,6	5,1	12,5	495	19,5	7,0	12,5	548
241.14.25.089	25,0	12,5	89	24,0	13,8	6,0	7,8	331	18,4	6,0	12,4	442	20,7	6,0	14,7	497	23,0	8,3	14,7	552
241.14.25.102	25,0	12,5	102	21,1	15,6	6,8	8,8	329	20,8	6,8	14,0	439	23,4	6,8	16,6	494	26,0	9,4	16,6	549
241.14.25.115	25,0	12,5	115	18,7	17,7	7,7	10,0	331	23,6	7,7	15,9	441	26,6	7,7	18,9	497	29,5	10,6	18,9	552
241.14.25.127	25,0	12,5	127	16,7	19,8	8,6	11,2	331	26,4	8,6	17,8	441	29,7	8,6	21,1	496	33,0	11,9	21,1	551
241.14.25.139	25,0	12,5	139	15,3	22,2	9,6	12,6	340	29,6	9,6	20,0	453	33,3	9,6	23,7	509	37,0	13,3	23,7	566
241.14.25.152	25,0	12,5	152	14,0	24,0	10,4	13,6	336	32,0	10,4	21,6	448	36,0	10,4	25,6	504	40,0	14,4	25,6	560
241.14.25.178	25,0	12,5	178	12,6	27,9	12,1	15,8	352	37,2	12,1	25,1	469	41,9	12,1	29,8	528	46,5	16,7	29,8	586
241.14.25.203	25,0	12,5	203	10,4	32,1	13,9	18,2	334	42,8	13,9	28,9	445	48,2	13,9	34,3	501	53,5	19,3	34,2	556
241.14.25.305	25,0	12,5	305	7,0	48,0	20,8	27,2	336	64,0	20,8	43,2	448	72,0	20,8	51,2	504	80,0	28,8	51,2	560

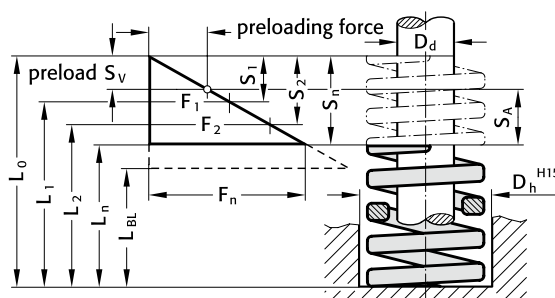
Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.14.25.025	25,0	12,5	25	100,0	7,2	3,0	4,2	720	8,1	3,9	4,2	810	10,4	7,5	2,9	1040	13,0	12,0	1300,0	
241.14.25.032	25,0	12,5	32	80,3	8,8	3,7	5,1	707	9,9	4,8	5,1	795	12,8	9,3	3,5	1028	16,0	16,0	1284,8	
241.14.25.038	25,0	12,5	38	62,0	10,5	4,4	6,1	651	11,8	5,7	6,1	732	15,2	11,0	4,2	942	19,0	19,0	1178,0	
241.14.25.044	25,0	12,5	44	53,0	12,7	5,3	7,4	673	14,3	6,9	7,4	758	18,4	13,3	5,1	975	23,0	21,0	1219,0	
241.14.25.051	25,0	12,5	51	44,1	13,8	5,8	8,0	609	15,5	7,5	8,0	684	20,0	14,5	5,5	882	25,0	26,0	1102,5	
241.14.25.064	25,0	12,5	64	35,2	17,1	7,1	10,0	602	19,2	9,3	9,9	676	24,8	18,0	6,8	873	31,0	33,0	1091,2	
241.14.25.076	25,0	12,5	76	28,1	21,5	9,0	12,5	604	24,2	11,7	12,5	680	31,2	22,6	8,6	877	39,0	37,0	1095,9	
241.14.25.089	25,0	12,5	89	24,0	25,3	10,6	14,7	607	28,5	13,8	14,7	684	36,8	26,7	10,1	883	46,0	43,0	1104,0	
241.14.25.102	25,0	12,5	102	21,1	28,6	12,0	16,6	603	32,2	15,6	16,6	679	41,6	30,2	11,4	878	52,0	50,0	1097,2	
241.14.25.115	25,0	12,5	115	18,7	32,5	13,6	18,9	608	36,6	17,7	18,9	684	47,2	34,2	13,0	883	59,0	56,0	1103,3	
241.14.25.127	25,0	12,5	127	16,7	36,3	15,2	21,1	606	40,9	19,8	21,1	683	52,8	38,3	14,5	882	66,0	61,0	1102,2	
241.14.25.139	25,0	12,5	139	15,3	40,7	17,0	23,7	623	45,9	22,2	23,7	702	59,2	42,9	16,3	906	74,0	65,0	1132,2	
241.14.25.152	25,0	12,5	152	14,0	44,0	18,4	25,6	616	49,6	24,0	25,6	694	64,0	46,4	17,6	896	80,0	72,0	1120,0	
241.14.25.178	25,0	12,5	178	12,6	51,2	21,4	29,8	645	57,7	27,9	29,8	727	74,4	53,9	20,5	937	93,0	85,0	1171,8	
241.14.25.203	25,0	12,5	203	10,4	58,9	24,6	34,3	613	66,3	32,1	34,2	690	85,6	62,1	23,5	890	107,0	96,0	1112,8	
241.14.25.305	25,0	12,5	305	7,0	88,0	36,8	51,2	616	99,2	48,0	51,2	694	128,0	92,8	35,2	896	160,0	145,0	1120,0	

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

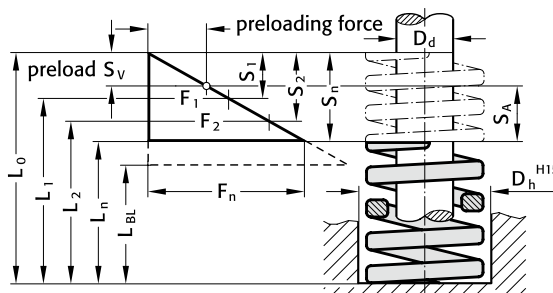


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.15.25.025	25,0	12,5	25	147,0	3,3	1,4	1,9	485	4,4	1,4	3,0	647	5,0	1,4	3,6	735	5,5	2,0	3,5	809
241.15.25.032	25,0	12,5	32	118,1	3,9	1,7	2,2	461	5,2	1,7	3,5	614	5,9	1,7	4,2	697	6,5	2,3	4,2	768
241.15.25.038	25,0	12,5	38	93,1	4,8	2,1	2,7	447	6,4	2,1	4,3	596	7,2	2,1	5,1	670	8,0	2,9	5,1	745
241.15.25.044	25,0	12,5	44	80,8	5,7	2,5	3,2	461	7,6	2,5	5,1	614	8,6	2,5	6,1	695	9,5	3,4	6,1	768
241.15.25.051	25,0	12,5	51	68,7	6,3	2,7	3,6	433	8,4	2,7	5,7	577	9,5	2,7	6,8	653	10,5	3,8	6,7	721
241.15.25.064	25,0	12,5	64	53,1	8,1	3,5	4,6	430	10,8	3,5	7,3	573	12,2	3,5	8,7	648	13,5	4,9	8,6	717
241.15.25.076	25,0	12,5	76	43,3	9,9	4,3	5,6	429	13,2	4,3	8,9	572	14,9	4,3	10,6	645	16,5	5,9	10,6	714
241.15.25.089	25,0	12,5	89	38,3	11,7	5,1	6,6	448	15,6	5,1	10,5	597	17,6	5,1	12,5	674	19,5	7,0	12,5	747
241.15.25.102	25,0	12,5	102	33,1	13,2	5,7	7,5	437	17,6	5,7	11,9	583	19,8	5,7	14,1	655	22,0	7,9	14,1	728
241.15.25.115	25,0	12,5	115	28,1	15,0	6,5	8,5	422	20,0	6,5	13,5	562	22,5	6,5	16,0	632	25,0	9,0	16,0	703
241.15.25.127	25,0	12,5	127	25,9	16,8	7,3	9,5	435	22,4	7,3	15,1	580	25,2	7,3	17,9	653	28,0	10,1	17,9	725
241.15.25.139	25,0	12,5	139	23,3	18,9	8,2	10,7	440	25,2	8,2	17,0	587	28,4	8,2	20,2	662	31,5	11,3	20,2	734
241.15.25.152	25,0	12,5	152	20,8	20,1	8,7	11,4	418	26,8	8,7	18,1	557	30,2	8,7	21,5	628	33,5	12,1	21,4	697
241.15.25.178	25,0	12,5	178	17,9	23,7	10,3	13,4	424	31,6	10,3	21,3	566	35,6	10,3	25,3	637	39,5	14,2	25,3	707
241.15.25.203	25,0	12,5	203	15,8	27,0	11,7	15,3	427	36,0	11,7	24,3	569	40,5	11,7	28,8	640	45,0	16,2	28,8	711
241.15.25.305	25,0	12,5	305	10,2	40,5	17,6	22,9	413	54,0	17,6	36,4	551	60,8	17,6	43,2	620	67,5	24,3	43,2	689

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.15.25.025	25,0	12,5	25	147,0	6,1	2,5	3,6	897	6,8	3,3	3,5	1000	8,8	6,4	2,4	1294	11,0	14,0	1617,0	
241.15.25.032	25,0	12,5	32	118,1	7,2	3,0	4,2	850	8,1	3,9	4,2	957	10,4	7,5	2,9	1228	13,0	19,0	1535,3	
241.15.25.038	25,0	12,5	38	93,1	8,8	3,7	5,1	819	9,9	4,8	5,1	922	12,8	9,3	3,5	1192	16,0	22,0	1489,6	
241.15.25.044	25,0	12,5	44	80,8	10,5	4,4	6,1	848	11,8	5,7	6,1	953	15,2	11,0	4,2	1228	19,0	25,0	1535,2	
241.15.25.051	25,0	12,5	51	68,7	11,6	4,8	6,8	797	13,0	6,3	6,7	893	16,8	12,2	4,6	1154	21,0	30,0	1442,7	
241.15.25.064	25,0	12,5	64	53,1	14,9	6,2	8,7	791	16,7	8,1	8,6	887	21,6	15,7	5,9	1147	27,0	37,0	1433,7	
241.15.25.076	25,0	12,5	76	43,3	18,2	7,6	10,6	788	20,5	9,9	10,6	888	26,4	19,1	7,3	1143	33,0	43,0	1428,9	
241.15.25.089	25,0	12,5	89	38,3	21,5	9,0	12,5	823	24,2	11,7	12,5	927	31,2	22,6	8,6	1195	39,0	50,0	1493,7	
241.15.25.102	25,0	12,5	102	33,1	24,2	10,1	14,1	801	27,3	13,2	14,1	904	35,2	25,5	9,7	1165	44,0	58,0	1456,4	
241.15.25.115	25,0	12,5	115	28,1	27,5	11,5	16,0	773	31,0	15,0	16,0	871	40,0	29,0	11,0	1124	50,0	65,0	1405,0	
241.15.25.127	25,0	12,5	127	25,9	30,8	12,9	17,9	798	34,7	16,8	17,9	899	44,8	32,5	12,3	1160	56,0	71,0	1450,4	
241.15.25.139	25,0	12,5	139	23,3	34,7	14,5	20,2	809	39,1	18,9	20,2	911	50,4	36,5	13,9	1174	63,0	76,0	1467,9	
241.15.25.152	25,0	12,5	152	20,8	36,9	15,4	21,5	768	41,5	20,1	21,4	863	53,6	38,9	14,7	1115	67,0	85,0	1393,6	
241.15.25.178	25,0	12,5	178	17,9	43,5	18,2	25,3	779	49,0	23,7	25,3	877	63,2	45,8	17,4	1131	79,0	99,0	1414,1	
241.15.25.203	25,0	12,5	203	15,8	49,5	20,7	28,8	782	55,8	27,0	28,8	882	72,0	52,2	19,8	1138	90,0	113,0	1422,0	
241.15.25.305	25,0	12,5	305	10,2	74,3	31,1	43,2	758	83,7	40,5	43,2	854	108,0	78,3	29,7	1102	135,0	170,0	1377,0	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

Order No	D_h	D_d	L_0	R	30% Stroke			40% Stroke			45% Stroke			50% Stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.16.25.025	25,0	12,5	25	375,7	2,7	1,2	1,5	1014	3,6	1,2	2,4	1353	4,1	1,2	2,9	1540
241.16.25.032	25,0	12,5	32	297,2	3,2	1,4	1,8	951	4,2	1,4	2,8	1248	4,7	1,4	3,3	1397
241.16.25.038	25,0	12,5	38	218,8	3,9	1,7	2,2	853	5,2	1,7	3,5	1138	5,9	1,7	4,2	1291
241.16.25.044	25,0	12,5	44	187,4	4,7	2,0	2,7	881	6,2	2,0	4,2	1162	7,0	2,0	5,0	1312
241.16.25.051	25,0	12,5	51	156,0	5,4	2,3	3,1	842	7,2	2,3	4,9	1123	8,1	2,3	5,8	1264
241.16.25.064	25,0	12,5	64	123,6	6,8	2,9	3,9	840	9,0	2,9	6,1	1112	10,1	2,9	7,2	1248
241.16.25.076	25,0	12,5	76	99,1	8,3	3,6	4,7	823	11,0	3,6	7,4	1090	12,4	3,6	8,8	1229
241.16.25.089	25,0	12,5	89	84,4	9,8	4,2	5,6	827	13,0	4,2	8,8	1097	14,6	4,2	10,4	1232
241.16.25.102	25,0	12,5	102	73,6	11,3	4,9	6,4	832	15,0	4,9	10,1	1104	16,9	4,9	12,0	1244
241.16.25.115	25,0	12,5	115	64,7	12,8	5,6	7,2	828	17,1	5,6	11,5	1106	19,2	5,6	13,6	1242
241.16.25.127	25,0	12,5	127	57,9	14,1	6,1	8,0	816	18,8	6,1	12,7	1089	21,2	6,1	15,1	1227
241.16.25.139	25,0	12,5	139	53,0	15,6	6,8	8,8	827	20,8	6,8	14,0	1102	23,4	6,8	16,6	1240
241.16.25.152	25,0	12,5	152	48,1	17,3	7,5	9,8	832	23,0	7,5	15,5	1106	25,9	7,5	18,4	1246
241.16.25.178	25,0	12,5	178	41,2	20,4	8,8	11,6	840	27,2	8,8	18,4	1121	30,6	8,8	21,8	1261
241.16.25.203	25,0	12,5	203	36,3	23,1	10,0	13,1	839	30,8	10,0	20,8	1118	34,7	10,0	24,7	1260
241.16.25.305	25,0	12,5	305	22,6	34,5	15,0	19,5	780	46,0	15,0	31,0	1040	51,8	15,0	36,8	1171

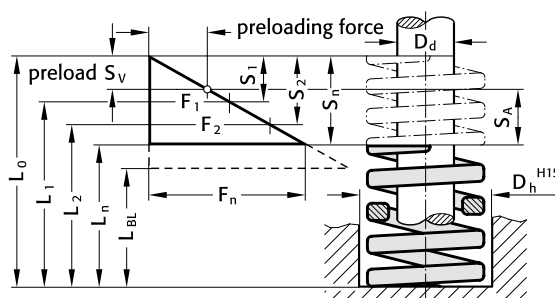
Order No	D_h	D_d	L_0	R	55% Stroke			62% Stroke			80% Stroke			100% Stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.16.25.025	25,0	12,5	25	375,7	5,0	2,1	2,9	1879	5,6	2,7	2,9	2104	7,2	5,2	2,0	2705
241.16.25.032	25,0	12,5	32	297,2	5,8	2,4	3,4	1724	6,5	3,2	3,3	1932	8,4	6,1	2,3	2496
241.16.25.038	25,0	12,5	38	218,8	7,2	3,0	4,2	1575	8,1	3,9	4,2	1772	10,4	7,5	2,9	2276
241.16.25.044	25,0	12,5	44	187,4	8,5	3,6	4,9	1593	9,6	4,7	4,9	1799	12,4	9,0	3,4	2324
241.16.25.051	25,0	12,5	51	156,0	9,9	4,1	5,8	1544	11,2	5,4	5,8	1747	14,4	10,4	4,0	2246
241.16.25.064	25,0	12,5	64	123,6	12,4	5,2	7,2	1533	14,0	6,8	7,2	1730	18,0	13,1	4,9	2225
241.16.25.076	25,0	12,5	76	99,1	15,1	6,3	8,8	1496	17,1	8,3	8,8	1695	22,0	16,0	6,0	2180
241.16.25.089	25,0	12,5	89	84,4	17,9	7,5	10,4	1511	20,2	9,8	10,4	1705	26,0	18,9	7,1	2194
241.16.25.102	25,0	12,5	102	73,6	20,6	8,6	12,0	1516	23,3	11,3	12,0	1715	30,0	21,8	8,2	2208
241.16.25.115	25,0	12,5	115	64,7	23,5	9,8	13,7	1520	26,5	12,8	13,7	1715	34,2	24,8	9,4	2213
241.16.25.127	25,0	12,5	127	57,9	25,9	10,8	15,1	1500	29,1	14,1	15,0	1685	37,6	27,3	10,3	2177
241.16.25.139	25,0	12,5	139	53,0	28,6	12,0	16,6	1516	32,2	15,6	16,6	1707	41,6	30,2	11,4	2205
241.16.25.152	25,0	12,5	152	48,1	31,6	13,2	18,4	1520	35,7	17,3	18,4	1717	46,0	33,4	12,6	2213
241.16.25.178	25,0	12,5	178	41,2	37,4	15,6	21,8	1541	42,2	20,4	21,8	1739	54,4	39,4	15,0	2241
241.16.25.203	25,0	12,5	203	36,3	42,4	17,7	24,7	1539	47,7	23,1	24,6	1732	61,6	44,7	16,9	2236
241.16.25.305	25,0	12,5	305	22,6	63,3	26,5	36,8	1431	71,3	34,5	36,8	1611	92,0	66,7	25,3	2079

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

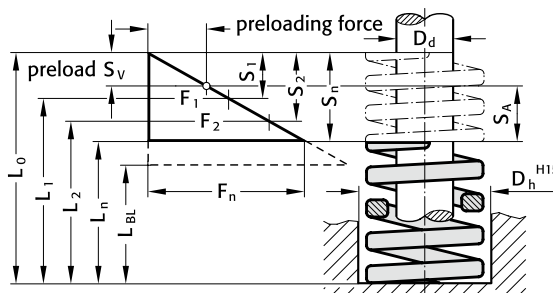


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D _h	D _d	L ₀	R	30% stroke			40% stroke			45% stroke			50% stroke						
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.17.25.032	25,0	12,5	32	375	3,0	1,3	1,7	1125	4,0	1,3	2,7	1500	4,5	1,3	3,2	1688	5,0	1,8	3,2	1875
241.17.25.038	25,0	12,5	38	346	3,6	1,6	2,0	1246	4,8	1,6	3,2	1661	5,4	1,6	3,8	1868	6,0	2,2	3,8	2076
241.17.25.044	25,0	12,5	44	244	4,2	1,8	2,4	1025	5,6	1,8	3,8	1366	6,3	1,8	4,5	1537	7,0	2,5	4,5	1708
241.17.25.051	25,0	12,5	51	208	4,8	2,1	2,7	998	6,4	2,1	4,3	1331	7,2	2,1	5,1	1498	8,0	2,9	5,1	1664
241.17.25.064	25,0	12,5	64	161	6,3	2,7	3,6	1014	8,4	2,7	5,7	1352	9,5	2,7	6,8	1530	10,5	3,8	6,7	1691
241.17.25.076	25,0	12,5	76	131	7,5	3,3	4,2	983	10,0	3,3	6,7	1310	11,3	3,3	8,0	1480	12,5	4,5	8,0	1638
241.17.25.089	25,0	12,5	89	111	8,7	3,8	4,9	966	11,6	3,8	7,8	1288	13,1	3,8	9,3	1454	14,5	5,2	9,3	1610
241.17.25.102	25,0	12,5	102	96,3	10,2	4,4	5,8	982	13,6	4,4	9,2	1310	15,3	4,4	10,9	1473	17,0	6,1	10,9	1637
241.17.25.115	25,0	12,5	115	85,7	11,7	5,1	6,6	1003	15,6	5,1	10,5	1337	17,6	5,1	12,5	1508	19,5	7,0	12,5	1671
241.17.25.127	25,0	12,5	127	76,3	12,9	5,6	7,3	984	17,2	5,6	11,6	1312	19,4	5,6	13,8	1480	21,5	7,7	13,8	1640
241.17.25.152	25,0	12,5	152	63,6	15,9	6,9	9,0	1011	21,2	6,9	14,3	1348	23,9	6,9	17,0	1520	26,5	9,5	17,0	1685
241.17.25.178	25,0	12,5	178	54,0	18,6	8,1	10,5	1004	24,8	8,1	16,7	1339	27,9	8,1	19,8	1507	31,0	11,2	19,8	1674
241.17.25.203	25,0	12,5	203	47,0	21,0	9,1	11,9	987	28,0	9,1	18,9	1316	31,5	9,1	22,4	1481	35,0	12,6	22,4	1645
241.17.25.305	25,0	12,5	305	30,9	32,4	14,0	18,4	1001	43,2	14,0	29,2	1335	48,6	14,0	34,6	1502	54,0	19,4	34,6	1669

Order No	D _h	D _d	L ₀	R	55% stroke				62% stroke				80% stroke				100% stroke			
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n	
241.17.25.032	25,0	12,5	32	375	5,5	2,3	3,2	2063	6,2	3,0	3,2	2325	8,0	5,8	2,2	3000	10,0	22,0	3750,0	
241.17.25.038	25,0	12,5	38	346	6,6	2,8	3,8	2284	7,4	3,6	3,8	2560	9,6	7,0	2,6	3322	12,0	26,0	4152,0	
241.17.25.044	25,0	12,5	44	244	7,7	3,2	4,5	1879	8,7	4,2	4,5	2123	11,2	8,1	3,1	2733	14,0	30,0	3416,0	
241.17.25.051	25,0	12,5	51	208	8,8	3,7	5,1	1830	9,9	4,8	5,1	2059	12,8	9,3	3,5	2662	16,0	35,0	3328,0	
241.17.25.064	25,0	12,5	64	161	11,6	4,8	6,8	1868	13,0	6,3	6,7	2093	16,8	12,2	4,6	2705	21,0	43,0	3381,0	
241.17.25.076	25,0	12,5	76	131	13,8	5,8	8,0	1808	15,5	7,5	8,0	2031	20,0	14,5	5,5	2620	25,0	51,0	3275,0	
241.17.25.089	25,0	12,5	89	111	16,0	6,7	9,3	1776	18,0	8,7	9,3	1998	23,2	16,8	6,4	2575	29,0	60,0	3219,0	
241.17.25.102	25,0	12,5	102	96,3	18,7	7,8	10,9	1801	21,1	10,2	10,9	2032	27,2	19,7	7,5	2619	34,0	68,0	3274,2	
241.17.25.115	25,0	12,5	115	85,7	21,5	9,0	12,5	1843	24,2	11,7	12,5	2074	31,2	22,6	8,6	2674	39,0	76,0	3342,3	
241.17.25.127	25,0	12,5	127	76,3	23,7	9,9	13,8	1808	26,7	12,9	13,8	2037	34,4	24,9	9,5	2625	43,0	84,0	3280,9	
241.17.25.152	25,0	12,5	152	63,6	29,2	12,2	17,0	1857	32,9	15,9	17,0	2092	42,4	30,7	11,7	2697	53,0	99,0	3370,8	
241.17.25.178	25,0	12,5	178	54,0	34,1	14,3	19,8	1841	38,4	18,6	19,8	2074	49,6	36,0	13,6	2678	62,0	116,0	3348,0	
241.17.25.203	25,0	12,5	203	47,0	38,5	16,1	22,4	1810	43,4	21,0	22,4	2040	56,0	40,6	15,4	2632	70,0	133,0	3290,0	
241.17.25.305	25,0	12,5	305	30,9	59,4	24,8	34,6	1835	67,0	32,4	34,6	2070	86,4	62,6	23,8	2670	108,0	197,0	3337,2	

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.14.32.038	32,0	16,0	38	94,1	5,7	2,5	3,2	536	7,6	2,5	5,1	715	8,6	2,5	6,1	809
241.14.32.044	32,0	16,0	44	79,6	6,6	2,9	3,7	525	8,8	2,9	5,9	700	9,9	2,9	7,0	788
241.14.32.051	32,0	16,0	51	67,0	7,5	3,3	4,2	503	10,0	3,3	6,7	670	11,3	3,3	8,0	757
241.14.32.064	32,0	16,0	64	53,0	9,6	4,2	5,4	509	12,8	4,2	8,6	678	14,4	4,2	10,2	763
241.14.32.076	32,0	16,0	76	44,1	11,7	5,1	6,6	516	15,6	5,1	10,5	688	17,6	5,1	12,5	776
241.14.32.089	32,0	16,0	89	37,2	13,5	5,9	7,6	502	18,0	5,9	12,1	670	20,3	5,9	14,4	755
241.14.32.102	32,0	16,0	102	32,0	15,6	6,8	8,8	499	20,8	6,8	14,0	666	23,4	6,8	16,6	749
241.14.32.115	32,0	16,0	115	29,0	17,4	7,5	9,9	505	23,2	7,5	15,7	673	26,1	7,5	18,6	757
241.14.32.127	32,0	16,0	127	25,0	19,5	8,5	11,0	488	26,0	8,5	17,5	650	29,3	8,5	20,8	733
241.14.32.139	32,0	16,0	139	23,1	21,6	9,4	12,2	499	28,8	9,4	19,4	665	32,4	9,4	23,0	748
241.14.32.152	32,0	16,0	152	21,5	23,4	10,1	13,3	503	31,2	10,1	21,1	671	35,1	10,1	25,0	755
241.14.32.178	32,0	16,0	178	18,3	26,4	11,4	15,0	483	35,2	11,4	23,8	644	39,6	11,4	28,2	725
241.14.32.203	32,0	16,0	203	15,8	31,2	13,5	17,7	493	41,6	13,5	28,1	657	46,8	13,5	33,3	739
241.14.32.254	32,0	16,0	254	12,6	39,0	16,9	22,1	491	52,0	16,9	35,1	655	58,5	16,9	41,6	737
241.14.32.305	32,0	16,0	305	10,3	46,5	20,2	26,3	479	62,0	20,2	41,8	639	69,8	20,2	49,6	719

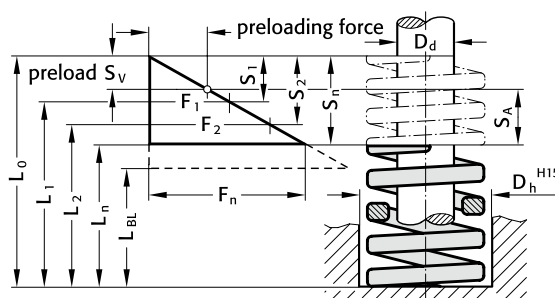
Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.14.32.038	32,0	16,0	38	94,1	10,5	4,4	6,1	988	11,8	5,7	6,1	1110	15,2	11,0	4,2	1430
241.14.32.044	32,0	16,0	44	79,6	12,1	5,1	7,0	963	13,6	6,6	7,0	1083	17,6	12,8	4,8	1401
241.14.32.051	32,0	16,0	51	67,0	13,8	5,8	8,0	925	15,5	7,5	8,0	1039	20,0	14,5	5,5	1340
241.14.32.064	32,0	16,0	64	53,0	17,6	7,4	10,2	933	19,8	9,6	10,2	1049	25,6	18,6	7,0	1357
241.14.32.076	32,0	16,0	76	44,1	21,5	9,0	12,5	948	24,2	11,7	12,5	1067	31,2	22,6	8,6	1376
241.14.32.089	32,0	16,0	89	37,2	24,8	10,4	14,4	923	27,9	13,5	14,4	1038	36,0	26,1	9,9	1339
241.14.32.102	32,0	16,0	102	32,0	28,6	12,0	16,6	915	32,2	15,6	16,6	1030	41,6	30,2	11,4	1331
241.14.32.115	32,0	16,0	115	29,0	31,9	13,3	18,6	925	36,0	17,4	18,6	1044	46,4	33,6	12,8	1346
241.14.32.127	32,0	16,0	127	25,0	35,8	15,0	20,8	895	40,3	19,5	20,8	1008	52,0	37,7	14,3	1300
241.14.32.139	32,0	16,0	139	23,1	39,6	16,6	23,0	915	44,6	21,6	23,0	1030	57,6	41,8	15,8	1331
241.14.32.152	32,0	16,0	152	21,5	42,9	17,9	25,0	922	48,4	23,4	25,0	1041	62,4	45,2	17,2	1342
241.14.32.178	32,0	16,0	178	18,3	48,4	20,2	28,2	886	54,6	26,4	28,2	999	70,4	51,0	19,4	1288
241.14.32.203	32,0	16,0	203	15,8	57,2	23,9	33,3	904	64,5	31,2	33,3	1019	83,2	60,3	22,9	1315
241.14.32.254	32,0	16,0	254	12,6	71,5	29,9	41,6	901	80,6	39,0	41,6	1016	104,0	75,4	28,6	1310
241.14.32.305	32,0	16,0	305	10,3	85,3	35,7	49,6	879	96,1	46,5	49,6	990	124,0	89,9	34,1	1277

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

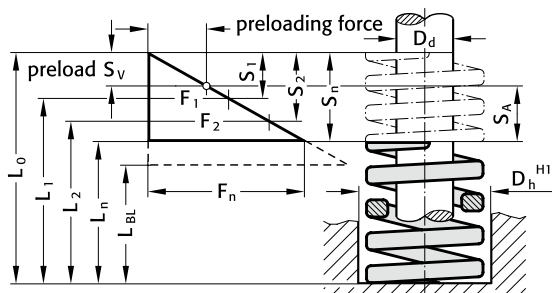


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.15.32.038	32,0	16,0	38	185,1	4,8	2,1	2,7	888	6,4	2,1	4,3	1185	7,2	2,1	5,1	1333	8,0	2,9	5,1	1481
241.15.32.044	32,0	16,0	44	158,1	5,7	2,5	3,2	901	7,6	2,5	5,1	1202	8,6	2,5	6,1	1360	9,5	3,4	6,1	1502
241.15.32.051	32,0	16,0	51	134,1	6,3	2,7	3,6	845	8,4	2,7	5,7	1126	9,5	2,7	6,8	1274	10,5	3,8	6,7	1408
241.15.32.064	32,0	16,0	64	99,1	8,1	3,5	4,6	803	10,8	3,5	7,3	1070	12,2	3,5	8,7	1209	13,5	4,9	8,6	1338
241.15.32.076	32,0	16,0	76	80,5	9,6	4,2	5,4	773	12,8	4,2	8,6	1030	14,4	4,2	10,2	1159	16,0	5,8	10,2	1288
241.15.32.089	32,0	16,0	89	69,2	11,1	4,8	6,3	768	14,8	4,8	10,0	1024	16,7	4,8	11,9	1156	18,5	6,7	11,8	1280
241.15.32.102	32,0	16,0	102	58,9	12,9	5,6	7,3	760	17,2	5,6	11,6	1013	19,4	5,6	13,8	1143	21,5	7,7	13,8	1266
241.15.32.115	32,0	16,0	115	51,5	14,7	6,4	8,3	757	19,6	6,4	13,2	1009	22,1	6,4	15,7	1138	24,5	8,8	15,7	1262
241.15.32.127	32,0	16,0	127	44,8	16,5	7,2	9,3	739	22,0	7,2	14,8	986	24,8	7,2	17,6	1111	27,5	9,9	17,6	1232
241.15.32.139	32,0	16,0	139	42,3	18,0	7,8	10,2	761	24,0	7,8	16,2	1015	27,0	7,8	19,2	1142	30,0	10,8	19,2	1269
241.15.32.152	32,0	16,0	152	37,9	19,8	8,6	11,2	750	26,4	8,6	17,8	1001	29,7	8,6	21,1	1126	33,0	11,9	21,1	1251
241.15.32.178	32,0	16,0	178	32,6	23,1	10,0	13,1	753	30,8	10,0	20,8	1004	34,7	10,0	24,7	1131	38,5	13,9	24,6	1255
241.15.32.203	32,0	16,0	203	28,9	26,4	11,4	15,0	763	35,2	11,4	23,8	1017	39,6	11,4	28,2	1144	44,0	15,8	28,2	1272
241.15.32.254	32,0	16,0	254	21,4	33,0	14,3	18,7	706	44,0	14,3	29,7	942	49,5	14,3	35,2	1059	55,0	19,8	35,2	1177
241.15.32.305	32,0	16,0	305	18,3	39,9	17,3	22,6	730	53,2	17,3	35,9	974	59,9	17,3	42,6	1096	66,5	23,9	42,6	1217

Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke					
					S_5	S_{V5}	S_{A5}	F_5	S_6	S_{V6}	S_{A6}	F_6	S_7	S_{V7}	S_{A7}	F_7	S_n	L_n	F_n
241.15.32.038	32,0	16,0	38	185,1	8,8	3,7	5,1	1629	9,9	4,8	5,1	1832	12,8	9,3	3,5	2369	16,0	22,0	2961,6
241.15.32.044	32,0	16,0	44	158,1	10,5	4,4	6,1	1660	11,8	5,7	6,1	1866	15,2	11,0	4,2	2403	19,0	25,0	3003,9
241.15.32.051	32,0	16,0	51	134,1	11,6	4,8	6,8	1556	13,0	6,3	6,7	1743	16,8	12,2	4,6	2253	21,0	30,0	2816,1
241.15.32.064	32,0	16,0	64	99,1	14,9	6,2	8,7	1477	16,7	8,1	8,6	1655	21,6	15,7	5,9	2141	27,0	37,0	2675,7
241.15.32.076	32,0	16,0	76	80,5	17,6	7,4	10,2	1417	19,8	9,6	10,2	1594	25,6	18,6	7,0	2061	32,0	44,0	2576,0
241.15.32.089	32,0	16,0	89	69,2	20,4	8,5	11,9	1412	22,9	11,1	11,8	1585	29,6	21,5	8,1	2048	37,0	52,0	2560,4
241.15.32.102	32,0	16,0	102	58,9	23,7	9,9	13,8	1396	26,7	12,9	13,8	1573	34,4	24,9	9,5	2026	43,0	59,0	2532,7
241.15.32.115	32,0	16,0	115	51,5	27,0	11,3	15,7	1391	30,4	14,7	15,7	1566	39,2	28,4	10,8	2019	49,0	66,0	2523,5
241.15.32.127	32,0	16,0	127	44,8	30,3	12,7	17,6	1357	34,1	16,5	17,6	1528	44,0	31,9	12,1	1971	55,0	72,0	2464,0
241.15.32.139	32,0	16,0	139	42,3	33,0	13,8	19,2	1396	37,2	18,0	19,2	1574	48,0	34,8	13,2	2030	60,0	79,0	2538,0
241.15.32.152	32,0	16,0	152	37,9	36,3	15,2	21,1	1376	40,9	19,8	21,1	1550	52,8	38,3	14,5	2001	66,0	86,0	2501,4
241.15.32.178	32,0	16,0	178	32,6	42,4	17,7	24,7	1382	47,7	23,1	24,6	1555	61,6	44,7	16,9	2008	77,0	101,0	2510,2
241.15.32.203	32,0	16,0	203	28,9	48,4	20,2	28,2	1399	54,6	26,4	28,2	1578	70,4	51,0	19,4	2035	88,0	115,0	2543,2
241.15.32.254	32,0	16,0	254	21,4	60,5	25,3	35,2	1295	68,2	33,0	35,2	1459	88,0	63,8	24,2	1883	110,0	144,0	2354,0
241.15.32.305	32,0	16,0	305	18,3	73,2	30,6	42,6	1340	82,5	39,9	42,6	1510	106,4	77,1	29,3	1947	133,0	172,0	2433,9

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

Order No	D_h	D_d	L_0	R	30% Stroke			40% Stroke			45% Stroke			50% Stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.16.32.038	32,0	16,0	38	388,5	3,6	1,6	2,0	1399	4,8	1,6	3,2	1865	5,4	1,6	3,8	2098
241.16.32.044	32,0	16,0	44	324,7	4,2	1,8	2,4	1364	5,6	1,8	3,8	1818	6,3	1,8	4,5	2046
241.16.32.051	32,0	16,0	51	271,7	5,0	2,1	2,9	1359	6,6	2,1	4,5	1793	7,4	2,1	5,3	2011
241.16.32.064	32,0	16,0	64	211,9	6,5	2,8	3,7	1377	8,6	2,8	5,8	1822	9,7	2,8	6,9	2055
241.16.32.076	32,0	16,0	76	171,7	7,8	3,4	4,4	1339	10,4	3,4	7,0	1786	11,7	3,4	8,3	2009
241.16.32.089	32,0	16,0	89	141,3	9,2	4,0	5,2	1300	12,2	4,0	8,2	1724	13,7	4,0	9,7	1936
241.16.32.102	32,0	16,0	102	121,6	10,7	4,6	6,1	1301	14,2	4,6	9,6	1727	16,0	4,6	11,4	1946
241.16.32.115	32,0	16,0	115	106,9	12,2	5,3	6,9	1304	16,2	5,3	10,9	1732	18,2	5,3	12,9	1946
241.16.32.127	32,0	16,0	127	93,2	13,5	5,9	7,6	1258	18,0	5,9	12,1	1678	20,3	5,9	14,4	1892
241.16.32.139	32,0	16,0	139	86,3	15,0	6,5	8,5	1295	20,0	6,5	13,5	1726	22,5	6,5	16,0	1942
241.16.32.152	32,0	16,0	152	78,5	16,2	7,0	9,2	1272	21,6	7,0	14,6	1696	24,3	7,0	17,3	1908
241.16.32.178	32,0	16,0	178	67,7	18,9	8,2	10,7	1280	25,2	8,2	17,0	1706	28,4	8,2	20,2	1923
241.16.32.203	32,0	16,0	203	58,9	21,6	9,4	12,2	1272	28,8	9,4	19,4	1696	32,4	9,4	23,0	1908
241.16.32.254	32,0	16,0	254	46,1	27,6	12,0	15,6	1272	36,8	12,0	24,8	1696	41,4	12,0	29,4	1909
241.16.32.305	32,0	16,0	305	38,3	33,0	14,3	18,7	1264	44,0	14,3	29,7	1685	49,5	14,3	35,2	1896

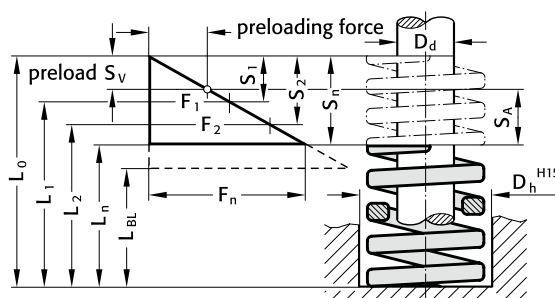
Order No	D_h	D_d	L_0	R	55% Stroke			62% Stroke			80% Stroke			100% Stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.16.32.038	32,0	16,0	38	388,5	6,6	2,8	3,8	2564	7,4	3,6	3,8	2875	9,6	7,0	2,6	3730
241.16.32.044	32,0	16,0	44	324,7	7,7	3,2	4,5	2500	8,7	4,2	4,5	2825	11,2	8,1	3,1	3637
241.16.32.051	32,0	16,0	51	271,7	9,1	3,8	5,3	2472	10,2	5,0	5,2	2771	13,2	9,6	3,6	3586
241.16.32.064	32,0	16,0	64	211,9	11,8	4,9	6,9	2500	13,3	6,5	6,8	2818	17,2	12,5	4,7	3645
241.16.32.076	32,0	16,0	76	171,7	14,3	6,0	8,3	2455	16,1	7,8	8,3	2764	20,8	15,1	5,7	3571
241.16.32.089	32,0	16,0	89	141,3	16,8	7,0	9,8	2374	18,9	9,2	9,7	2671	24,4	17,7	6,7	3448
241.16.32.102	32,0	16,0	102	121,6	19,5	8,2	11,3	2371	22,0	10,7	11,3	2675	28,4	20,6	7,8	3453
241.16.32.115	32,0	16,0	115	106,9	22,3	9,3	13,0	2384	25,1	12,2	12,9	2683	32,4	23,5	8,9	3464
241.16.32.127	32,0	16,0	127	93,2	24,8	10,4	14,4	2311	27,9	13,5	14,4	2600	36,0	26,1	9,9	3355
241.16.32.139	32,0	16,0	139	86,3	27,5	11,5	16,0	2373	31,0	15,0	16,0	2675	40,0	29,0	11,0	3452
241.16.32.152	32,0	16,0	152	78,5	29,7	12,4	17,3	2331	33,5	16,2	17,3	2630	43,2	31,3	11,9	3391
241.16.32.178	32,0	16,0	178	67,7	34,7	14,5	20,2	2349	39,1	18,9	20,2	2647	50,4	36,5	13,9	3412
241.16.32.203	32,0	16,0	203	58,9	39,6	16,6	23,0	2332	44,6	21,6	23,0	2627	57,6	41,8	15,8	3393
241.16.32.254	32,0	16,0	254	46,1	50,6	21,2	29,4	2333	57,0	27,6	29,4	2628	73,6	53,4	20,2	3393
241.16.32.305	32,0	16,0	305	38,3	60,5	25,3	35,2	2317	68,2	33,0	35,2	2612	88,0	63,8	24,2	3370

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

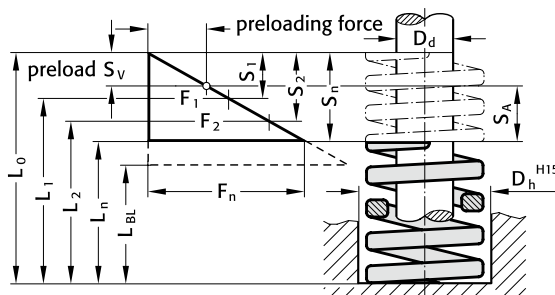


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.17.32.038	32,0	16,0	38	529	3,3	1,4	1,9	1746	4,4	1,4	3,0	2328	5,0	1,4	3,6	2645	5,5	2,0	3,5	2910
241.17.32.044	32,0	16,0	44	425	3,9	1,7	2,2	1958	5,2	1,7	3,5	2210	5,9	1,7	4,2	2508	6,5	2,3	4,2	2763
241.17.32.051	32,0	16,0	51	353	4,5	2,0	2,5	1589	6,0	2,0	4,0	2118	6,8	2,0	4,8	2400	7,5	2,7	4,8	2648
241.17.32.064	32,0	16,0	64	269	6,0	2,6	3,4	1614	8,0	2,6	5,4	2152	9,0	2,6	6,4	2421	10,0	3,6	6,4	2690
241.17.32.076	32,0	16,0	76	219	7,2	3,1	4,1	1577	9,6	3,1	6,5	2102	10,8	3,1	7,7	2365	12,0	4,3	7,7	2628
241.17.32.089	32,0	16,0	89	180	8,7	3,8	4,9	1566	11,6	3,8	7,8	2088	13,1	3,8	9,3	2358	14,5	5,2	9,3	2610
241.17.32.102	32,0	16,0	102	155	9,9	4,3	5,6	1535	13,2	4,3	8,9	2046	14,9	4,3	10,6	2310	16,5	5,9	10,6	2558
241.17.32.115	32,0	16,0	115	140	10,8	4,7	6,1	1512	14,4	4,7	9,7	2016	16,2	4,7	11,5	2268	18,0	6,5	11,5	2520
241.17.32.127	32,0	16,0	127	124	12,3	5,3	7,0	1525	16,4	5,3	11,1	2034	18,5	5,3	13,2	2294	20,5	7,4	13,1	2542
241.17.32.152	32,0	16,0	152	102	15,0	6,5	8,5	1530	20,0	6,5	13,5	2040	22,5	6,5	16,0	2295	25,0	9,0	16,0	2550
241.17.32.178	32,0	16,0	178	88,3	17,7	7,7	10,0	1563	23,6	7,8	15,9	2084	26,6	7,7	18,9	2349	29,5	10,6	18,9	2605
241.17.32.203	32,0	16,0	203	76,0	20,4	8,8	11,6	1550	27,2	8,8	18,4	2067	30,6	8,8	21,8	2326	34,0	12,2	21,8	2584
241.17.32.254	32,0	16,0	254	60,8	25,5	11,1	14,4	1550	34,0	11,1	22,9	2067	38,3	11,1	27,2	2329	42,5	15,3	27,2	2584
241.17.32.305	32,0	16,0	305	49,1	30,9	13,4	17,5	1517	41,2	13,4	27,8	2023	46,4	13,4	33,0	2278	51,5	18,5	33,0	2529

Order No	D _h	D _d	L ₀	R	55% stroke			62% stroke			80% stroke			100% stroke					
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n
241.17.32.038	32,0	16,0	38	529	6,1	2,5	3,6	3227	6,8	3,3	3,5	3597	8,8	6,4	2,4	4655	11,0	27,0	5819,0
241.17.32.044	32,0	16,0	44	425	7,2	3,0	4,2	3060	8,1	3,9	4,2	3443	10,4	7,5	2,9	4420	13,0	31,0	5525,0
241.17.32.051	32,0	16,0	51	353	8,3	3,5	4,8	2930	9,3	4,5	4,8	3283	12,0	8,7	3,3	4236	15,0	36,0	5295,0
241.17.32.064	32,0	16,0	64	269	11,0	4,6	6,4	2959	12,4	6,0	6,4	3336	16,0	11,6	4,4	4304	20,0	44,0	5380,0
241.17.32.076	32,0	16,0	76	219	13,2	5,5	7,7	2891	14,9	7,2	7,7	3263	19,2	13,9	5,3	4205	24,0	52,0	5256,0
241.17.32.089	32,0	16,0	89	180	16,0	6,7	9,3	2880	18,0	8,7	9,3	3240	23,2	16,8	6,4	4176	29,0	60,0	5220,0
241.17.32.102	32,0	16,0	102	155	18,2	7,6	10,6	2821	20,5	9,9	10,6	3178	26,4	19,1	7,3	4092	33,0	69,0	5115,0
241.17.32.115	32,0	16,0	115	140	19,8	8,3	11,5	2772	22,3	10,8	11,5	3122	28,8	20,9	7,9	4032	36,0	79,0	5040,0
241.17.32.127	32,0	16,0	127	124	22,6	9,4	13,2	2802	25,4	12,3	13,1	3150	32,8	23,8	9,0	4067	41,0	86,0	5084,0
241.17.32.152	32,0	16,0	152	102	27,5	11,5	16,0	2805	31,0	15,0	16,0	3162	40,0	29,0	11,0	4080	50,0	102,0	5100,0
241.17.32.178	32,0	16,0	178	88,3	32,5	13,6	18,9	2870	36,6	17,7	18,9	3232	47,2	34,2	13,0	4168	59,0	119,0	5209,7
241.17.32.203	32,0	16,0	203	76,0	37,4	15,6	21,8	2842	42,2	20,4	21,8	3207	54,4	39,4	15,0	4134	68,0	135,0	5168,0
241.17.32.254	32,0	16,0	254	60,8	46,8	19,6	27,2	2845	52,7	25,5	27,2	3204	68,0	49,3	18,7	4134	85,0	169,0	5168,0
241.17.32.305	32,0	16,0	305	49,1	56,7	23,7	33,0	2784	63,9	30,9	33,0	3137	82,4	59,7	22,7	4046	103,0	202,0	5057,3

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.14.40.051	40,0	20,0	51	92,0	7,5	3,3	4,2	690	10,0	3,3	6,7	920	11,3	3,3	8,0	1040
241.14.40.064	40,0	20,0	64	73,1	9,6	4,2	5,4	702	12,8	4,2	8,6	936	14,4	4,2	10,2	1053
241.14.40.076	40,0	20,0	76	63,1	11,4	4,9	6,5	719	15,2	4,9	10,3	959	17,1	4,9	12,2	1079
241.14.40.089	40,0	20,0	89	51,0	13,5	5,9	7,6	689	18,0	5,9	12,1	918	20,3	5,9	14,4	1035
241.14.40.102	40,0	20,0	102	43,1	15,3	6,6	8,7	659	20,4	6,6	13,8	879	23,0	6,6	16,4	991
241.14.40.115	40,0	20,0	115	39,6	17,4	7,5	9,9	689	23,2	7,5	15,7	919	26,1	7,5	18,6	1034
241.14.40.127	40,0	20,0	127	37,0	19,5	8,5	11,0	722	26,0	8,5	17,5	962	29,3	8,5	20,8	1084
241.14.40.139	40,0	20,0	139	32,0	21,3	9,2	12,1	682	28,4	9,2	19,2	909	32,0	9,2	22,8	1024
241.14.40.152	40,0	20,0	152	28,1	23,4	10,1	13,3	658	31,2	10,1	21,1	877	35,1	10,1	25,0	986
241.14.40.178	40,0	20,0	178	25,2	27,6	12,0	15,6	696	36,8	12,0	24,8	927	41,4	12,0	29,4	1043
241.14.40.203	40,0	20,0	203	22,7	31,5	13,7	17,8	715	42,0	13,7	28,3	953	47,3	13,7	33,6	1074
241.14.40.254	40,0	20,0	254	17,0	39,3	17,0	22,3	668	52,4	17,0	35,4	891	59,0	17,0	42,0	1003
241.14.40.305	40,0	20,0	305	14,8	47,1	20,4	26,7	697	62,8	20,4	42,4	929	70,7	20,4	50,3	1046

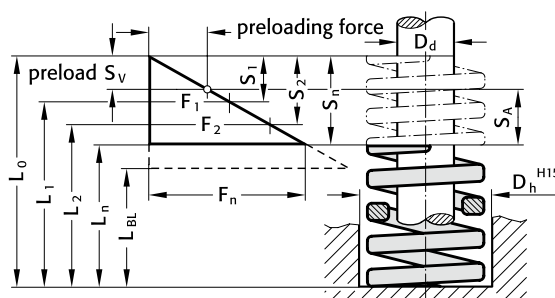
Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.14.40.051	40,0	20,0	51	92,0	13,8	5,8	8,0	1270	15,5	7,5	8,0	1426	20,0	14,5	5,5	1840
241.14.40.064	40,0	20,0	64	73,1	17,6	7,4	10,2	1287	19,8	9,6	10,2	1447	25,6	18,6	7,0	1871
241.14.40.076	40,0	20,0	76	63,1	20,9	8,7	12,2	1319	23,6	11,4	12,2	1489	30,4	22,0	8,4	1918
241.14.40.089	40,0	20,0	89	51,0	24,8	10,4	14,4	1265	27,9	13,5	14,4	1423	36,0	26,1	9,9	1836
241.14.40.102	40,0	20,0	102	43,1	28,1	11,7	16,4	1211	31,6	15,3	16,3	1362	40,8	29,6	11,2	1758
241.14.40.115	40,0	20,0	115	39,6	31,9	13,3	18,6	1263	36,0	17,4	18,6	1426	46,4	33,6	12,8	1837
241.14.40.127	40,0	20,0	127	37,0	35,8	15,0	20,8	1325	40,3	19,5	20,8	1491	52,0	37,7	14,3	1924
241.14.40.139	40,0	20,0	139	32,0	39,1	16,3	22,8	1251	44,0	21,3	22,7	1408	56,8	41,2	15,6	1818
241.14.40.152	40,0	20,0	152	28,1	42,9	17,9	25,0	1205	48,4	23,4	25,0	1360	62,4	45,2	17,2	1753
241.14.40.178	40,0	20,0	178	25,2	50,6	21,2	29,4	1275	57,0	27,6	29,4	1436	73,6	53,4	20,2	1855
241.14.40.203	40,0	20,0	203	22,7	57,8	24,2	33,6	1312	65,1	31,5	33,6	1478	84,0	60,9	23,1	1907
241.14.40.254	40,0	20,0	254	17,0	72,1	30,1	42,0	1226	81,2	39,3	41,9	1380	104,8	76,0	28,8	1782
241.14.40.305	40,0	20,0	305	14,8	86,4	36,1	50,3	1279	97,3	47,1	50,2	1440	125,6	91,1	34,5	1859

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

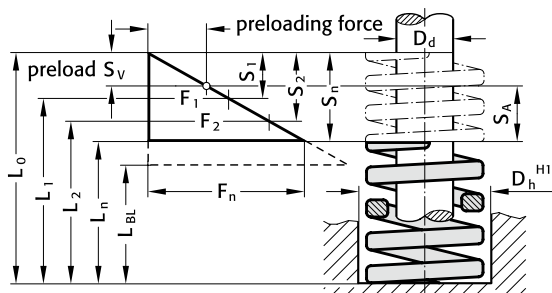


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3
241.15.40.051	40,0	20,0	51	179,0	6,3	2,7	3,6	1128	8,4	2,7	5,7	1504	9,5	2,7	6,8	1701
241.15.40.064	40,0	20,0	64	140,0	7,8	3,4	4,4	1092	10,4	3,4	7,0	1456	11,7	3,4	8,3	1638
241.15.40.076	40,0	20,0	76	108,1	9,6	4,2	5,4	1038	12,8	4,2	8,6	1384	14,4	4,2	10,2	1557
241.15.40.089	40,0	20,0	89	90,7	11,1	4,8	6,3	1007	14,8	4,8	10,0	1342	16,7	4,8	11,9	1515
241.15.40.102	40,0	20,0	102	81,0	12,9	5,6	7,3	1045	17,2	5,6	11,6	1393	19,4	5,6	13,8	1571
241.15.40.115	40,0	20,0	115	71,8	14,4	6,2	8,2	1034	19,2	6,2	13,0	1379	21,6	6,2	15,4	1551
241.15.40.127	40,0	20,0	127	62,8	16,2	7,0	9,2	1017	21,6	7,0	14,6	1356	24,3	7,0	17,3	1526
241.15.40.139	40,0	20,0	139	57,6	17,7	7,7	10,0	1020	23,6	7,7	15,9	1359	26,6	7,7	18,9	1532
241.15.40.152	40,0	20,0	152	51,6	19,5	8,5	11,0	1006	26,0	8,5	17,5	1342	29,3	8,5	20,8	1512
241.15.40.178	40,0	20,0	178	44,2	22,8	9,9	12,9	1008	30,4	9,9	20,5	1344	34,2	9,9	24,3	1512
241.15.40.203	40,0	20,0	203	36,7	26,1	11,3	14,8	958	34,8	11,3	23,5	1277	39,2	11,3	27,9	1439
241.15.40.254	40,0	20,0	254	30,1	33,0	14,3	18,7	993	44,0	14,3	29,7	1324	49,5	14,3	35,2	1490
241.15.40.305	40,0	20,0	305	24,6	39,3	17,0	22,3	967	52,4	17,0	35,4	1289	59,0	17,0	42,0	1451

Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{V5}	S_{A5}	F_5	S_6	S_{V6}	S_{A6}	F_6	S_7	S_{V7}	S_{A7}	F_7
241.15.40.051	40,0	20,0	51	179,0	11,6	4,8	6,8	2076	13,0	6,3	6,7	2327	16,8	12,2	4,6	3007
241.15.40.064	40,0	20,0	64	140,0	14,3	6,0	8,3	2002	16,1	7,8	8,3	2254	20,8	15,1	5,7	2912
241.15.40.076	40,0	20,0	76	108,1	17,6	7,4	10,2	1903	19,8	9,6	10,2	2140	25,6	18,6	7,0	2767
241.15.40.089	40,0	20,0	89	90,7	20,4	8,5	11,9	1850	22,9	11,1	11,8	2077	29,6	21,5	8,1	2685
241.15.40.102	40,0	20,0	102	81,0	23,7	9,9	13,8	1920	26,7	12,9	13,8	2163	34,4	24,9	9,5	2786
241.15.40.115	40,0	20,0	115	71,8	26,4	11,0	15,4	1896	29,8	14,4	15,4	2140	38,4	27,8	10,6	2757
241.15.40.127	40,0	20,0	127	62,8	29,7	12,4	17,3	1865	33,5	16,2	17,3	2104	43,2	31,3	11,9	2713
241.15.40.139	40,0	20,0	139	57,6	32,5	13,6	18,9	1872	36,6	17,7	18,9	2108	47,2	34,2	13,0	2719
241.15.40.152	40,0	20,0	152	51,6	35,8	15,0	20,8	1847	40,3	19,5	20,8	2079	52,0	37,7	14,3	2683
241.15.40.178	40,0	20,0	178	44,2	41,8	17,5	24,3	1848	47,1	22,8	24,3	2082	60,8	44,1	16,7	2687
241.15.40.203	40,0	20,0	203	36,7	47,9	20,0	27,9	1758	53,9	26,1	27,8	1978	69,6	50,5	19,1	2554
241.15.40.254	40,0	20,0	254	30,1	60,5	25,3	35,2	1821	68,2	33,0	35,2	2053	88,0	63,8	24,2	2649
241.15.40.305	40,0	20,0	305	24,6	72,1	30,1	42,0	1774	81,2	39,3	41,9	1998	104,8	76,0	28,8	2578

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

Order No	D_h	D_d	L_0	R	30% Stroke			40% Stroke			45% Stroke			50% Stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.16.40.051	40,0	20,0	51	350,2	5,1	2,2	2,9	1786	6,8	2,2	4,6	2381	7,7	2,2	5,5	2697
241.16.40.064	40,0	20,0	64	268,8	6,6	2,9	3,7	1774	8,8	2,9	5,9	2365	9,9	2,9	7,0	2661
241.16.40.076	40,0	20,0	76	218,8	8,1	3,5	4,6	1772	10,8	3,5	7,3	2363	12,2	3,5	8,7	2669
241.16.40.089	40,0	20,0	89	190,3	9,6	4,2	5,4	1827	12,8	4,2	8,6	2436	14,4	4,2	10,2	2740
241.16.40.102	40,0	20,0	102	162,8	11,1	4,8	6,3	1807	14,8	4,8	10,0	2409	16,7	4,8	11,9	2719
241.16.40.115	40,0	20,0	115	142,2	12,6	5,5	7,1	1792	16,8	5,5	11,3	2389	18,9	5,5	13,4	2688
241.16.40.127	40,0	20,0	127	128,5	14,1	6,1	8,0	1812	18,8	6,1	12,7	2416	21,2	6,1	15,1	2724
241.16.40.139	40,0	20,0	139	114,8	15,6	6,8	8,8	1791	20,8	6,8	14,0	2388	23,4	6,8	16,6	2686
241.16.40.152	40,0	20,0	152	105,0	17,3	7,5	9,8	1817	23,0	7,5	15,5	2415	25,9	7,5	18,4	2720
241.16.40.178	40,0	20,0	178	89,3	20,1	8,7	11,4	1795	26,8	8,7	18,1	2393	30,2	8,7	21,5	2697
241.16.40.203	40,0	20,0	203	77,5	22,8	9,9	12,9	1767	30,4	9,9	20,5	2356	34,2	9,9	24,3	2651
241.16.40.254	40,0	20,0	254	60,8	29,1	12,6	16,5	1769	38,8	12,6	26,2	2359	43,7	12,6	31,1	2657
241.16.40.305	40,0	20,0	305	51,0	34,8	15,1	19,7	1775	46,4	15,1	31,3	2366	52,2	15,1	37,1	2662

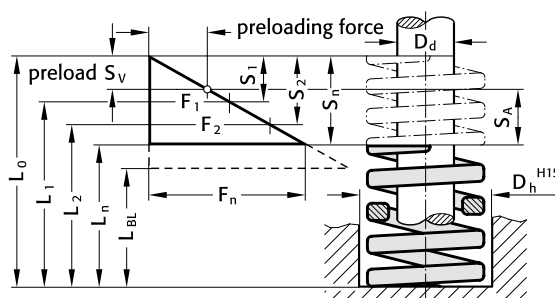
Order No	D_h	D_d	L_0	R	55% Stroke			62% Stroke			80% Stroke			100% Stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.16.40.051	40,0	20,0	51	350,2	9,4	3,9	5,5	3292	10,5	5,1	5,4	3677	13,6	9,9	3,7	4763
241.16.40.064	40,0	20,0	64	268,8	12,1	5,1	7,0	3252	13,6	6,6	7,0	3656	17,6	12,8	4,8	4731
241.16.40.076	40,0	20,0	76	218,8	14,9	6,2	8,7	3260	16,7	8,1	8,6	3654	21,6	15,7	5,9	4726
241.16.40.089	40,0	20,0	89	190,3	17,6	7,4	10,2	3349	19,8	9,6	10,2	3768	25,6	18,6	7,0	4872
241.16.40.102	40,0	20,0	102	162,8	20,4	8,5	11,9	3321	22,9	11,1	11,8	3728	29,6	21,5	8,1	4819
241.16.40.115	40,0	20,0	115	142,2	23,1	9,7	13,4	3285	26,0	12,6	13,4	3697	33,6	24,4	9,2	4778
241.16.40.127	40,0	20,0	127	128,5	25,9	10,8	15,1	3328	29,1	14,1	15,0	3739	37,6	27,3	10,3	4832
241.16.40.139	40,0	20,0	139	114,8	28,6	12,0	16,6	3283	32,2	15,6	16,6	3697	41,6	30,2	11,4	4776
241.16.40.152	40,0	20,0	152	105,0	31,6	13,2	18,4	3318	35,7	17,3	18,4	3749	46,0	33,4	12,6	4830
241.16.40.178	40,0	20,0	178	89,3	36,9	15,4	21,5	3295	41,5	20,1	21,4	3706	53,6	38,9	14,7	4786
241.16.40.203	40,0	20,0	203	77,5	41,8	17,5	24,3	3240	47,1	22,8	24,3	3650	60,8	44,1	16,7	4712
241.16.40.254	40,0	20,0	254	60,8	53,4	22,3	31,1	3247	60,1	29,1	31,0	3654	77,6	56,3	21,3	4718
241.16.40.305	40,0	20,0	305	51,0	63,8	26,7	37,1	3254	71,9	34,8	37,1	3667	92,8	67,3	25,5	4733

High Performance Compression Springs DIN ISO 10243



FIBRO

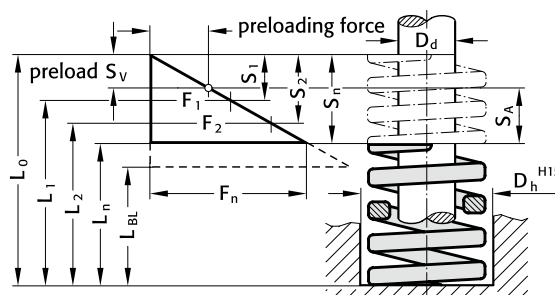
- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)



241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3
241.17.40.051	40,0	20,0	51	628	4,5	2,0	2,5	2826	6,0	2,0	4,0	3768	6,8	2,0	4,8	4270
241.17.40.064	40,0	20,0	64	488	5,7	2,5	3,2	2782	7,6	2,5	5,1	3709	8,6	2,5	6,1	4197
241.17.40.076	40,0	20,0	76	379	7,2	3,1	4,1	2729	9,6	3,1	6,5	3638	10,8	3,1	7,7	4093
241.17.40.089	40,0	20,0	89	321	8,4	3,6	4,8	2696	11,2	3,6	7,6	3595	12,6	3,6	9,0	4045
241.17.40.102	40,0	20,0	102	281	9,9	4,3	5,6	2782	13,2	4,3	8,9	3709	14,9	4,3	10,6	4187
241.17.40.115	40,0	20,0	115	245	11,1	4,8	6,3	2720	14,8	4,8	10,0	3626	16,7	4,8	11,9	4092
241.17.40.127	40,0	20,0	127	221	12,3	5,3	7,0	2718	16,4	5,3	11,1	3624	18,5	5,3	13,2	4089
241.17.40.152	40,0	20,0	152	168	15,0	6,5	8,5	2520	20,0	6,5	13,5	3360	22,5	6,5	16,0	3780
241.17.40.203	40,0	20,0	203	132	20,1	8,7	11,4	2653	26,8	8,7	18,1	3538	30,2	8,7	21,5	3986
241.17.40.254	40,0	20,0	254	107	25,5	11,1	14,4	2729	34,0	11,1	22,9	3638	38,3	11,1	27,2	4098
241.17.40.305	40,0	20,0	305	87,9	30,6	13,3	17,3	2690	40,8	13,3	27,5	3586	45,9	13,3	32,6	4035

Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{V5}	S_{A5}	F_5	S_6	S_{V6}	S_{A6}	F_6	S_7	S_{V7}	S_{A7}	F_7
241.17.40.051	40,0	20,0	51	628	8,3	3,5	4,8	5212	9,3	4,5	4,8	5840	12,0	8,7	3,3	7536
241.17.40.064	40,0	20,0	64	488	10,5	4,4	6,1	5124	11,8	5,7	6,1	5758	15,2	11,0	4,2	7418
241.17.40.076	40,0	20,0	76	379	13,2	5,5	7,7	5003	14,9	7,2	7,7	5647	19,2	13,9	5,3	7277
241.17.40.089	40,0	20,0	89	321	15,4	6,4	9,0	4943	17,4	8,4	9,0	5585	22,4	16,2	6,2	7190
241.17.40.102	40,0	20,0	102	281	18,2	7,6	10,6	5114	20,5	9,9	10,6	5761	26,4	19,1	7,3	7418
241.17.40.115	40,0	20,0	115	245	20,4	8,5	11,9	4998	22,9	11,1	11,8	5611	29,6	21,5	8,1	7252
241.17.40.127	40,0	20,0	127	221	22,6	9,4	13,2	4995	25,4	12,3	13,1	5613	32,8	23,8	9,0	7249
241.17.40.152	40,0	20,0	152	168	27,5	11,5	16,0	4620	31,0	15,0	16,0	5208	40,0	29,0	11,0	6720
241.17.40.203	40,0	20,0	203	132	36,9	15,4	21,5	4871	41,5	20,1	21,4	5478	53,6	38,9	14,7	7075
241.17.40.254	40,0	20,0	254	107	46,8	19,6	27,2	5008	52,7	25,5	27,2	5639	68,0	49,3	18,7	7276
241.17.40.305	40,0	20,0	305	87,9	56,1	23,5	32,6	4931	63,2	30,6	32,6	5555	81,6	59,2	22,4	7173



- | | |
|-------------------|--|
| D_h | = dia. of guide sleeve |
| D_d | = diameter of guide pin |
| L_0 | = free length of spring |
| $L_1...L_n$ | = length of loaded spring (mm) as related to spring forces $F_1...F_n$ |
| L_{BL} | = length of compacted-spring (i.e. wire-to-wire) |
| $F_1...F_n$ | = forces (N) as related to length of spring $L_1...L_n$ |
| $S_{V1}...S_{V7}$ | = recommend. preload. compression, as relat. to compress. $S_1...S_7$ |
| $S_1...S_n$ | = compr. as related to spring forces $F_1...F_n$ |
| R | = spring rate (N/mm) |
| $S_{A1}...S_{A7}$ | = working stroke (mm) |

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{V1}	S _{A1}	F ₁	S ₂	S _{V2}	S _{A2}	F ₂	S ₃	S _{V3}	S _{A3}	F ₃	S ₄	S _{V4}	S _{A4}	F ₄
241.14.50.064	50,0	25,0	64	156,0	9,6	4,2	5,4	1498	12,8	4,2	8,6	1997	14,4	4,2	10,2	2246	16,0	5,8	10,2	2496
241.14.50.076	50,0	25,0	76	125,0	11,7	5,1	6,6	1463	15,6	5,1	10,5	1950	17,6	5,1	12,5	2200	19,5	7,0	12,5	2438
241.14.50.089	50,0	25,0	89	109,0	13,5	5,9	7,6	1472	18,0	5,9	12,1	1962	20,3	5,9	14,4	2213	22,5	8,1	14,4	2453
241.14.50.102	50,0	25,0	102	94,1	15,6	6,8	8,8	1468	20,8	6,8	14,0	1957	23,4	6,8	16,6	2202	26,0	9,4	16,6	2447
241.14.50.115	50,0	25,0	115	81,0	17,4	7,5	9,9	1409	23,2	7,5	15,7	1879	26,1	7,5	18,6	2114	29,0	10,4	18,6	2349
241.14.50.127	50,0	25,0	127	71,0	19,5	8,5	11,0	1385	26,0	8,5	17,5	1846	29,3	8,5	20,8	2080	32,5	11,7	20,8	2308
241.14.50.139	50,0	25,0	139	66,5	21,6	9,4	12,2	1436	28,8	9,4	19,4	1915	32,4	9,4	23,0	2155	36,0	13,0	23,0	2394
241.14.50.152	50,0	25,0	152	60,0	23,4	10,1	13,3	1404	31,2	10,1	21,1	1872	35,1	10,1	25,0	2106	39,0	14,0	25,0	2340
241.14.50.178	50,0	25,0	178	52,0	27,6	12,0	15,6	1435	36,8	12,0	24,8	1914	41,4	12,0	29,4	2153	46,0	16,6	29,4	2392
241.14.50.203	50,0	25,0	203	44,1	31,2	13,5	17,7	1376	41,6	13,5	28,1	1835	46,8	13,5	33,3	2064	52,0	18,7	33,3	2293
241.14.50.254	50,0	25,0	254	35,0	39,0	16,9	22,1	1365	52,0	16,9	35,1	1820	58,5	16,9	41,6	2048	65,0	23,4	41,6	2275
241.14.50.305	50,0	25,0	305	28,6	46,8	20,3	26,5	1338	62,4	20,3	42,1	1785	70,2	20,3	49,9	2008	78,0	28,1	49,9	2231

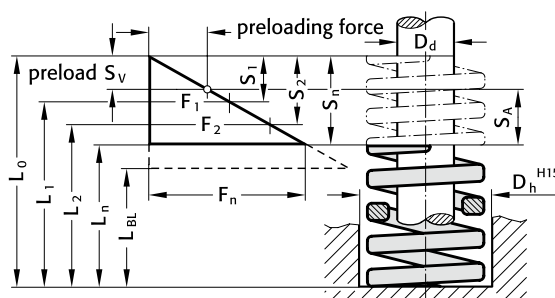
Order No	D _h	D _d	L ₀	R	55% stroke			62% stroke			80% stroke			100% stroke					
					S ₅	S _{V5}	S _{A5}	F ₅	S ₆	S _{V6}	S _{A6}	F ₆	S ₇	S _{V7}	S _{A7}	F ₇	S _n	L _n	F _n
241.14.50.064	50,0	25,0	64	156,0	17,6	7,4	10,2	2746	19,8	9,6	10,2	3089	25,6	18,6	7,0	3994	32,0	32,0	4992,0
241.14.50.076	50,0	25,0	76	125,0	21,5	9,0	12,5	2688	24,2	11,7	12,5	3025	31,2	22,6	8,6	3900	39,0	37,0	4875,0
241.14.50.089	50,0	25,0	89	109,0	24,8	10,4	14,4	2703	27,9	13,5	14,4	3041	36,0	26,1	9,9	3924	45,0	44,0	4905,0
241.14.50.102	50,0	25,0	102	94,1	28,6	12,0	16,6	2691	32,2	15,6	16,6	3030	41,6	30,2	11,4	3915	52,0	50,0	4893,2
241.14.50.115	50,0	25,0	115	81,0	31,9	13,3	18,6	2584	36,0	17,4	18,6	2916	46,4	33,6	12,8	3758	58,0	57,0	4698,0
241.14.50.127	50,0	25,0	127	71,0	35,8	15,0	20,8	2542	40,3	19,5	20,8	2861	52,0	37,7	14,3	3692	65,0	62,0	4615,0
241.14.50.139	50,0	25,0	139	66,5	39,6	16,6	23,0	2633	44,6	21,6	23,0	2966	57,6	41,8	15,8	3830	72,0	67,0	4788,0
241.14.50.152	50,0	25,0	152	60,0	42,9	17,9	25,0	2574	48,4	23,4	25,0	2904	62,4	45,2	17,2	3744	78,0	74,0	4680,0
241.14.50.178	50,0	25,0	178	52,0	50,6	21,2	29,4	2631	57,0	27,6	29,4	2964	73,6	53,4	20,2	3827	92,0	86,0	4784,0
241.14.50.203	50,0	25,0	203	44,1	57,2	23,9	33,3	2523	64,5	31,2	33,3	2844	83,2	60,3	22,9	3669	104,0	99,0	4586,4
241.14.50.254	50,0	25,0	254	35,0	71,5	29,9	41,6	2503	80,6	39,0	41,6	2821	104,0	75,4	28,6	3640	130,0	124,0	4550,0
241.14.50.305	50,0	25,0	305	28,6	85,8	35,9	49,9	2454	96,7	46,8	49,9	2766	124,8	90,5	34,3	3569	156,0	149,0	4461,6

High Performance Compression Springs DIN ISO 10243



FIBRO

- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

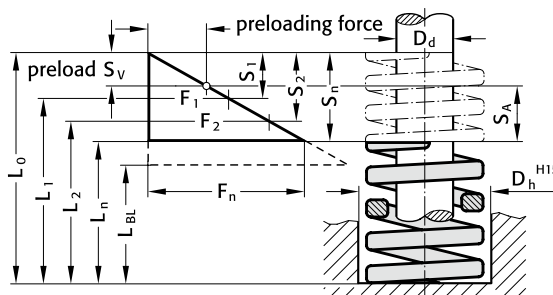


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3
241.15.50.064	50,0	25,0	64	209,1	8,1	3,5	4,6	1694	10,8	3,5	7,3	2258	12,2	3,5	8,7	2551
241.15.50.076	50,0	25,0	76	168,1	9,6	4,2	5,4	1614	12,8	4,2	8,6	2152	14,4	4,2	10,2	2421
241.15.50.089	50,0	25,0	89	140,0	11,1	4,8	6,3	1554	14,8	4,8	10,0	2072	16,7	4,8	11,9	2338
241.15.50.102	50,0	25,0	102	119,0	12,9	5,6	7,3	1535	17,2	5,6	11,6	2047	19,4	5,6	13,8	2309
241.15.50.115	50,0	25,0	115	106,0	14,7	6,4	8,3	1558	19,6	6,4	13,2	2078	22,1	6,4	15,7	2343
241.15.50.127	50,0	25,0	127	97,0	16,2	7,0	9,2	1571	21,6	7,0	14,6	2095	24,3	7,0	17,3	2357
241.15.50.139	50,0	25,0	139	87,0	17,7	7,7	10,0	1540	23,6	7,7	15,9	2053	26,6	7,7	18,9	2314
241.15.50.152	50,0	25,0	152	80,1	19,8	8,6	11,2	1586	26,4	8,6	17,8	2115	29,7	8,6	21,1	2379
241.15.50.178	50,0	25,0	178	69,6	23,1	10,0	13,1	1608	30,8	10,0	20,8	2144	34,7	10,0	24,7	2415
241.15.50.203	50,0	25,0	203	59,8	26,4	11,4	15,0	1579	35,2	11,4	23,8	2105	39,6	11,4	28,2	2368
241.15.50.229	50,0	25,0	229	50,9	30,0	13,0	17,0	1527	40,0	13,0	27,0	2036	45,0	13,0	32,0	2291
241.15.50.254	50,0	25,0	254	44,0	35,1	15,2	19,9	1544	46,8	15,2	31,6	2059	52,7	15,2	37,5	2319
241.15.50.305	50,0	25,0	305	38,7	40,2	17,4	22,8	1556	53,6	17,4	36,2	2074	60,3	17,4	42,9	2334

Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{V5}	S_{A5}	F_5	S_6	S_{V6}	S_{A6}	F_6	S_7	S_{V7}	S_{A7}	F_7
241.15.50.064	50,0	25,0	64	209,1	14,9	6,2	8,7	3116	16,7	8,1	8,6	3492	21,6	15,7	5,9	4517
241.15.50.076	50,0	25,0	76	168,1	17,6	7,4	10,2	2959	19,8	9,6	10,2	3328	25,6	18,6	7,0	4303
241.15.50.089	50,0	25,0	89	140,0	20,4	8,5	11,9	2856	22,9	11,1	11,8	3206	29,6	21,5	8,1	4144
241.15.50.102	50,0	25,0	102	119,0	23,7	9,9	13,8	2820	26,7	12,9	13,8	3177	34,4	24,9	9,5	4094
241.15.50.115	50,0	25,0	115	106,0	27,0	11,3	15,7	2862	30,4	14,7	15,7	3222	39,2	28,4	10,8	4155
241.15.50.127	50,0	25,0	127	97,0	29,7	12,4	17,3	2881	33,5	16,2	17,3	3250	43,2	31,3	11,9	4190
241.15.50.139	50,0	25,0	139	87,0	32,5	13,6	18,9	2828	36,6	17,7	18,9	3184	47,2	34,2	13,0	4106
241.15.50.152	50,0	25,0	152	80,1	36,3	15,2	21,1	2908	40,9	19,8	21,1	3276	52,8	38,3	14,5	4229
241.15.50.178	50,0	25,0	178	69,6	42,4	17,7	24,7	2951	47,7	23,1	24,6	3320	61,6	44,7	16,9	4287
241.15.50.203	50,0	25,0	203	59,8	48,4	20,2	28,2	2894	54,6	26,4	28,2	3265	70,4	51,0	19,4	4210
241.15.50.229	50,0	25,0	229	50,9	55,0	23,0	32,0	2800	62,0	30,0	32,0	3156	80,0	58,0	22,0	4072
241.15.50.254	50,0	25,0	254	44,0	64,4	26,9	37,5	2834	72,5	35,1	37,4	3190	93,6	67,9	25,7	4118
241.15.50.305	50,0	25,0	305	38,7	73,7	30,8	42,9	2852	83,1	40,2	42,9	3216	107,2	77,7	29,5	4149

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.16. High Performance Compression Springs DIN ISO 10243 Colour: „Red“

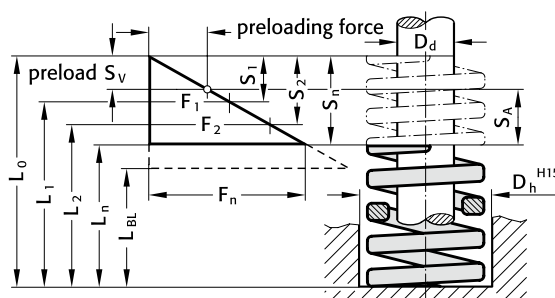
Order No	D_h	D_d	L_0	R	30% Stroke			40% Stroke			45% Stroke			50% Stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.16.50.064	50,0	25,0	64	413,0	6,5	2,8	3,7	2685	8,6	2,8	5,8	3552	9,7	2,8	6,9	4006
241.16.50.076	50,0	25,0	76	339,4	7,8	3,4	4,4	2647	10,4	3,4	7,0	3530	11,7	3,4	8,3	3971
241.16.50.089	50,0	25,0	89	288,4	9,2	4,0	5,2	2653	12,2	4,0	8,2	3518	13,7	4,0	9,7	3951
241.16.50.102	50,0	25,0	102	245,3	10,5	4,6	5,9	2576	14,0	4,6	9,4	3434	15,8	4,6	11,2	3876
241.16.50.115	50,0	25,0	115	214,8	12,0	5,2	6,8	2578	16,0	5,2	10,8	3437	18,0	5,2	12,8	3866
241.16.50.127	50,0	25,0	127	192,3	13,5	5,9	7,6	2596	18,0	5,9	12,1	3461	20,3	5,9	14,4	3904
241.16.50.139	50,0	25,0	139	170,7	15,0	6,5	8,5	2561	20,0	6,5	13,5	3414	22,5	6,5	16,0	3841
241.16.50.152	50,0	25,0	152	154,0	16,2	7,0	9,2	2495	21,6	7,0	14,6	3326	24,3	7,0	17,3	3742
241.16.50.178	50,0	25,0	178	134,4	19,2	8,3	10,9	2580	25,6	8,3	17,3	3441	28,8	8,3	20,5	3871
241.16.50.203	50,0	25,0	203	116,7	21,8	9,4	12,4	2544	29,0	9,4	19,6	3384	32,6	9,4	23,2	3804
241.16.50.254	50,0	25,0	254	89,3	27,6	12,0	15,6	2465	36,8	12,0	24,8	3286	41,4	12,0	29,4	3697
241.16.50.305	50,0	25,0	305	73,6	33,6	14,6	19,0	2473	44,8	14,6	30,2	3297	50,4	14,6	35,8	3709

Order No	D_h	D_d	L_0	R	55% Stroke			62% Stroke			80% Stroke			100% Stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.16.50.064	50,0	25,0	64	413,0	11,8	4,9	6,9	4873	13,3	6,5	6,8	5493	17,2	12,5	4,7	7104
241.16.50.076	50,0	25,0	76	339,4	14,3	6,0	8,3	4853	16,1	7,8	8,3	5464	20,8	15,1	5,7	7060
241.16.50.089	50,0	25,0	89	288,4	16,8	7,0	9,8	4845	18,9	9,2	9,7	5451	24,4	17,7	6,7	7037
241.16.50.102	50,0	25,0	102	245,3	19,3	8,1	11,2	4734	21,7	10,5	11,2	5323	28,0	20,3	7,7	6868
241.16.50.115	50,0	25,0	115	214,8	22,0	9,2	12,8	4726	24,8	12,0	12,8	5327	32,0	23,2	8,8	6874
241.16.50.127	50,0	25,0	127	192,3	24,8	10,4	14,4	4769	27,9	13,5	14,4	5365	36,0	26,1	9,9	6923
241.16.50.139	50,0	25,0	139	170,7	27,5	11,5	16,0	4694	31,0	15,0	16,0	5292	40,0	29,0	11,0	6828
241.16.50.152	50,0	25,0	152	154,0	29,7	12,4	17,3	4574	33,5	16,2	17,3	5159	43,2	31,3	11,9	6653
241.16.50.178	50,0	25,0	178	134,4	35,2	14,7	20,5	4731	39,7	19,2	20,5	5336	51,2	37,1	14,1	6881
241.16.50.203	50,0	25,0	203	116,7	39,9	16,7	23,2	4656	45,0	21,8	23,2	5252	58,0	42,1	15,9	6769
241.16.50.254	50,0	25,0	254	89,3	50,6	21,2	29,4	4519	57,0	27,6	29,4	5090	73,6	53,4	20,2	6572
241.16.50.305	50,0	25,0	305	73,6	61,6	25,8	35,8	4534	69,4	33,6	35,8	5108	89,6	65,0	24,6	6595

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

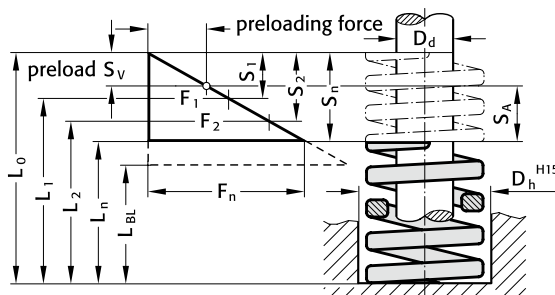


241.17. High Performance Compression Springs DIN ISO 10243 Colour: „Yellow“

Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_4
241.17.50.064	50,0	25,0	64	709	5,7	2,5	3,2	4041	7,6	2,5	5,1	5388	8,6	2,5	6,1	6097	9,5
241.17.50.076	50,0	25,0	76	572	6,9	3,0	3,9	3947	9,2	3,0	6,2	5262	10,4	3,0	7,4	5949	11,5
241.17.50.089	50,0	25,0	89	475	8,1	3,5	4,6	3848	10,8	3,5	7,3	5130	12,2	3,5	8,7	5795	13,5
241.17.50.102	50,0	25,0	102	405	9,3	4,0	5,3	3767	12,4	4,0	8,4	5022	14,0	4,0	10,0	5670	15,5
241.17.50.115	50,0	25,0	115	352	10,5	4,6	5,9	3696	14,0	4,6	9,4	4928	15,8	4,6	11,2	5562	17,5
241.17.50.127	50,0	25,0	127	316	11,7	5,1	6,6	3697	15,6	5,1	10,5	4930	17,6	5,1	12,5	5562	19,5
241.17.50.152	50,0	25,0	152	239	14,1	6,1	8,0	3370	18,8	6,1	12,7	4493	21,2	6,1	15,1	5067	23,5
241.17.50.203	50,0	25,0	203	187	22,2	9,6	12,6	4151	29,6	9,6	20,0	5535	33,3	9,6	23,7	6227	37,0
241.17.50.254	50,0	25,0	254	153	24,0	10,4	13,6	3672	32,0	10,4	21,6	4896	36,0	10,4	25,6	5508	40,0
241.17.50.305	50,0	25,0	305	127	29,1	12,6	16,5	3696	38,8	12,6	26,2	4928	43,7	12,6	31,1	5550	48,5

Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{V5}	S_{A5}	F_5	S_6	S_{V6}	S_{A6}	F_6	S_7	S_{V7}	S_{A7}	F_7
241.17.50.064	50,0	25,0	64	709	10,5	4,4	6,1	7445	11,8	5,7	6,1	8366	15,2	11,0	4,2	10777
241.17.50.076	50,0	25,0	76	572	12,7	5,3	7,4	7264	14,3	6,9	7,4	8180	18,4	13,3	5,1	10525
241.17.50.089	50,0	25,0	89	475	14,9	6,2	8,7	7078	16,7	8,1	8,6	7933	21,6	15,7	5,9	10260
241.17.50.102	50,0	25,0	102	405	17,1	7,1	10,0	6926	19,2	9,3	9,9	7776	24,8	18,0	6,8	10044
241.17.50.115	50,0	25,0	115	352	19,3	8,1	11,2	6794	21,7	10,5	11,2	7638	28,0	20,3	7,7	9856
241.17.50.127	50,0	25,0	127	316	21,5	9,0	12,5	6794	24,2	11,7	12,5	7647	31,2	22,6	8,6	9859
241.17.50.152	50,0	25,0	152	239	25,9	10,8	15,1	6190	29,1	14,1	15,0	6955	37,6	27,3	10,3	8986
241.17.50.203	50,0	25,0	203	187	40,7	17,0	23,7	7611	45,9	22,2	23,7	8583	59,2	42,9	16,3	11070
241.17.50.254	50,0	25,0	254	153	44,0	18,4	25,6	6732	49,6	24,0	25,6	7589	64,0	46,4	17,6	9792
241.17.50.305	50,0	25,0	305	127	53,4	22,3	31,1	6782	60,1	29,1	31,0	7633	77,6	56,3	21,3	9855

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1 \dots L_n$ = length of loaded spring (mm) as related to spring forces $F_1 \dots F_n$
- L_{BL} = length of compacted-spring (i.e. wire-to-wire)
- $F_1 \dots F_n$ = forces (N) as related to length of spring $L_1 \dots L_n$
- $S_{v1} \dots S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1 \dots S_7$
- $S_1 \dots S_n$ = compr. as related to spring forces $F_1 \dots F_n$
- R = spring rate (N/mm)
- $S_{A1} \dots S_{A7}$ = working stroke (mm)

241.14. High Performance Compression Springs DIN ISO 10243 Colour: „Green“

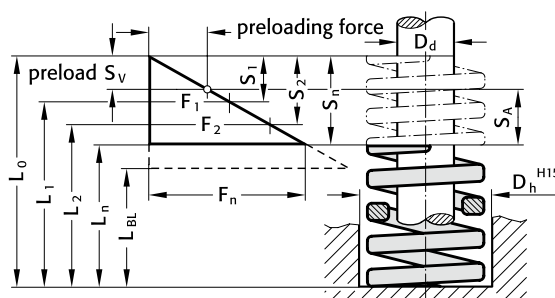
Order No	D_h	D_d	L_0	R	30% stroke			40% stroke			45% stroke			50% stroke		
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3
241.14.63.076	63,0	38,0	76	189,1	11,4	4,9	6,5	2156	15,2	4,9	10,3	2874	17,1	4,9	12,2	3234
241.14.63.089	63,0	38,0	89	158,1	13,2	5,7	7,5	2087	17,6	5,7	11,9	2783	19,8	5,7	14,1	3130
241.14.63.102	63,0	38,0	102	131,0	15,0	6,5	8,5	1965	20,0	6,5	13,5	2620	22,5	6,5	16,0	2948
241.14.63.115	63,0	38,0	115	116,0	17,1	7,4	9,7	1984	22,8	7,4	15,4	2645	25,7	7,4	18,3	2981
241.14.63.127	63,0	38,0	127	103,1	19,2	8,3	10,9	1980	25,6	8,3	17,3	2639	28,8	8,3	20,5	2969
241.14.63.152	63,0	38,0	152	84,4	22,8	9,9	12,9	1924	30,4	9,9	20,5	2566	34,2	9,9	24,3	2886
241.14.63.178	63,0	38,0	178	71,5	26,7	11,6	15,1	1909	35,6	11,6	24,0	2545	40,1	11,6	28,5	2867
241.14.63.203	63,0	38,0	203	61,7	30,6	13,3	17,3	1888	40,8	13,3	27,5	2517	45,9	13,3	32,6	2832
241.14.63.254	63,0	38,0	254	47,0	38,4	16,6	21,8	1805	51,2	16,6	34,6	2406	57,6	16,6	41,0	2707
241.14.63.305	63,0	38,0	305	38,3	45,6	19,8	25,8	1746	60,8	19,8	41,0	2329	68,4	19,8	48,6	2620

Order No	D_h	D_d	L_0	R	55% stroke			62% stroke			80% stroke			100% stroke		
					S_5	S_{v5}	S_{A5}	F_5	S_6	S_{v6}	S_{A6}	F_6	S_7	S_{v7}	S_{A7}	F_7
241.14.63.076	63,0	38,0	76	189,1	20,9	8,7	12,2	3952	23,6	11,4	12,2	4463	30,4	22,0	8,4	5749
241.14.63.089	63,0	38,0	89	158,1	24,2	10,1	14,1	3826	27,3	13,2	14,1	4316	35,2	25,5	9,7	5565
241.14.63.102	63,0	38,0	102	131,0	27,5	11,5	16,0	3603	31,0	15,0	16,0	4061	40,0	29,0	11,0	5240
241.14.63.115	63,0	38,0	115	116,0	31,4	13,1	18,3	3642	35,3	17,1	18,2	4095	45,6	33,1	12,5	5290
241.14.63.127	63,0	38,0	127	103,1	35,2	14,7	20,5	3629	39,7	19,2	20,5	4093	51,2	37,1	14,1	5279
241.14.63.152	63,0	38,0	152	84,4	41,8	17,5	24,3	3528	47,1	22,8	24,3	3975	60,8	44,1	16,7	5132
241.14.63.178	63,0	38,0	178	71,5	49,0	20,5	28,5	3504	55,2	26,7	28,5	3947	71,2	51,6	19,6	5091
241.14.63.203	63,0	38,0	203	61,7	56,1	23,5	32,6	3461	63,2	30,6	32,6	3899	81,6	59,2	22,4	5035
241.14.63.254	63,0	38,0	254	47,0	70,4	29,4	41,0	3309	79,4	38,4	41,0	3732	102,4	74,2	28,2	4813
241.14.63.305	63,0	38,0	305	38,3	83,6	35,0	48,6	3202	94,2	45,6	48,6	3608	121,6	88,2	33,4	4657

High Performance Compression Springs DIN ISO 10243



- D_h = dia. of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload, compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

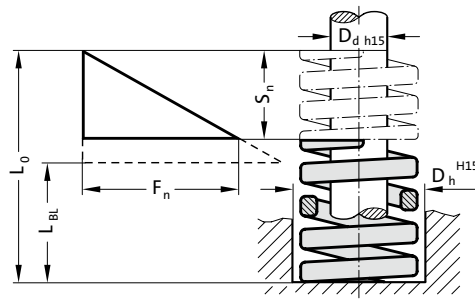


241.15. High Performance Compression Springs DIN ISO 10243 Colour: „Blue“

Order No	D _h	D _d	L ₀	R	30% stroke				40% stroke				45% stroke				50% stroke			
					S ₁	S _{v1}	S _{A1}	F ₁	S ₂	S _{v2}	S _{A2}	F ₂	S ₃	S _{v3}	S _{A3}	F ₃	S ₄	S _{v4}	S _{A4}	F ₄
241.15.63.076	63,0	38,0	76	312,1	9,6	4,2	5,4	2996	12,8	4,2	8,6	3995	14,4	4,2	10,2	4494	16,0	5,8	10,2	4994
241.15.63.089	63,0	38,0	89	260,1	11,4	4,9	6,5	2965	15,2	4,9	10,3	3954	17,1	4,9	12,2	4448	19,0	6,8	12,2	4942
241.15.63.102	63,0	38,0	102	221,1	13,2	5,7	7,5	2919	17,6	5,7	11,9	3891	19,8	5,7	14,1	4378	22,0	7,9	14,1	4864
241.15.63.115	63,0	38,0	115	187,0	15,0	6,5	8,5	2805	20,0	6,5	13,5	3740	22,5	6,5	16,0	4208	25,0	9,0	16,0	4675
241.15.63.127	63,0	38,0	127	168,1	16,8	7,3	9,5	2824	22,4	7,3	15,1	3765	25,2	7,3	17,9	4236	28,0	10,1	17,9	4707
241.15.63.152	63,0	38,0	152	136,0	20,1	8,7	11,4	2734	26,8	8,7	18,1	3645	30,2	8,7	21,5	4107	33,5	12,1	21,4	4556
241.15.63.178	63,0	38,0	178	114,0	23,4	10,1	13,3	2668	31,2	10,1	21,1	3557	35,1	10,1	25,0	4001	39,0	14,0	25,0	4446
241.15.63.203	63,0	38,0	203	100,0	27,0	11,7	15,3	2700	36,0	11,7	24,3	3600	40,5	11,7	28,8	4050	45,0	16,2	28,8	4500
241.15.63.229	63,0	38,0	229	89,3	30,6	13,3	17,3	2733	40,8	13,3	27,5	3643	45,9	13,3	32,6	4099	51,0	18,4	32,6	4554
241.15.63.254	63,0	38,0	254	78,5	34,5	15,0	19,5	2708	46,0	15,0	31,0	3611	51,8	15,0	36,8	4066	57,5	20,7	36,8	4514
241.15.63.305	63,0	38,0	305	64,8	41,4	17,9	23,5	2683	55,2	17,9	37,3	3577	62,1	17,9	44,2	4024	69,0	24,8	44,2	4471

Order No	55% stroke																			62% stroke				80% stroke				100% stroke			
	D _h	D _d	L ₀	R	S ₅	S _{v5}	S _{A5}	F ₅	S ₆	S _{v6}	S _{A6}	F ₆	S ₇	S _{v7}	S _{A7}	F ₇	S _n	L _n	F _n												
241.15.63.076	63,0	38,0	76	312,1	17,6	7,4	10,2	5493	19,8	9,6	10,2	6180	25,6	18,6	7,0	7990	32,0	44,0	9987,2												
241.15.63.089	63,0	38,0	89	260,1	20,9	8,7	12,2	5436	23,6	11,4	12,2	6138	30,4	22,0	8,4	7907	38,0	51,0	9883,8												
241.15.63.102	63,0	38,0	102	221,1	24,2	10,1	14,1	5351	27,3	13,2	14,1	6036	35,2	25,5	9,7	7783	44,0	58,0	9728,4												
241.15.63.115	63,0	38,0	115	187,0	27,5	11,5	16,0	5143	31,0	15,0	16,0	5797	40,0	29,0	11,0	7480	50,0	65,0	9350,0												
241.15.63.127	63,0	38,0	127	168,1	30,8	12,9	17,9	5177	34,7	16,8	17,9	5833	44,8	32,5	12,3	7531	56,0	71,0	9413,6												
241.15.63.152	63,0	38,0	152	136,0	36,9	15,4	21,5	5018	41,5	20,1	21,4	5644	53,6	38,9	14,7	7290	67,0	85,0	9112,0												
241.15.63.178	63,0	38,0	178	114,0	42,9	17,9	25,0	4891	48,4	23,4	25,0	5518	62,4	45,2	17,2	7114	78,0	100,0	8892,0												
241.15.63.203	63,0	38,0	203	100,0	49,5	20,7	28,8	4950	55,8	27,0	28,8	5580	72,0	52,2	19,8	7200	90,0	113,0	9000,0												
241.15.63.229	63,0	38,0	229	89,3	56,1	23,5	32,6	5010	63,2	30,6	32,6	5644	81,6	59,2	22,4	7287	102,0	127,0	9108,6												
241.15.63.254	63,0	38,0	254	78,5	63,3	26,5	36,8	4969	71,3	34,5	36,8	5597	92,0	66,7	25,3	7222	115,0	139,0	9027,5												
241.15.63.305	63,0	38,0	305	64,8	75,9	31,7	44,2	4918	85,6	41,4	44,2	5547	110,4	80,0	30,4	7154	138,0	167,0	8942,4												

High performance compression spring, 3XLF, Colour "White"



- D_h = dia. of guide sleeve
 D_d = diameter of guide pin
 L_0 = free length of spring
 L_{BL} = length of compacted spring (i.e. wire-to-wire)
 F_n = Spring force in N
 S_n = Stroke
 R = spring rate (N/mm)

Description:

The diameters are comparable with the high performance compression springs DIN ISO 10243. The special flat wound wire cross section brings a reduction of the medium winding diameter for the same winding ratio with an edge-wound spring. Consequently, the high performance compression spring 3XLF has a 6x larger starting spring force than the high performance compression spring DIN ISO 10243 colour code "yellow".

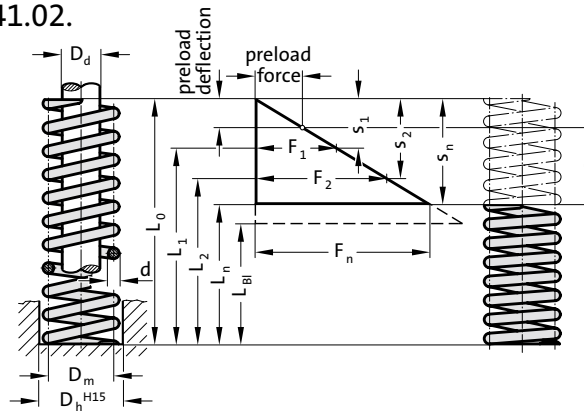
241.19. High performance compression spring, 3XLF, Colour "White"

Order No	D_h	D_d	L_0	R	S_1	S_{V1}	S_{A1}	F_1	S_n	F_n
241.19.16.020	16	6.3	20	1818	2.2	1	1.2	4000	3	5454
241.19.16.035	16	6.3	35	1000	4	1.8	2.2	4000	5.5	5500
241.19.16.050	16	6.3	50	615	6.5	2.5	4	3998	8	4920
241.19.16.075	16	6.3	75	400	10	3.8	6.2	4000	12.5	5000
241.19.16.100	16	6.3	100	286	14	5	9	4004	16.3	4662
241.19.19.025	19	8	25	2400	2.5	1.2	1.2	6000	3.4	8160
241.19.19.040	19	8	40	1333	4.5	2	2.5	5998	5.9	7865
241.19.19.050	19	8	50	1000	6	2.5	3.5	6000	7.8	7800
241.19.19.075	19	8	75	600	10	3.8	6.2	6000	12.4	7440
241.19.19.100	19	8	100	429	14	5	9	6006	16.5	7078
241.19.25.030	25	10	30	4800	2.5	1.5	1	12000	3	14400
241.19.25.050	25	10	50	2400	5	2.5	2.5	12000	5.9	14160
241.19.25.075	25	10	75	1500	8	3.8	4.2	12000	9.5	14250
241.19.25.100	25	10	100	1000	12	5	7	12000	14.7	14700
241.19.25.125	25	10	125	857	14	6.2	7.8	11998	16.9	14483
241.19.32.035	32	12.5	35	6667	3	1.8	1.2	20001	3.7	24668
241.19.32.050	32	12.5	50	3636	5.5	2.5	3	19998	6.3	22907
241.19.32.075	32	12.5	75	2222	9	3.8	5.2	19998	11.3	25109
241.19.32.100	32	12.5	100	1538	13	5	8	19994	17.9	27530
241.19.32.125	32	12.5	125	1250	16	6.2	9.8	20000	18.3	22875
241.19.32.150	32	12.5	150	1053	19	7.5	11.5	20007	21.7	22850
241.19.38.040	38	16	40	7143	3.5	2	1.5	25000	4.5	32144
241.19.38.050	38	16	50	5000	5	2.5	2.5	25000	5.9	29500
241.19.38.075	38	16	75	2778	9	3.8	5.2	25002	10.4	28891
241.19.38.100	38	16	100	1923	13	5	8	24999	15	28845
241.19.38.150	38	16	150	1316	19	7.5	11.5	25004	22.4	29478
241.19.38.200	38	16	200	926	27	10	17	25002	29.9	27687

Round wire compression spring



241.02.



Material:

Spring steel wire class C DIN 17.223 sheet 1, drawn and patented.
For highly stressed compression springs and for loads both static and oscillating.
Manufacturing tolerances to DIN 2095 class 2, load-stabilized.
Max. working temperature 100 °C.

Execution:

Flattened and ground end coils, surface homogenized byball-shot, oiled.

Note:

All spring sizes listed also available in "making-up"-lengths of 500 mm.
When ordering these, please add "500" at the end of the order number
– e. g. 241.02.11.040.500.
 D_h = diameter of guide sleeve
 D_m = mean coil diameter
 D_d = diameter of guide pin

d = diameter of spring wire

L_0 = free length of spring

$L_1...L_n$ = lengths of loaded spring as related to spring forces $F_1...F_n$

R = spring rate [N/mm]

L_{BI} = length of compacted spring (i.-e. wire-to-wire)

$F_1...F_n$ = forces [N] as related to lengths of spring $L_1...L_n$

$s_1...s_n$ = deflection as related to spring forces $F_1...F_n$

i_f = number of active coils = working stroke of spring – i. e. working deflection

241.02. Round wire compression spring

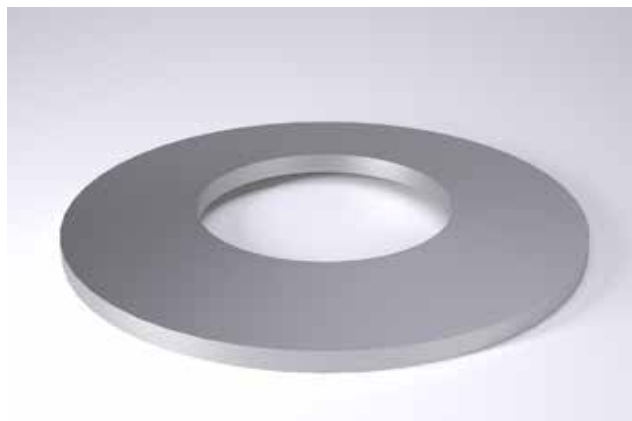
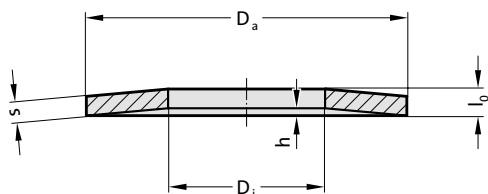
Order No	D_h	D_d	D_m	d	L_0	R	s_1	Spring force [N]		i_f
								initial*	F_2 [N]**	
241.02.11.040	11	6.5	8.5	1.5	40	8.08	11.3	91	28.7	13.7
241.02.13.055	13	8.5	10.5	1.5	55	3.8	20.8	79	34.2	25.2
241.02.15.040	15	9.5	12	2	40	11.93	12.3	146	27.7	15
241.02.15.050	15	9.5	12	2	50	10	17.5	175	32.5	21.2
241.02.16.040	16	10.5	13	2	40	11	14	154	26	17
241.02.18.085	18	12	14.75	2.25	85	5.92	30.8	182	54.2	37.4
241.02.19.045	19	11	14.5	3	45	35	9.8	343	35.2	11.9
241.02.19.050	19	11	14.5	3	50	30	11.2	336	38.8	13.6
241.02.19.083	19.5	9	14	4	83	75	12.6	945	70.4	15.3
241.02.20.035	20.5	10	15	4	35	170	5.6	952	29.4	6.8
241.02.20.090	20.5	9	14.5	4.5	90	97.8	12.3	1202	77.7	15
241.02.21.035	21	13.5	17	2.5	35	13.32	10.5	139	24.5	12.7
241.02.21.040	21	12	16.25	3	40	32.1	9.8	314	30.2	11.9
241.02.22.095	22	14.5	18	2.5	95	4.1	34.2	140	60.8	41.5
241.02.22.040	22.5	12	17	4	40	105.5	7.7	812	32.3	9.3
241.02.23.045	23	14.5	18.5	3	45	25.7	15	385	30	18.2
241.02.23.050	23	12.5	17.5	4	50	74.3	11	817	39	13.3
241.02.26.024	26.5	16	21	4	24	133.2	5	666	19	6.1
241.02.30.070	30	13	20.8	7	70	341	7.7	2625	62.3	9.3
241.02.32.070	32	21	26	4	70	24.2	23.8	575	46.2	28.9
241.02.32.150	32	16	23.5	6.5	150	103.6	19.6	2030	130.4	23.8
241.02.34.125	34	19	26	6	125	67.2	22.4	1505	102.6	27.2
241.02.44.130	44	25	34	8	130	108.2	25.2	2726	104.8	30.6
241.02.44.200	44	25	34	8	200	62.7	43.4	2721	156.6	52.7
241.02.48.067	48	25	36	10	67	640	6.3	4032	60.7	7.6
241.02.49.050	49	29	38.5	8.5	50	337	7.7	2594	42.3	9.3
241.02.55.200	55	30	42	11	200	157	30.1	4725	169.9	36.6
241.02.58.050	58	39	48	8	50	151.2	9.8	1481	40.2	11.9
241.02.63.180	63	38	50	11	180	121	30.1	3642	149.9	36.6

* = long spring life; ** = medium spring life; *** = max. spring loading



Disc spring DIN 2093

242.01.



Material:

50 CrV 4 Vanadium Spring Steel

Note:

FIBRO Disc Springs 242.01. are made from 50 CrV 4 premier grade spring steel. This "classic" spring material guarantees optimal performance levels within the temperature range from -15°C to $+150^{\circ}\text{C}$. "Hot pressetting" allows working temperatures from -25°C to $+200^{\circ}\text{C}$.

D_a = outside diameter of spring

D_i = diameter of hole

s = crosssectional thickness of spring

h = concavity of free spring

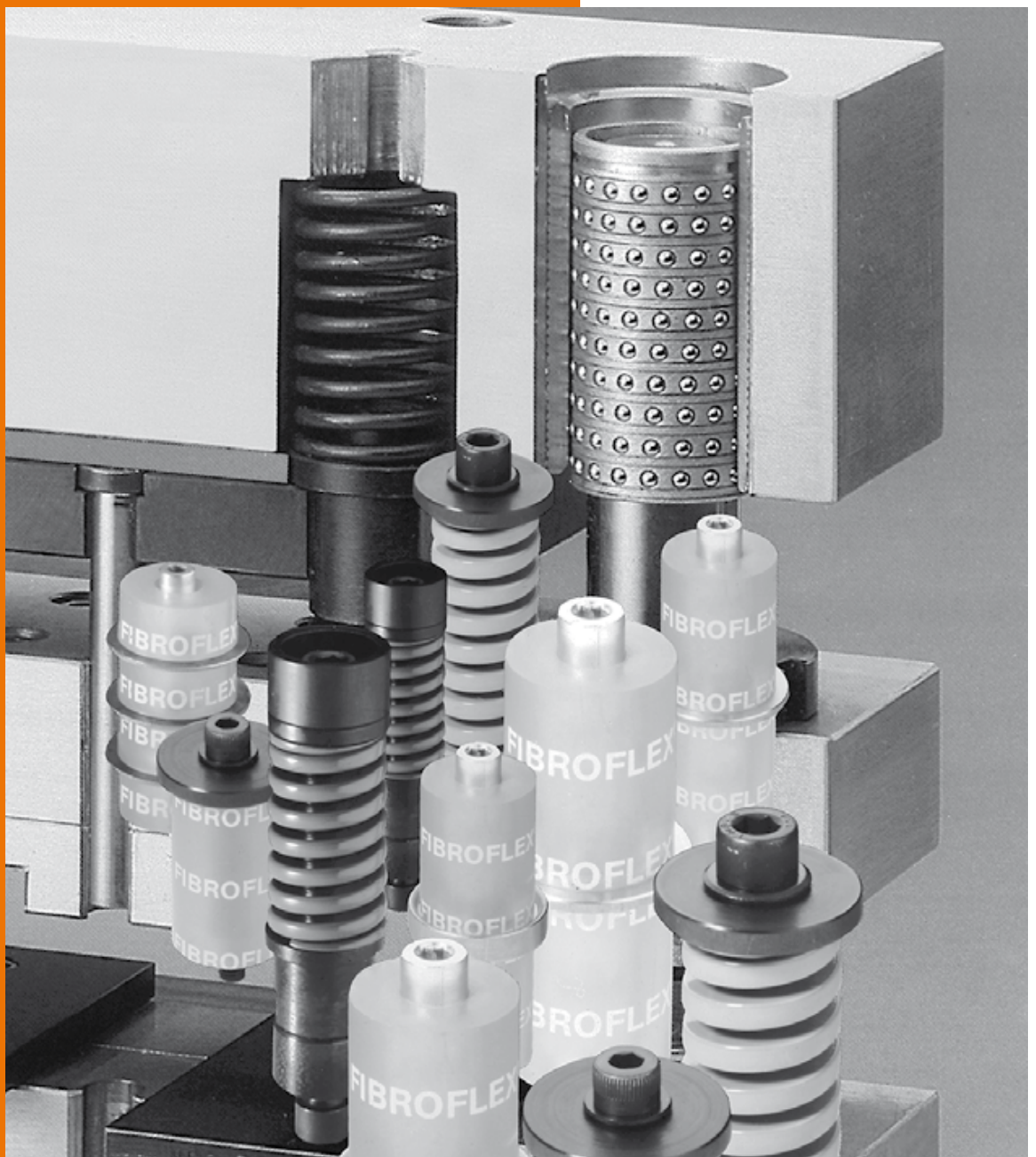
l_0 = total height of free spring

f = deflection of spring, caused by load F

F = load F [N], causing deflection f

242.01. Disc spring DIN 2093

Order No	in accord. with DIN 2093 series															
		D_a h12	D_i H12	s	h	l_0	$f_1=$ 0,2 h	F_1 [N]	$f_2=$ 0,4 h	F_2 [N]	$f_3=$ 0,6 h	F_3 [N]	$f_4=$ 0,7 h	F_4 [N]	$f_5=$ 0,8 h	F_5 [N]
242.01.080.032.040		8	3.2	0.4	0.2	0.6	0.04	58	0.08	110	0.12	160	0.14	180	0.16	200
242.01.100.052.040	B	10	5.2	0.4	0.3	0.7	0.06	73	0.12	134	0.18	180	0.21	200	0.24	220
242.01.125.062.050	B	12.5	6.2	0.5	0.35	0.85	0.07	100	0.14	180	0.21	250	0.24	280	0.28	310
242.01.140.072.080	A	14	7.2	0.8	0.3	1.1	0.06	230	0.12	450	0.18	660	0.21	770	0.24	870
242.01.150.052.070		15	5.2	0.7	0.4	1.1	0.08	180	0.16	340	0.24	470	0.28	540	0.32	610
242.01.160.082.060	B	16	8.2	0.6	0.45	1.05	0.09	145	0.18	260	0.27	360	0.31	400	0.36	440
242.01.160.082.090	A	16	8.2	0.9	0.35	1.25	0.07	300	0.14	580	0.21	850	0.24	970	0.28	1100
242.01.180.092.100	A	18	9.2	1	0.4	1.4	0.08	370	0.16	720	0.24	1050	0.28	1200	0.32	1350
242.01.200.102.080	B	20	10.2	0.8	0.55	1.35	0.11	250	0.22	470	0.33	650	0.38	730	0.44	800
242.01.200.102.090		20	10.2	0.9	0.55	1.45	0.11	340	0.22	640	0.33	900	0.38	1000	0.44	1150
242.01.200.102.110	A	20	10.2	1.1	0.45	1.55	0.09	450	0.18	870	0.27	1350	0.31	1450	0.36	1650
242.01.230.122.125		23	12.2	1.25	0.6	1.85	0.12	710	0.24	1360	0.36	1960	0.42	2240	0.48	2520
242.01.250.122.150	A	25	12.2	1.5	0.55	2.05	0.11	860	0.22	1650	0.33	2450	0.38	2800	0.44	3100
242.01.250.122.100		25	12.2	1	0.6	1.6	0.12	320	0.24	600	0.36	840	0.42	950	0.48	1050
242.01.280.142.100	B	28	14.2	1	0.8	1.8	0.16	400	0.32	720	0.48	970	0.56	1100	0.64	1200
242.01.280.142.150	A	28	14.2	1.5	0.65	2.15	0.13	850	0.26	1650	0.39	2400	0.45	2700	0.52	3100
242.01.315.163.125	B	31.5	16.3	1.25	0.9	2.15	0.18	660	0.36	1200	0.54	1650	0.63	1850	0.72	2000
242.01.315.163.175	A	31.5	16.3	1.75	0.7	2.45	0.14	1150	0.28	2200	0.42	3200	0.49	3700	0.56	4200
242.01.355.183.200	A	35.5	18.3	2	0.8	2.8	0.16	1550	0.32	3000	0.48	4300	0.56	5000	0.64	5600
242.01.400.142.150		40	14.2	1.5	1.25	2.75	0.25	950	0.5	1700	0.75	2200	0.87	2500	1	2700
242.01.400.204.225	A	40	20.4	2.25	0.9	3.15	0.18	1900	0.36	3700	0.54	5400	0.63	5200	0.72	7000
242.01.450.224.250	A	45	22.4	2.5	1	3.5	0.2	2300	0.4	4500	0.6	6400	0.7	7400	0.8	8500
242.01.500.183.150		50	18.3	1.5	1.8	3.3	0.36	1200	0.72	2000	1.08	2400	1.26	2600	1.44	2700
242.01.500.254.250		50	25.4	2.5	1.4	3.9	0.28	2850	0.56	5350	0.84	7600	0.98	8650	1.12	9650
242.01.500.254.300	A	50	25.4	3	1.1	4.1	0.22	3500	0.44	6800	0.66	10000	0.77	11500	0.88	13000
242.01.560.285.200	B	56	28.5	2	1.6	3.6	0.32	1600	0.64	2900	0.96	3900	1.12	4300	1.28	4700
242.01.600.204.200		60	20.4	2	2.1	4.1	0.42	2000	0.84	3400	1.26	4300	1.47	4700	1.68	5000



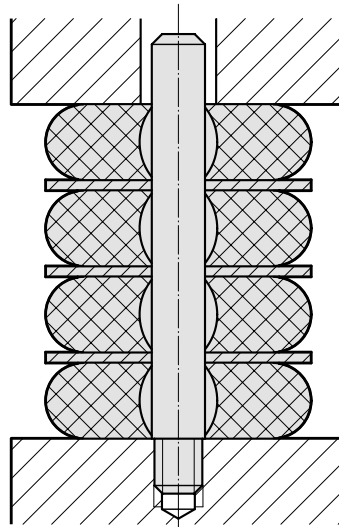
Elastomer Springs Spring and spacer units Accessories



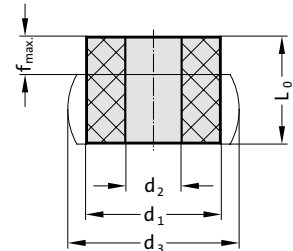
FIBROFLEX®-Elastomer spring for FIBROFLEX®-Spring system



Mounting example



244.1.



Description:

FIBROFLEX® Spring Systems represent a finely graded range of elastomer spring units (material: polyurethane) exhibiting particular suitability for all stamping dies and related tools.

The 244.-Systems comprise FIBROFLEX® Spring Elements 244.1., available in three Shore hardnesses. With the aid of Stacking Washers 244.4. and Guide Pins 244.5., the elements can be stacked. Note that stacking with interposed stacking washers results in the addition of the individual spring deflections – without addition of the spring forces.

Note:

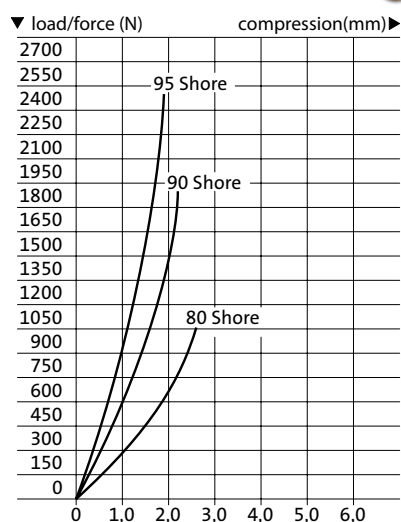
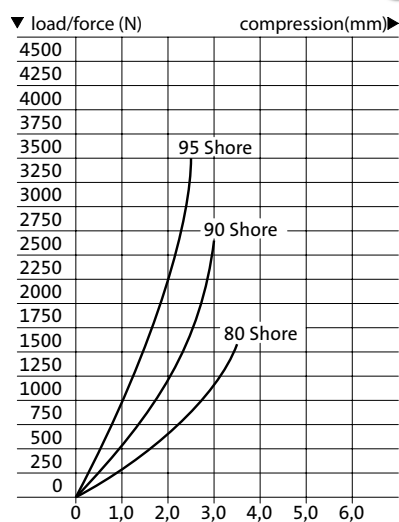
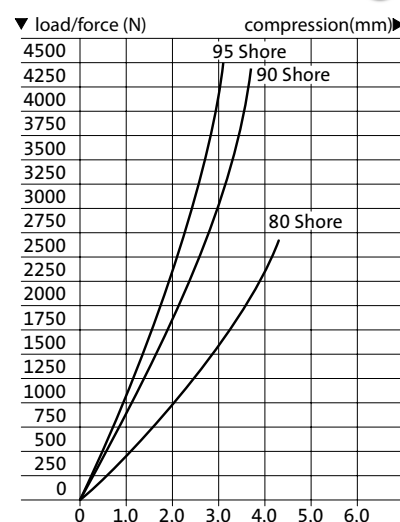
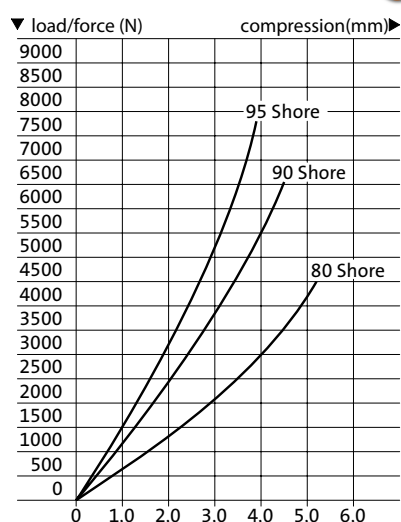
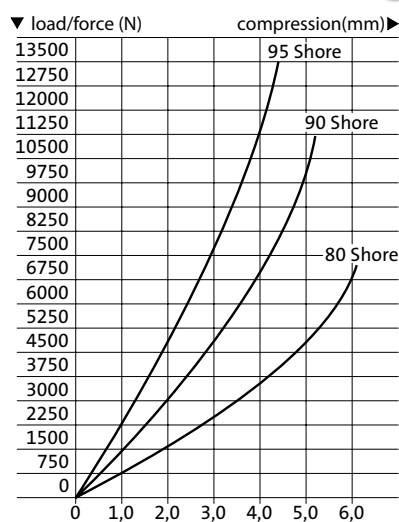
Physical and chemical properties of FIBROFLEX®-Elastomer – see at the beginning of Chapter G.
Dowel pins (235./2351.1.) or guide pins (244.5.), recommended for stacks higher than $1,5 \times d_2$.

244.1. FIBROFLEX®-Elastomer spring for FIBROFLEX®-Spring system

Order No	Spring rate	d_1	d_2	d_3	L_0	$f_{max.}$	$F_{max.} [N]$
244.1.16.5	80 Shore A	16	6.5	20	7.5	2.6	1060
244.1.20.5	80 Shore A	20	8.5	26	10	3.5	1580
244.1.25.5	80 Shore A	25	10.5	32	12.5	4.3	2670
244.1.32.5	80 Shore A	32	13.5	40	15	5.2	4500
244.1.40.5	80 Shore A	40	13.5	50	17.5	6.1	7200
244.1.16.6	90 Shore A	16	6.5	20	7.5	2.2	1900
244.1.20.6	90 Shore A	20	8.5	26	10	3	2650
244.1.25.6	90 Shore A	25	10.5	32	12.5	3.7	4400
244.1.32.6	90 Shore A	32	13.5	40	15	4.5	6550
244.1.40.6	90 Shore A	40	13.5	50	17.5	5.2	11200
244.1.16.7	95 Shore A	16	6.5	20	7.5	1.9	2500
244.1.20.7	95 Shore A	20	8.5	26	10	2.5	3500
244.1.25.7	95 Shore A	25	10.5	32	12.5	3.1	4500
244.1.32.7	95 Shore A	32	13.5	40	15	3.9	7800
244.1.40.7	95 Shore A	40	13.5	50	17.5	4.4	13500



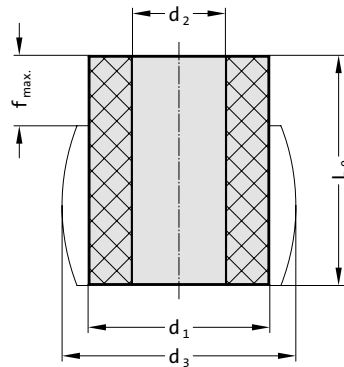
FIBROFLEX®-Elastomer spring for FIBROFLEX®-Spring system

244.1.16. – Ø 16**244.1.20. – Ø 20****244.1.25. – Ø 25****244.1.32. – Ø 32****244.1.40. – Ø 40**

FIBROFLEX®-Tubular spring element 80 Shore A, to DIN ISO 10069-1



246.5.



Description:

FIBROFLEX® Spring Elements are made from highly elastic polyurethane elastomers. Shore hardness is the most significant rating of the various FIBROFLEX® elements. Shore hardness ratings are symbolized by distinctive colour coding. Correct selection of Shore hardness has a fundamental bearing on the success of FIBROFLEX®-applications.

Material:

Polyurethan 80 Shore A
Colour: green

Note:

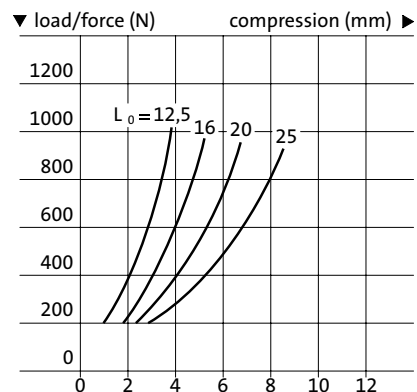
The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness.

Settlement may be as much as 4 to 7% of the spring length L_0 .

246.5. FIBROFLEX®-Tubular spring element 80 Shore A, to DIN ISO 10069-1

Order No	d_1	L_0	d_2	d_3	$f_{max.}$	F max. [N]	Order No	d_1	L_0	d_2	d_3	$f_{max.}$	F max. [N]
246.5.016.012	16	12.5	6.5	21	4.3	1020	246.5.100.080	100	80	21	130	28	45000
246.5.016.016	16	16	6.5	21	5.6	980	246.5.100.100	100	100	21	130	35	43300
246.5.016.020	16	20	6.5	21	7	950	246.5.100.125	100	125	21	130	43.7	41500
246.5.016.025	16	25	6.5	21	8.7	940	246.5.125.032	125	32	27	160	10.6	92000
246.5.020.016	20	16	8.5	26	5.6	1530	246.5.125.040	125	40	27	160	14	85000
246.5.020.020	20	20	8.5	26	7	1510	246.5.125.050	125	50	27	160	17.5	80000
246.5.020.025	20	25	8.5	26	8.7	1500	246.5.125.063	125	63	27	160	22	75000
246.5.020.032	20	32	8.5	26	10.6	1490	246.5.125.080	125	80	27	160	28	71000
246.5.025.020	25	20	10.5	32	7	2600	246.5.125.100	125	100	27	160	35	70500
246.5.025.025	25	25	10.5	32	8.7	2550	246.5.125.125	125	125	27	160	43.7	70000
246.5.025.032	25	32	10.5	32	10.6	2520	246.5.125.160	125	160	27	160	56	68000
246.5.025.040	25	40	10.5	32	14	2500							
246.5.032.032	32	32	13.5	42	10.6	3900							
246.5.032.040	32	40	13.5	42	14	3850							
246.5.032.050	32	50	13.5	42	17.5	3820							
246.5.032.063	32	63	13.5	42	22	3800							
246.5.040.032	40	32	13.5	52	10.6	6700							
246.5.040.040	40	40	13.5	52	14	6600							
246.5.040.050	40	50	13.5	52	17.5	6550							
246.5.040.063	40	63	13.5	52	22	6500							
246.5.040.080	40	80	13.5	52	28	6480							
246.5.050.032	50	32	17	65	10.6	10800							
246.5.050.040	50	40	17	65	14	10400							
246.5.050.050	50	50	17	65	17.5	10200							
246.5.050.063	50	63	17	65	22	10000							
246.5.050.080	50	80	17	65	28	9950							
246.5.050.100	50	100	17	65	35	9900							
246.5.063.032	63	32	17	81	11.2	18650							
246.5.063.040	63	40	17	81	14	18000							
246.5.063.050	63	50	17	81	17.5	17500							
246.5.063.063	63	63	17	81	22	17000							
246.5.063.080	63	80	17	81	28	16500							
246.5.063.100	63	100	17	81	35	16200							
246.5.063.125	63	125	17	81	43.7	16000							
246.5.080.032	80	32	21	104	11.2	31500							
246.5.080.040	80	40	21	104	14	30100							
246.5.080.050	80	50	21	104	17.5	29900							
246.5.080.063	80	63	21	104	22	28800							
246.5.080.080	80	80	21	104	28	28300							
246.5.080.100	80	100	21	104	35	28100							
246.5.080.125	80	125	21	104	43.7	28000							
246.5.100.032	100	32	21	130	10.6	56000							
246.5.100.040	100	40	21	130	14	52000							
246.5.100.050	100	50	21	130	17.5	50000							
246.5.100.063	100	63	21	130	22	47500							

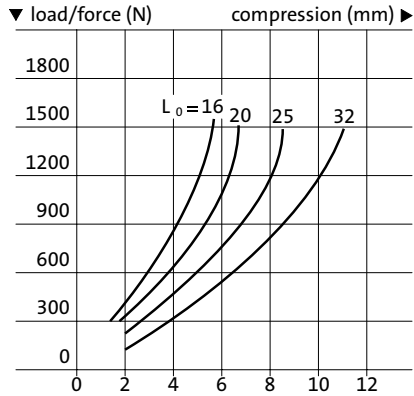
246.5.016. Ø 16/80 Shore A



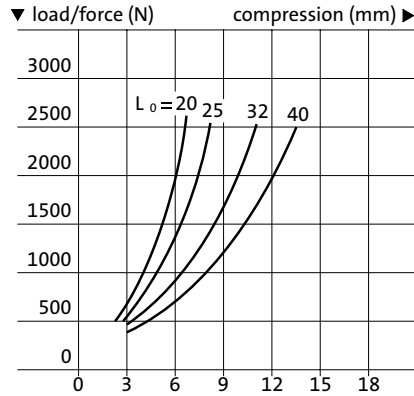


FIBROFLEX®-Tubular Spring Elements 80 Shore A

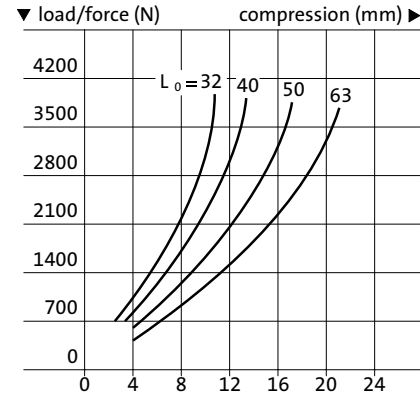
246.5.020.
Ø 20/80 Shore A



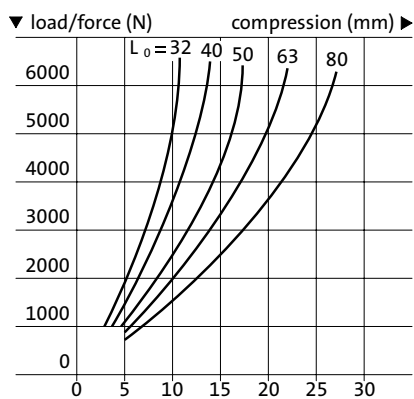
246.5.025.
Ø 25/80 Shore A



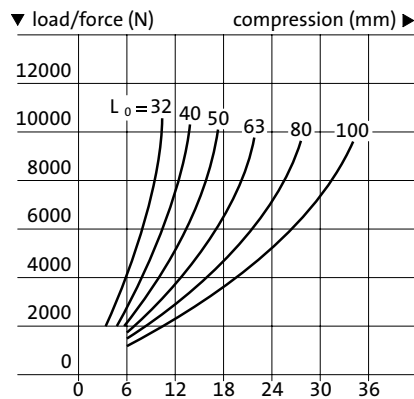
246.5.032.
Ø 32/80 Shore A



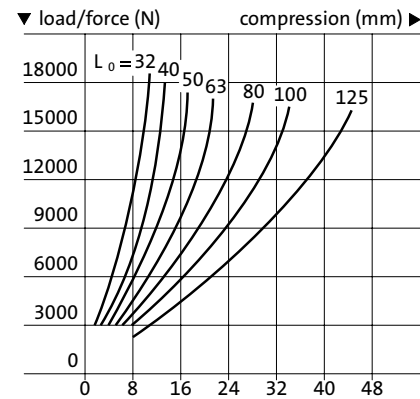
246.5.040.
Ø 40/80 Shore A



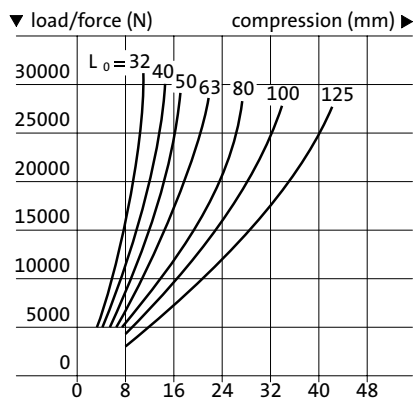
246.5.050.
Ø 50/80 Shore A



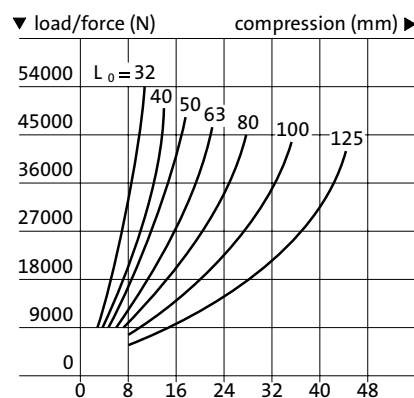
246.5.063.
Ø 63/80 Shore A



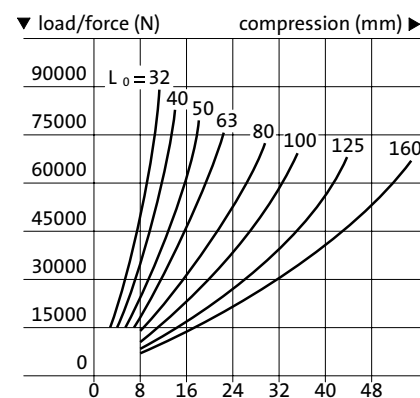
246.5.080.
Ø 80/80 Shore A



246.5.100.
Ø 100/80 Shore A



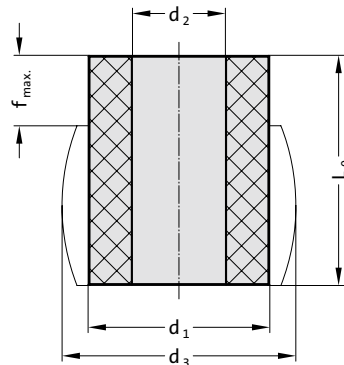
246.5.125.
Ø 125/80 Shore A



FIBROFLEX®-Tubular spring element 90 Shore A, to DIN ISO 10069-1



246.6.



Description:

FIBROFLEX® Spring Elements are made from highly elastic polyurethane elastomers. Shore hardness is the most significant rating of the various FIBROFLEX® elements. Shore hardness ratings are symbolized by distinctive colour coding. Correct selection of Shore hardness has a fundamental bearing on the success of FIBROFLEX®-applications.

Material:

Polyurethan 90 Shore A
Colour: yellow

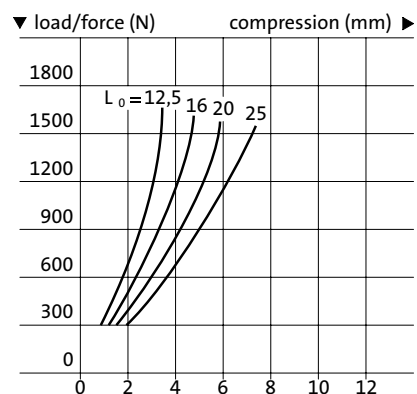
Note:

The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness. Settlement may be as much as 4 to 7% of the spring length L_0 .

246.6. FIBROFLEX®-Tubular spring element 90 Shore A, to DIN ISO 10069-1

Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]	Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]
246.6.016.012	16	12.5	6.5	21	3.6	1680	246.6.100.080	100	80	21	130	24	75000
246.6.016.016	16	16	6.5	21	4.8	1650	246.6.100.100	100	100	21	130	30	73000
246.6.016.020	16	20	6.5	21	6	1620	246.6.100.125	100	125	21	130	37.5	71000
246.6.016.025	16	25	6.5	21	7.5	1580	246.6.125.032	125	32	27	160	9.6	150000
246.6.020.016	20	16	8.5	26	4.8	2600	246.6.125.040	125	40	27	160	12	142500
246.6.020.020	20	20	8.5	26	6	2550	246.6.125.050	125	50	27	160	15	132000
246.6.020.025	20	25	8.5	26	7.5	2530	246.6.125.063	125	63	27	160	18.9	125000
246.6.020.032	20	32	8.5	26	9.6	2500	246.6.125.080	125	80	27	160	24	118000
246.6.025.020	25	20	10.5	32	6	4300	246.6.125.100	125	100	27	160	30	115000
246.6.025.025	25	25	10.5	32	7.5	4200	246.6.125.125	125	125	27	160	37.5	113000
246.6.025.032	25	32	10.5	32	9.6	4150	246.6.125.160	125	160	27	160	48	111300
246.6.025.040	25	40	10.5	32	12	4120							
246.6.032.032	32	32	13.5	42	9.6	6400							
246.6.032.040	32	40	13.5	42	12	6350							
246.6.032.050	32	50	13.5	42	15	6300							
246.6.032.063	32	63	13.5	42	18.9	6250							
246.6.040.032	40	32	13.5	52	9.6	11000							
246.6.040.040	40	40	13.5	52	12	10900							
246.6.040.050	40	50	13.5	52	15	10800							
246.6.040.063	40	63	13.5	52	18.9	10750							
246.6.040.080	40	80	13.5	52	24	10700							
246.6.050.032	50	32	17	65	9.6	17400							
246.6.050.040	50	40	17	65	12	17300							
246.6.050.050	50	50	17	65	15	17000							
246.6.050.063	50	63	17	65	18.9	16650							
246.6.050.080	50	80	17	65	24	16500							
246.6.050.100	50	100	17	65	30	16400							
246.6.063.032	63	32	17	81	9.6	30100							
246.6.063.040	63	40	17	81	12	29500							
246.6.063.050	63	50	17	81	15	28900							
246.6.063.063	63	63	17	81	18.9	28000							
246.6.063.080	63	80	17	81	24	27500							
246.6.063.100	63	100	17	81	30	27300							
246.6.063.125	63	125	17	81	37.5	26800							
246.6.080.032	80	32	21	104	9.6	53000							
246.6.080.040	80	40	21	104	12	50500							
246.6.080.050	80	50	21	104	15	48000							
246.6.080.063	80	63	21	104	18.9	46500							
246.6.080.080	80	80	21	104	24	45500							
246.6.080.100	80	100	21	104	30	44900							
246.6.080.125	80	125	21	104	37.5	44000							
246.6.100.032	100	32	21	130	9.6	90000							
246.6.100.040	100	40	21	130	12	84800							
246.6.100.050	100	50	21	130	15	81000							
246.6.100.063	100	63	21	130	18.9	78000							

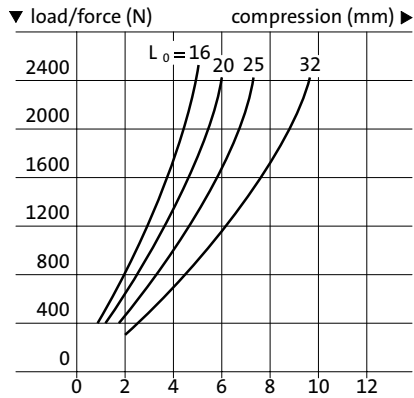
246.6.016. Ø 16/90 Shore A



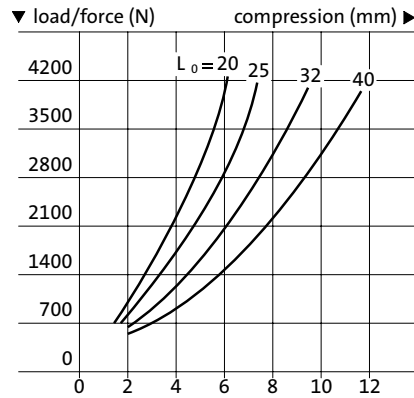


FIBROFLEX®-Tubular Spring Elements 90 Shore A

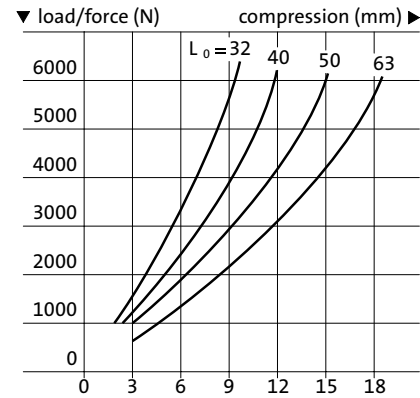
246.6.020.
Ø 20/90 Shore A



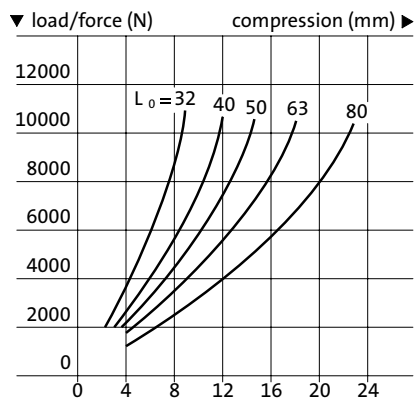
246.6.025.
Ø 25/90 Shore A



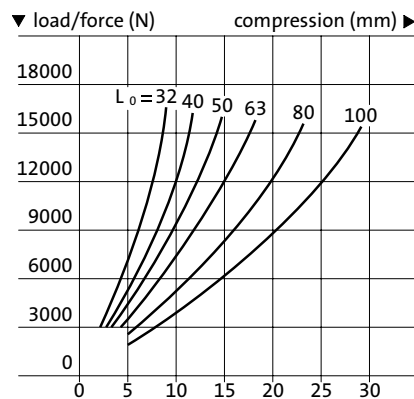
246.6.032.
Ø 32/90 Shore A



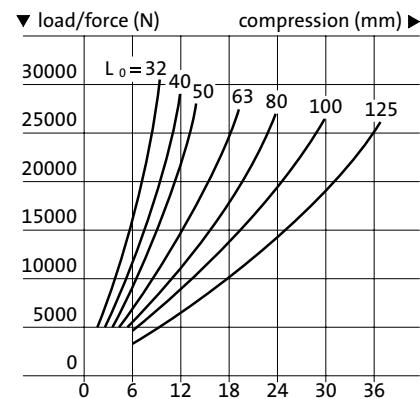
246.6.040.
Ø 40/90 Shore A



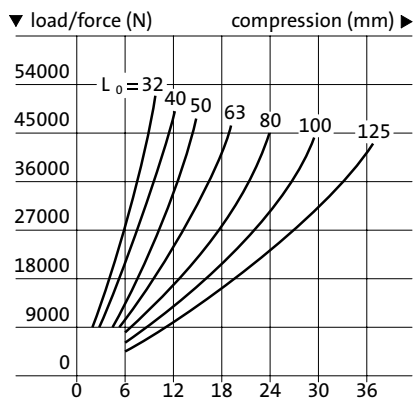
246.6.050.
Ø 50/90 Shore A



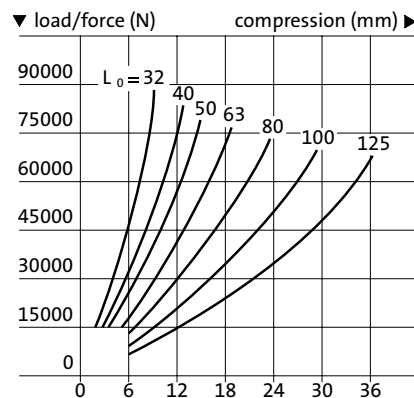
246.6.063.
Ø 63/90 Shore A



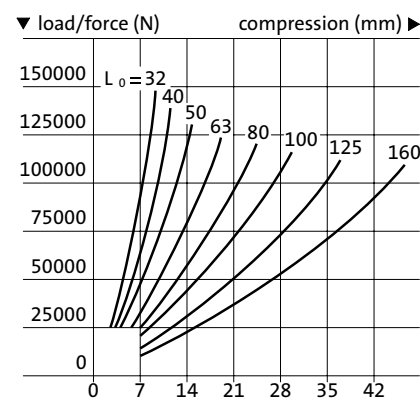
246.6.080.
Ø 80/90 Shore A



246.6.100.
Ø 100/90 Shore A



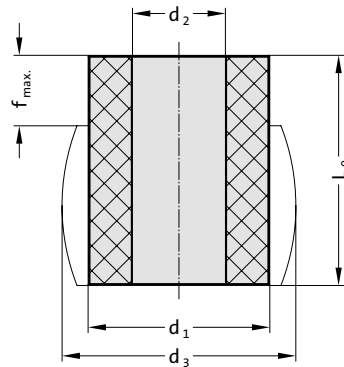
246.6.125.
Ø 125/90 Shore A



FIBROFLEX®-Tubular spring element 95 Shore A, to DIN ISO 10069-1



246.7.

**Description:**

FIBROFLEX® Spring Elements are made from highly elastic polyurethane elastomers. Shore hardness is the most significant rating of the various FIBROFLEX® elements. Shore hardness ratings are symbolized by distinctive colour coding.

Correct selection of Shore hardness has a fundamental bearing on the success of FIBROFLEX®-applications.

Material:

Polyurethan 95 Shore A

Colour: red

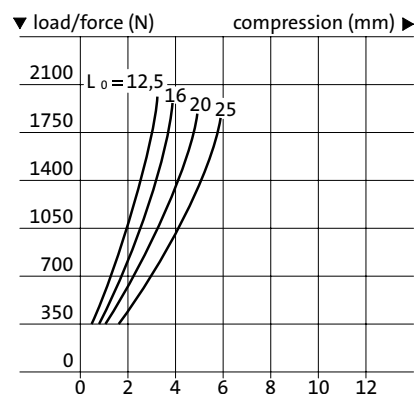
Note:

The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness.

Settlement may be as much as 4 to 7% of the spring length L_0 .

246.7. FIBROFLEX®-Tubular spring element 95 Shore A, to DIN ISO 10069-1

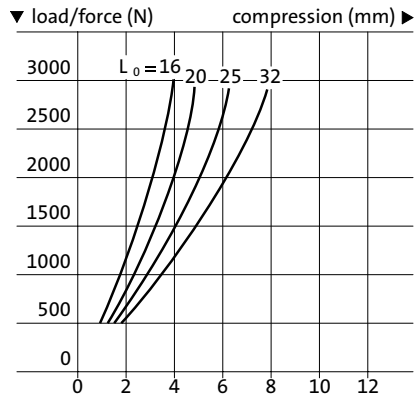
Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]	Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]
246.7.016.012	16	12.5	6.5	21	3.1	2000	246.7.100.080	100	80	21	130	20	89000
246.7.016.016	16	16	6.5	21	4	1920	246.7.100.100	100	100	21	130	25	87000
246.7.016.020	16	20	6.5	21	5	1900	246.7.100.125	100	125	21	130	31.2	86000
246.7.016.025	16	25	6.5	21	6.2	1870	246.7.125.032	125	32	27	160	8	178000
246.7.020.016	20	16	8.5	26	4	3050	246.7.125.040	125	40	27	160	10	168000
246.7.020.020	20	20	8.5	26	5	3000	246.7.125.050	125	50	27	160	12.5	157000
246.7.020.025	20	25	8.5	26	6.2	2980	246.7.125.063	125	63	27	160	15.7	150000
246.7.020.032	20	32	8.5	26	8	2950	246.7.125.080	125	80	27	160	20	142000
246.7.025.020	25	20	10.5	32	5	5100	246.7.125.100	125	100	27	160	25	135000
246.7.025.025	25	25	10.5	32	6.2	5080	246.7.125.125	125	125	27	160	31.2	133000
246.7.025.032	25	32	10.5	32	8	5020	246.7.125.160	125	160	27	160	40	130000
246.7.025.040	25	40	10.5	32	10	5000							
246.7.032.032	32	32	13.5	42	8	7600							
246.7.032.040	32	40	13.5	42	10	7500							
246.7.032.050	32	50	13.5	42	12	7480							
246.7.032.063	32	63	13.5	42	15.7	7450							
246.7.040.032	40	32	13.5	52	8	13000							
246.7.040.040	40	40	13.5	52	10	12700							
246.7.040.050	40	50	13.5	52	12.5	12500							
246.7.040.063	40	63	13.5	52	15.7	12450							
246.7.040.080	40	80	13.5	52	20	12430							
246.7.050.032	50	32	17	65	8	21000							
246.7.050.040	50	40	17	65	10	20100							
246.7.050.050	50	50	17	65	12.5	19600							
246.7.050.063	50	63	17	65	15.7	19200							
246.7.050.080	50	80	17	65	20	19100							
246.7.050.100	50	100	17	65	25	19050							
246.7.063.032	63	32	17	81	8	37000							
246.7.063.040	63	40	17	81	10	35900							
246.7.063.050	63	50	17	81	12.5	34000							
246.7.063.063	63	63	17	81	15.7	33000							
246.7.063.080	63	80	17	81	20	32000							
246.7.063.100	63	100	17	81	25	31800							
246.7.063.125	63	125	17	81	31.2	31600							
246.7.080.032	80	32	21	104	8	62500							
246.7.080.040	80	40	21	104	10	59000							
246.7.080.050	80	50	21	104	12.5	58000							
246.7.080.063	80	63	21	104	15.7	55000							
246.7.080.080	80	80	21	104	20	54000							
246.7.080.100	80	100	21	104	25	53000							
246.7.080.125	80	125	21	104	31.2	52000							
246.7.100.032	100	32	21	130	8	110000							
246.7.100.040	100	40	21	130	10	102500							
246.7.100.050	100	50	21	130	12.5	95000							
246.7.100.063	100	63	21	130	15.7	92000							

246.7.016.
Ø 16/95 Shore A

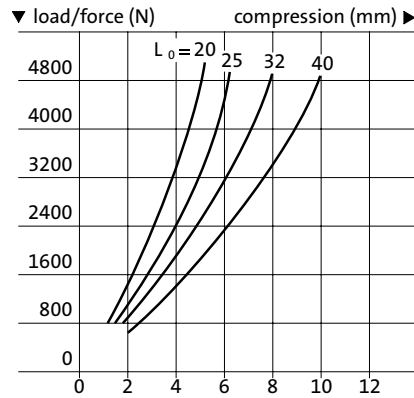


FIBROFLEX®-Tubular Spring Elements 95 Shore A

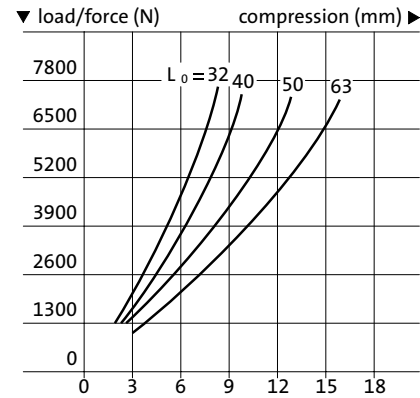
246.7.020.
Ø 20/95 Shore A



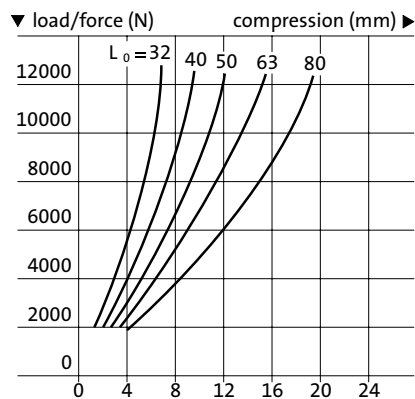
246.7.025.
Ø 25/95 Shore A



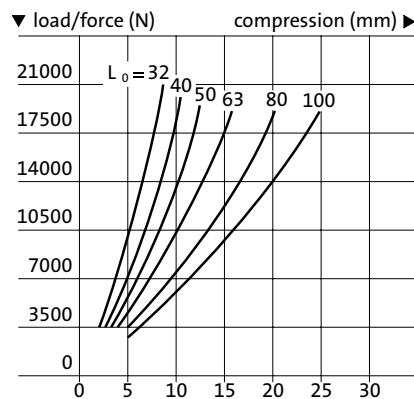
246.7.032.
Ø 32/95 Shore A



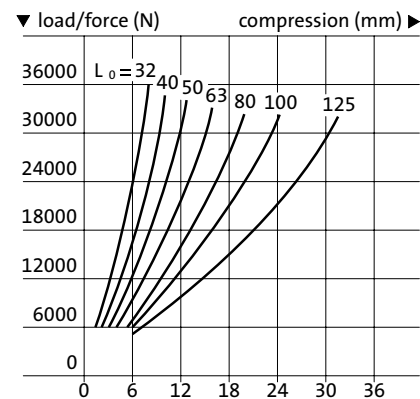
246.7.040.
Ø 40/95 Shore A



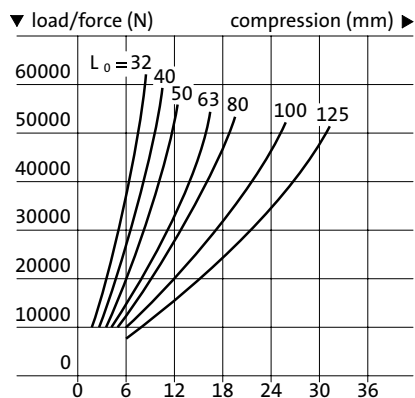
246.7.050.
Ø 50/95 Shore A



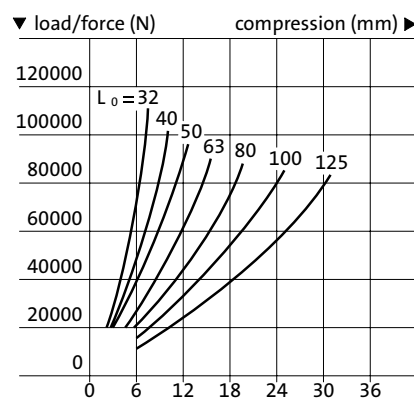
246.7.063.
Ø 63/95 Shore A



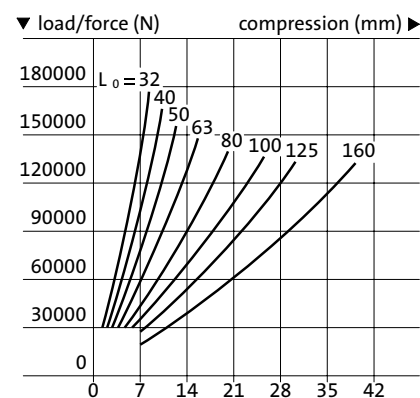
246.7.080.
Ø 80/95 Shore A



246.7.100.
Ø 100/95 Shore A



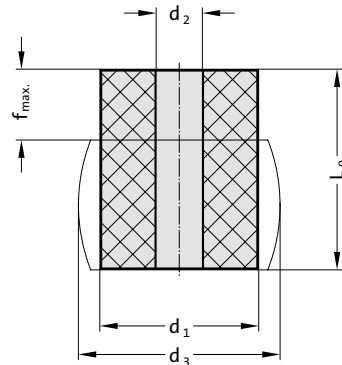
246.7.125.
Ø 125/95 Shore A



FIBROELAST® Tubular spring element 70 Shore A



2461.4.



Material:

Polyester-based polyurethane 70 Shore A
Colour: white

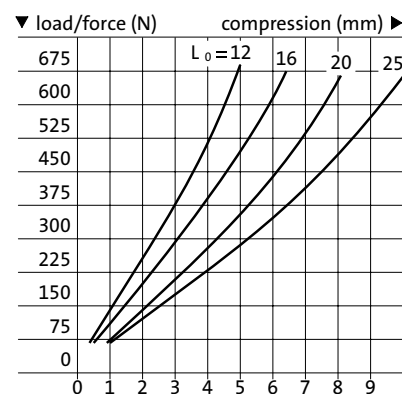
Note:

The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness. Settlement may be as much as 4 to 7% of the spring length L_0 .

2461.4. FIBROELAST® Tubular spring element 70 Shore A

Order No	d ₁	L ₀	d ₂	d ₃	f max.	Order No	d ₁	L ₀	d ₂	d ₃	f max.
2461.4.016.012	16	12	6.5	21	4.8	2461.4.100.080	100	80	21	130	32
2461.4.016.016	16	16	6.5	21	6.4	2461.4.100.100	100	100	21	130	40
2461.4.016.020	16	20	6.5	21	8	2461.4.100.125	100	125	21	130	50
2461.4.016.025	16	25	6.5	21	10	2461.4.125.032	125	32	27	160	12.8
2461.4.020.016	20	16	8.5	26	6.4	2461.4.125.040	125	40	27	160	16
2461.4.020.020	20	20	8.5	26	8	2461.4.125.050	125	50	27	160	20
2461.4.020.025	20	25	8.5	26	10	2461.4.125.063	125	63	27	160	25.2
2461.4.020.032	20	32	8.5	26	12.8	2461.4.125.080	125	80	27	160	32
2461.4.025.020	25	20	10.5	32	8	2461.4.125.100	125	100	27	160	40
2461.4.025.025	25	25	10.5	32	10	2461.4.125.125	125	125	27	160	50
2461.4.025.032	25	32	10.5	32	12.8	2461.4.125.160	125	160	27	160	64
2461.4.025.040	25	40	10.5	32	16						
2461.4.032.032	32	32	13.5	42	12.8						
2461.4.032.040	32	40	13.5	42	16						
2461.4.032.050	32	50	13.5	42	20						
2461.4.032.063	32	63	13.5	42	25.2						
2461.4.040.032	40	32	13.5	52	12.8						
2461.4.040.040	40	40	13.5	52	16						
2461.4.040.050	40	50	13.5	52	20						
2461.4.040.063	40	63	13.5	52	25.2						
2461.4.040.080	40	80	13.5	52	32						
2461.4.050.032	50	32	17	65	12.8						
2461.4.050.040	50	40	17	65	16						
2461.4.050.050	50	50	17	65	20						
2461.4.050.063	50	63	17	65	25.2						
2461.4.050.080	50	80	17	65	32						
2461.4.050.100	50	100	17	65	40						
2461.4.063.032	63	32	17	81	12.8						
2461.4.063.040	63	40	17	81	16						
2461.4.063.050	63	50	17	81	20						
2461.4.063.063	63	63	17	81	25.2						
2461.4.063.080	63	80	17	81	32						
2461.4.063.100	63	100	17	81	40						
2461.4.063.125	63	125	17	81	50						
2461.4.080.032	80	32	21	104	12.8						
2461.4.080.040	80	40	21	104	16						
2461.4.080.050	80	50	21	104	20						
2461.4.080.063	80	63	21	104	25.2						
2461.4.080.080	80	80	21	104	32						
2461.4.080.100	80	100	21	104	40						
2461.4.080.125	80	125	21	104	50						
2461.4.100.032	100	32	21	130	12.8						
2461.4.100.040	100	40	21	130	16						
2461.4.100.050	100	50	21	130	20						
2461.4.100.063	100	63	21	130	25.2						

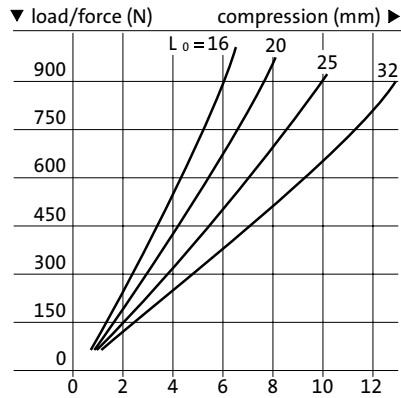
2461.4.016.
Ø 16/70 Shore A



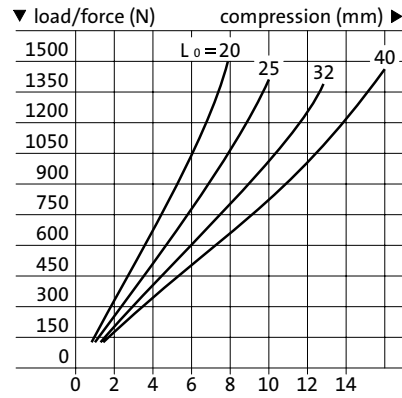


FIBROELAST®-Tubular Spring Elements 70 Shore A

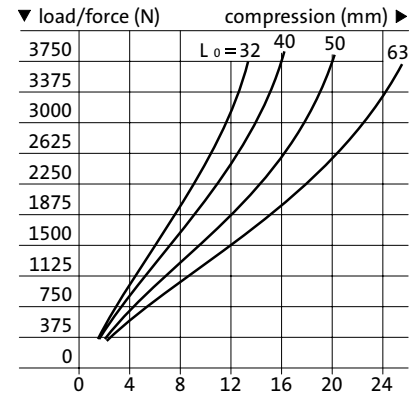
2461.4.020.
Ø 20/70 Shore A



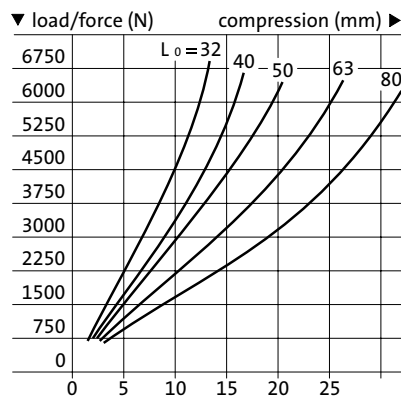
2461.4.025.
Ø 25/70 Shore A



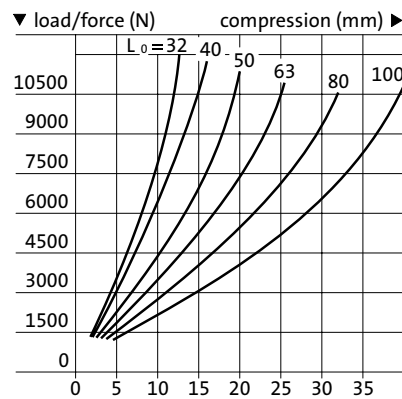
2461.4.032.
Ø 32/70 Shore A



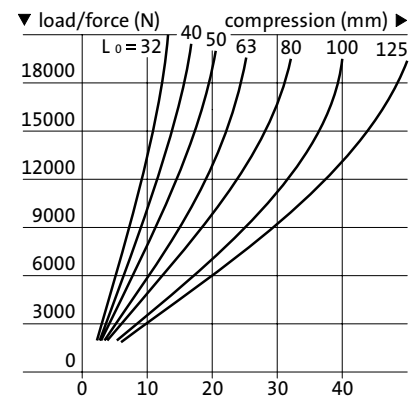
2461.4.040.
Ø 40/70 Shore A



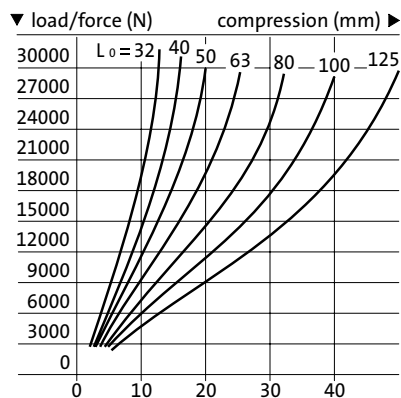
2461.4.050.
Ø 50/70 Shore A



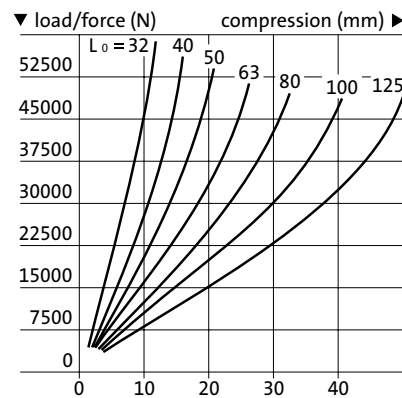
2461.4.063.
Ø 63/70 Shore A



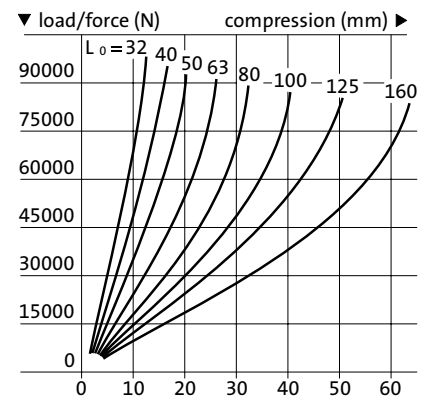
2461.4.080.
Ø 80/70 Shore A



2461.4.100.
Ø 100/70 Shore A



2461.4.125.
Ø 125/70 Shore A

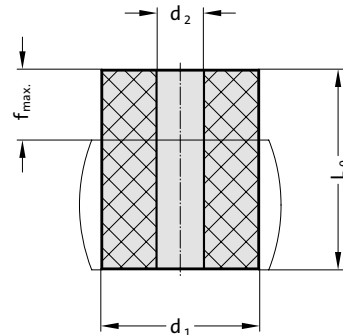




Tubular Spring Element, Rubber 70 Shore A



2461.2.



Material:

Chloroprene rubber 70 shore A
Colour: black

Note:

The physical properties of elastomere springs means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness. Settlement may be as much as 3 to 5% of the spring length L_0 .

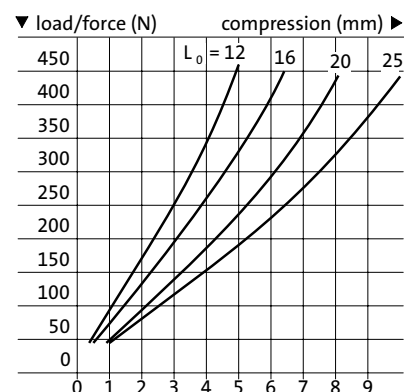
Physical characteristics:

Tensile strength acc. to DIN 53504:
Sgroßergleich. 12 N/mm²
Elongation at break acc. to DIN 53504:
Sgroßergleich. 250 %
Bulk density acc. to DIN 53479: 1.37 g/cm³
Compression set acc. to DIN 53517: 20 % (24 h/70 °C)
Temperature scope: -20 °C to 80 °C short-term to max. 120 °C

2461.2. Tubular Spring Element, Rubber 70 Shore A

Order No	d ₁	L ₀	d ₂	f max.	Order No	d ₁	L ₀	d ₂	f max.
2461.2.016.012	16	12	6.5	4.8	2461.2.100.080	100	80	21	32.0
2461.2.016.016	16	16	6.5	6.4	2461.2.100.100	100	100	21	40.0
2461.2.016.020	16	20	6.5	8.0	2461.2.100.125	100	125	21	50.0
2461.2.016.025	16	25	6.5	10.0	2461.2.125.032	125	32	27	12.8
2461.2.020.016	20	16	8.5	6.4	2461.2.125.040	125	40	27	16.0
2461.2.020.020	20	20	8.5	8.0	2461.2.125.050	125	50	27	20.0
2461.2.020.025	20	25	8.5	10.0	2461.2.125.063	125	63	27	25.2
2461.2.020.032	20	32	8.5	12.8	2461.2.125.080	125	80	27	32.0
2461.2.025.020	25	20	10.5	8.0	2461.2.125.100	125	100	27	40.0
2461.2.025.025	25	25	10.5	10.0	2461.2.125.125	125	125	27	50.0
2461.2.025.032	25	32	10.5	12.8	2461.2.125.160	125	160	27	64.0
2461.2.025.040	25	40	10.5	16.0					
2461.2.032.032	32	32	13.5	12.8					
2461.2.032.040	32	40	13.5	16.0					
2461.2.032.050	32	50	13.5	20.0					
2461.2.032.063	32	63	13.5	25.2					
2461.2.040.032	40	32	13.5	12.8					
2461.2.040.040	40	40	13.5	16.0					
2461.2.040.050	40	50	13.5	20.0					
2461.2.040.063	40	63	13.5	25.2					
2461.2.040.080	40	80	13.5	32.0					
2461.2.050.032	50	32	17	12.8					
2461.2.050.040	50	40	17	16.0					
2461.2.050.050	50	50	17	20.0					
2461.2.050.063	50	63	17	25.2					
2461.2.050.080	50	80	17	32.0					
2461.2.050.100	50	100	17	40.0					
2461.2.063.032	63	32	17	12.8					
2461.2.063.040	63	40	17	16.0					
2461.2.063.050	63	50	17	20.0					
2461.2.063.063	63	63	17	25.2					
2461.2.063.080	63	80	17	32.0					
2461.2.063.100	63	100	17	40.0					
2461.2.063.125	63	125	17	50.0					
2461.2.080.032	80	32	21	12.8					
2461.2.080.040	80	40	21	16.0					
2461.2.080.050	80	50	21	20.0					
2461.2.080.063	80	63	21	25.2					
2461.2.080.080	80	80	21	32.0					
2461.2.080.100	80	100	21	40.0					
2461.2.080.125	80	125	21	50.0					
2461.2.100.032	100	32	21	12.8					
2461.2.100.040	100	40	21	16.0					
2461.2.100.050	100	50	21	20.0					
2461.2.100.063	100	63	21	25.2					

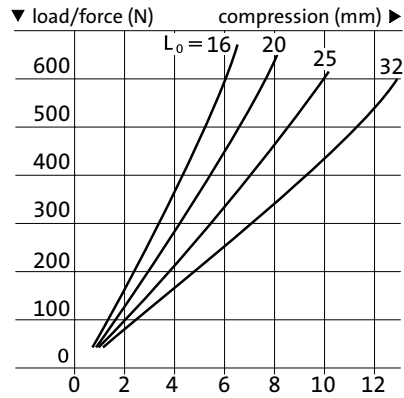
2461.2.016. Ø 16/70 Shore A



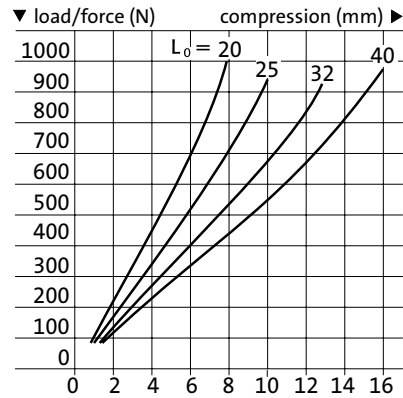


Tubular Spring Elements, Rubber 70 Shore A

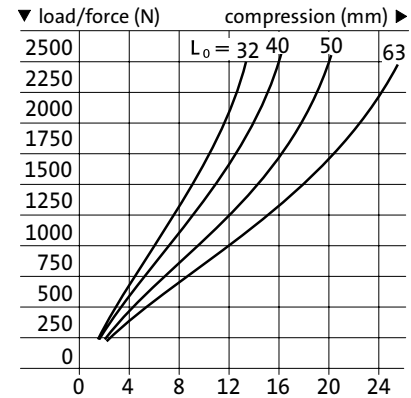
2461.2.020.
Ø 20/70 Shore A



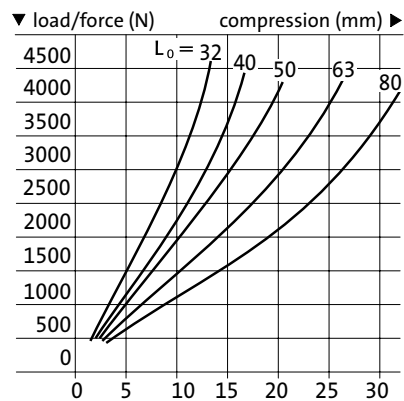
2461.2.025.
Ø 25/70 Shore A



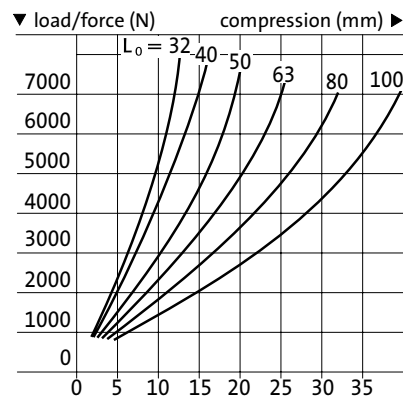
2461.2.032.
Ø 32/70 Shore A



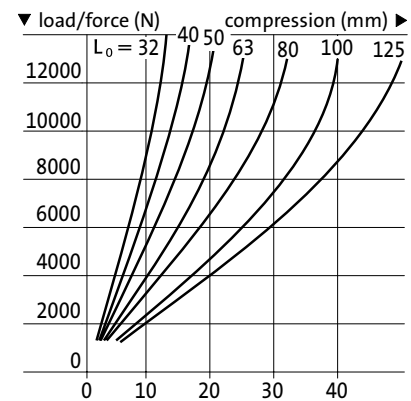
2461.2.040.
Ø 40/70 Shore A



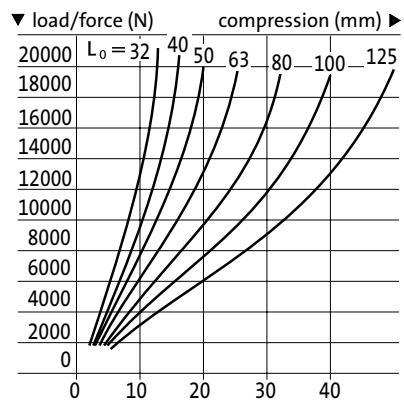
2461.2.050.
Ø 50/70 Shore A



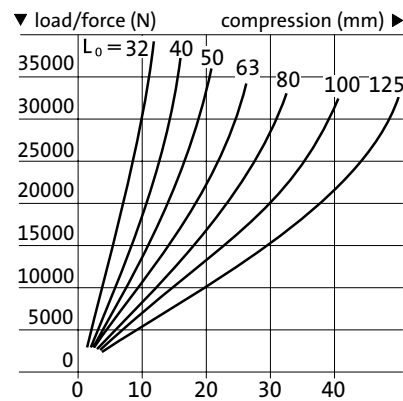
2461.2.063.
Ø 63/70 Shore A



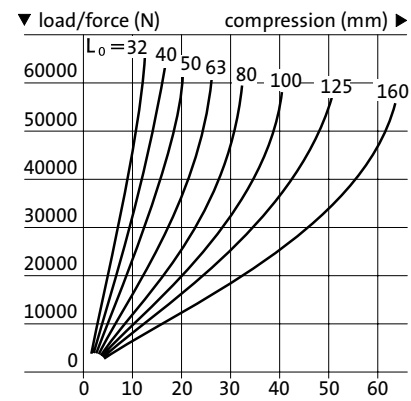
2461.2.080.
Ø 80/70 Shore A



2461.2.100.
Ø 100/70 Shore A



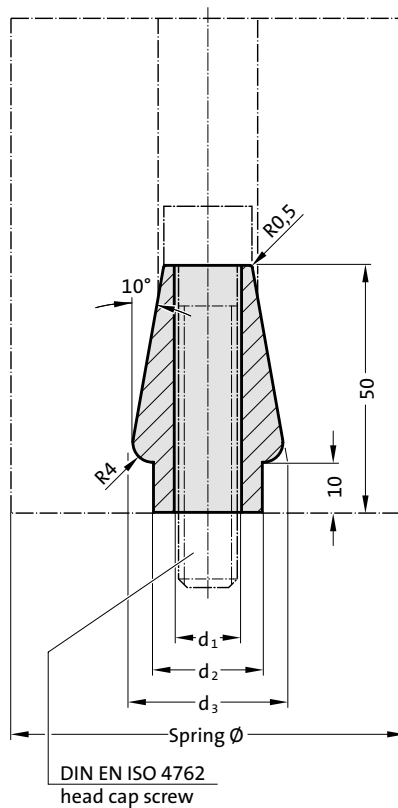
2461.2.125.
Ø 125/70 Shore A



Locating bolt Locating bolt, threaded



2441.5.



2441.5.
Locating bolt

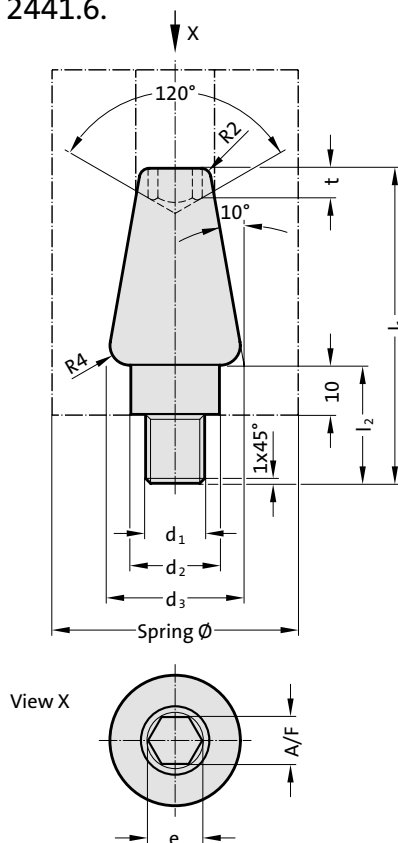
Order No	Spring Ø	d ₁	d ₂	d ₃	Socket cap screw DIN EN ISO 4762
2441.5.10	63	11	18	28	M10x65
2441.5.12	80 100	13.5	22	32	M12x70
2441.5.16	125	17.5	28	38	M16x70

Note:

Elastomeric round springs are positioned and secured in place by the locating bolts.
Screws not included.



2441.6.



2441.6.
Locating bolt, threaded

Order No	Spring Ø	d ₁	d ₂	d ₃	l ₁	l ₂	SW	e	t
2441.6.12	63	M12	18	28	64	24	10	11.4	6
2441.6.16	80 100	M16	22	32	68	28	10	11.4	6
2441.6.20	125	M20	28	38	72	32	14	16	8

Note:

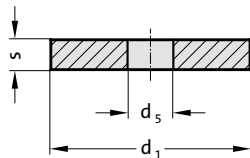
Elastomeric round springs are positioned and secured in place by the locating bolts.



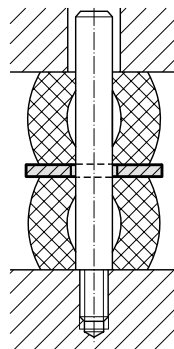
Stacking washer DIN ISO 10069-2

Thrust washer

2441.3.



Mounting example



2441.3. Stacking washer DIN ISO 10069-2

Material:

Brass

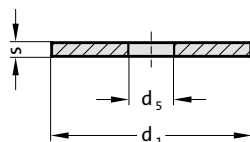
Spring-Ø	16	20	25	32	40	50	63	80	100	125
d ₁	20	25	30	40	50	60	80	100	120	150
d _s	6.5	8.5	10.5	13.5	13.5	16.5	16.5	20.5	20.5	26
s	4	4	5	5	5	6	6	8	8	8



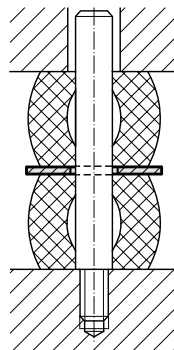
Ordering Code (example):

Stacking washer DIN ISO 10069-2	=2441.3.
Spring diameter Spring-Ø	50 mm = 050
Order No	=2441.3.050

244.4.



Mounting example



244.4. Thrust washer

Material:

St 37

Spring-Ø	16	20	25	32	40	50	63	80	100	125
d ₁	20	26	32	40	50	60	80	100	120	150
d _s	6.5	8.5	10.5	13.5	13.5	16.5	16.5	20.5	20.5	26
s	1	1.5	2	2.5	2.5	3	3	4	4	5



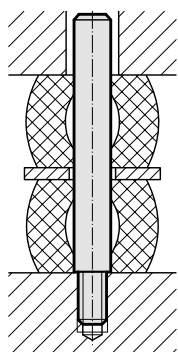
Ordering Code (example):

Thrust washer	=244.4.
Spring diameter Spring-Ø	50 mm = 050
Order No	=244.4. 050

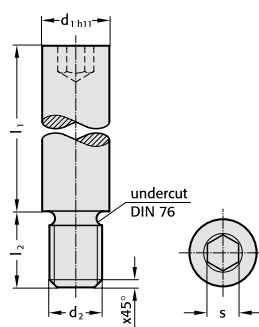
Guide pin Trust washer for elastomer springs



Mounting example



244.5.



Material:
C 15



Ordering Code (example):

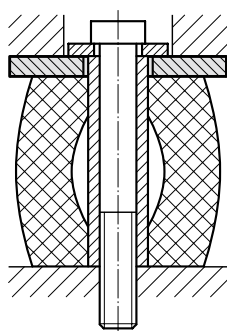
Guide pin	=244.5.
Nominal diameter d_1	16 mm = 16.
Guide length l_1	40 mm = 040
Order No	=244.5. 16.040

244.5. Guide pin

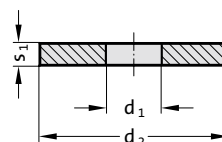
d_1	6	8	10	13	16	20	25
d_2	M4	M6	M8	M10	M12	M16	M20
l_2	6	9	15	15	18	25	30
s	3	4	5	6	8	10	14
l_1							
20	•	•	•				
25	•	•	•				
32	•	•	•	•	•		
40	•	•	•	•	•		
50		•	•	•	•	•	•
63			•	•	•	•	•
80				•	•	•	•
95				•	•	•	•
118					•	•	•
140					•	•	•
180					•	•	•



Mounting example



244.6.



Material:
St 37



Ordering Code (example):

Trust washer for elastomer springs	=244.6.
Spring diameter Spring-Ø	63 mm = 063
Order No	=244.6. 063

244.6. Trust washer for elastomer springs

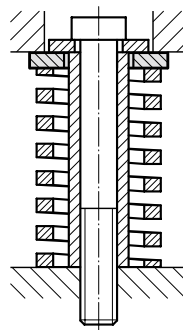
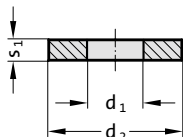
Spring-Ø	25	32	40	50	63	80	100	125
d_1	10.5	13.5	13.5	16.5	16.5	20.5	20.5	26
d_2	32	40	50	60	80	100	120	150
s_1	4	5	5	6	8	10	12	15



Trust washer for compression springs

244.7.

Mounting example



244.7. Trust washer for
compression springs

Material:
No 1.1191 heat treated

Spring-Ø	20	25	32	40	50	63
d ₁	10.5	12.5	16.5	20.5	25.5	35.5
d ₂	25	25	38	38	50	65
s ₁	4	4	5	5	6	8

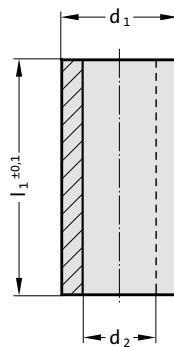
Ordering Code (example):

Trust washer for compression springs	=244.7.
Spring diameter Spring-Ø	40 mm = 040
Order No	=244.7. 040

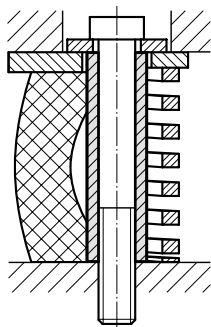
Spacer tube



244.9.



Mounting example



Material:
St 35.4 case-hardened

Note:
Other lengths on request!

244.9. Spacer tube

d ₁	10	12	13	16	19	20	25	30	32	35	36	42
d ₂	6.4	8.4	9	11	13	13	17	22	22	23	26	32
l ₁												
27	•	•										
30			•	•	•							
33	•	•		•		•						
38	•	•		•		•						
40			•	•	•							
44	•	•		•		•						
48	•	•		•		•	•					
50			•	•	•	•		•				
61	•	•		•		•	•					
63		•	•	•	•	•	•	•				
70							•	•				
72	•	•		•		•	•			•	•	
80	•	•	•	•	•	•	•	•		•	•	
90		•		•		•	•	•		•	•	
95							•		•			
100		•	•	•	•	•	•	•		•	•	
105							•		•			
115							•					
125				•	•	•	•	•	•	•	•	
135							•					
145								•	•			
150				•		•	•	•		•	•	•
155							•					
165								•				
175							•	•		•	•	
185								•				
195							•					
200				•		•	•	•		•	•	•
205								•				
215							•					
225							•	•	•	•	•	
235							•					
245								•				
250							•	•		•	•	
255							•					

Ordering Code (example):

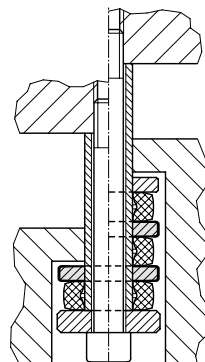
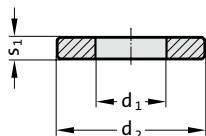
Spacer tube	=244.9.
External diameter d ₁ 25 mm	= 25.
Length l ₁ 48 mm	= 048
Order No	=244.9. 25.048



Washer

244.10.15.

Mounting example



244.10.15. Washer

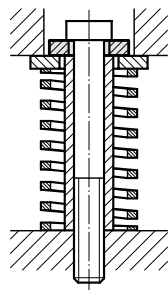
Material:
90MnCrV8, hardened

Order No	d ₁	d ₂	s ₁
244.10.15.170.30.04	17	30	4
244.10.15.210.35.06	21	35	6
244.10.15.260.50.06	26	50	6
244.10.15.310.65.08	31	65	8
244.10.15.370.70.08	37	70	8
244.10.15.430.90.08	43	90	8

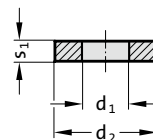
Washer Spacer sleeve



Mounting example



244.10.



Material:
C 45 heat treated



Ordering Code (example):

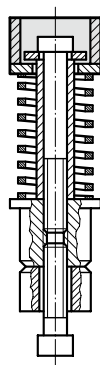
Washer	=244.10.
Inside diameter d_1	17 mm = 170.
External diameter d_2	40 mm = 40.
Thickness s_1	6 mm = 06
Order No	=244.10.170.40.06

244.10. Washer

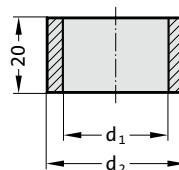
d_1	d_2	s_1	d_1	d_2	s_1	d_1	d_2	s_1	d_1	d_2	s_1
6.4	17	3	13	35	5	17	50	10	25	56	10
8.4	17	3	13	30	6	17	58	10	25	70	10
8.4	23	4	13	35	8	20.4	30	5	26	58	6
8.5	20	4	13	46	8	21	42	8	26	70	12
9	26	4	13.4	23	4	21	44	8	26	80	12
10.5	25	4	16.4	26	4	21	45	8	31	68	8
10.5	25	5	17	35	4	21	45	16	31	68	10
10.5	26	4	17	35	6	21	46	6	32	90	15
10.5	28	4	17	36	4	21	49	6	32	92	15
10.5	30	5	17	36	13	21	65	8	37	80	8
11	30	6	17	37	6	22	65	12	43	92	8
11	36	6	17	38	6	22	68	12			
12.5	28	4	17	40	6	25	46	10			
13	30	5	17	50	6	25	55	10			



Mounting example



244.11.



Material:
St 35.4 case-hardened



Ordering Code (example):

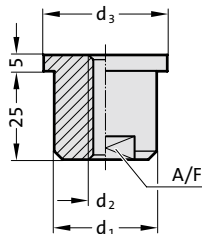
Spacer sleeve	=244.11.
Order code Diameter	40 mm = 40
Order No	=244.11.40

244.11. Spacer sleeve

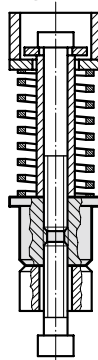
Spring-Ø	20 25	32 40
d_1	20	30
d_2	25	38
Order code	25	40

Spacer plug Adjusting washer

244.12.



Mounting example



244.12. Spacer plug

Spring-Ø	20	25	32	40
d ₁	20	20	32	32
d ₂	M6	M8	M10	M12
d ₃	25.3	25.3	38	38
A/F	15	15	27	27

Material:

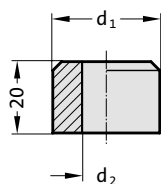
No. 1.7131 case-hardened



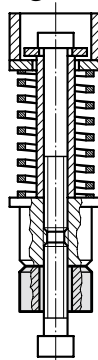
Ordering Code (example):

Spacer plug	=244.12.
Spring diameter Spring-Ø	32 mm = 32
Order No	=244.12. 32

244.13.



Mounting example



244.13. Adjusting washer

Spring-Ø	20	25	32	40
d ₁	20	20	32	32
d ₂	7	9	11	14

Material:

No. 1.7131



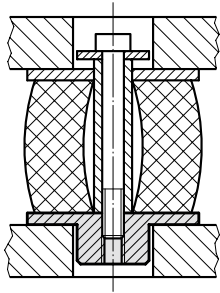
Ordering Code (example):

Adjusting washer	=244.13.
Spring diameter Spring-Ø	32 mm = 32
Order No	=244.13. 32

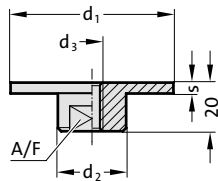
Threaded disc for elastomer springs Threaded disc for compression springs



Mounting example



2441.14.



Material:
St 37

2441.14. Threaded disc for elastomer springs

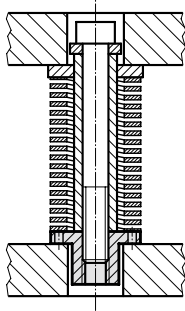
Spring-Ø	25	32	40	50	63	80	100
d ₁	32	40	50	60	78	98	120
d ₂	18	18	18	20	20	26	26
d ₃	M6	M8	M8	M10	M10	M12	M12
A/F	14	14	14	17	17	22	22
s	5	5	5	6	8	10	12

Ordering Code (example):

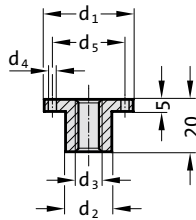
Threaded disc for elastomer springs =2441.14.
Spring diameter Spring-Ø 50 mm = 050
Order No =2441.14.050



Mounting example



2441.15.



Material:
Ck 45 heat treated

2441.15. Threaded disc for compression springs

Spring-Ø d ₁	20	25	32	40	50
d ₂	10	12.5	16	20	25
d ₃	M6	M8	M10	M12	M16
d ₄	3.2	4.2	4.2	4.2	4.2
d ₅	14	20	25	30	40

Ordering Code (example):

Threaded disc for compression springs =2441.15.
Spring diameter Spring-Ø d₁ 32 mm = 032
Order No =2441.15.032

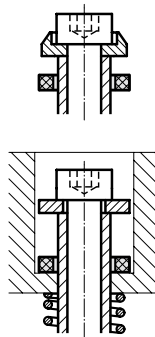
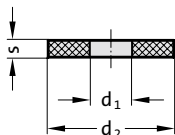




Shock absorbing washer

2450.

Mounting example



Material:

Polyurethan (FIBROFLEX®)

Execution:

2450.6. (90 Shore A) available from stock

2450.5. (80 Shore A) and

2450.7. (95 Shore A) available upon request

2450. Shock absorbing washer

d ₁	d ₂	s	d ₁	d ₂	s	d ₁	d ₂	s
6.4	16	3	17	26	4	25	32	6
8.5	20	3	17	38	5	26	35	6
10.5	15	4	17	50	6	26	50	6
10.5	25	4	17	63	6	27	41	7
11	17	3	18	27	4	27	125	10
12	24	5	18	32	7	31	42	6
13	19	4	21	30	5	32	40	6
13	25	4	21	35	7	32	49	8
13.5	32	4	21	38	6	32	60	10
13.5	40	5	21	80	10	37	46	6
14	23	4	21	100	10	37	53	8
14	26	5	22	28	6	37	65	10
15.5	23	4	23.5	34	4	42	70	10

Ordering Code (example):

Shock absorbing washer =2450.

Shore A hardness MAT 80 Shore A= 5.

Inside diameter d₁ 23.5 mm = 23.

External diameter d₂ 34 mm = 034.

Thickness s 4 mm = 04

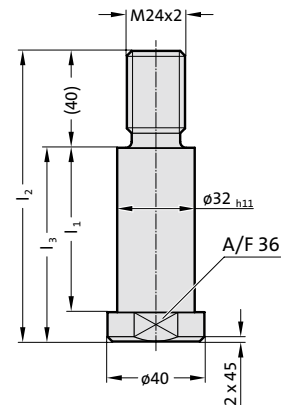
Order No =2450. 5. 23. 034.04

Retaining bolt Thrust washer



Material:
No. 1.7225, heat treated

2441.18.



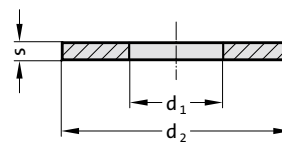
2441.18. Retaining bolt

Order No	l_1	l_2	l_3
2441.18.032.048	48	100	60
2441.18.032.068	68	120	80
2441.18.032.088	88	140	100
2441.18.032.108	108	160	120
2441.18.032.128	128	180	140
2441.18.032.148	148	200	160
2441.18.032.168	168	220	180
2441.18.032.188	188	240	200
2441.18.032.208	208	260	220
2441.18.032.228	228	280	240
2441.18.032.248	248	300	260
2441.18.032.268	268	320	280
2441.18.032.288	288	340	300



Material:
No. 1.0570

2441.16.



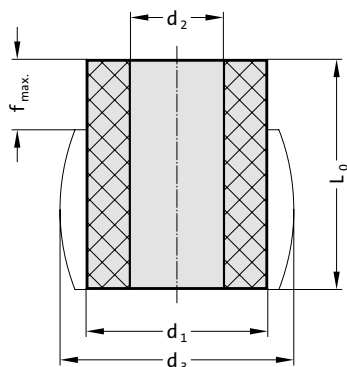
2441.16. Thrust washer

Order No	d_1	d_2	s
2441.16.033.080.06	33	80	6
2441.16.033.100.08	33	100	8



FIBROFLEX®-Tubular spring element

246.6.



246.6. FIBROFLEX®-Tubular spring element

Material:

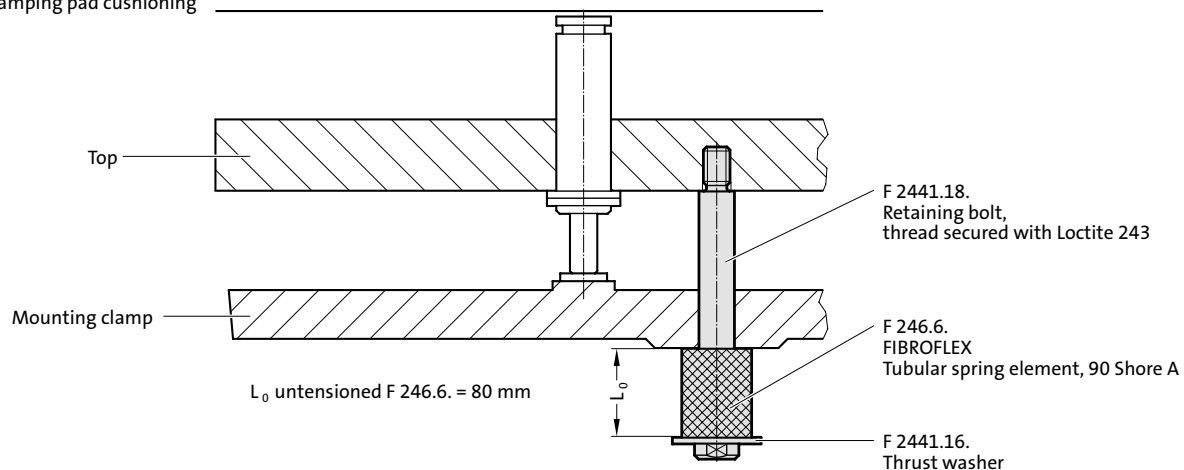
Polyurethan 90 Shore A

Colour: yellow

Order No	d ₁	d ₂	d ₃	l ₀	f max.
246.6.063.033.080	63	33	82	80	24
246.6.080.033.080	80	33	106	80	24

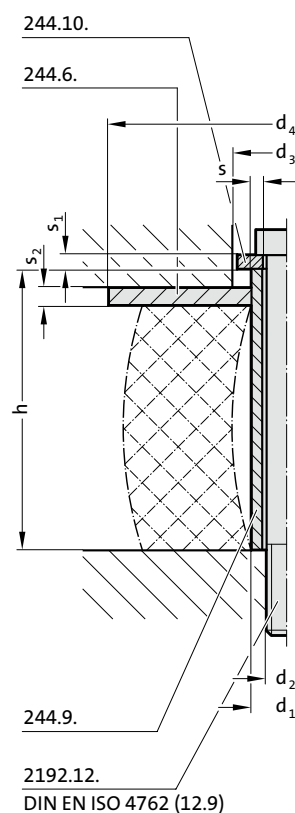
Mounting example

Clamping pad cushioning



Spring unit for elastomer spring

244.14.0.



244.14.0. Spring unit for elastomer spring

Spring unit consists of:

Socket cap screw DIN EN ISO 4762 (12.9) 2192.12.

Spring abutment washer 244.6.

Spacer tube 244.9.

Stop washer 244.10.

Elastomer spring (separate order): 246.5., 246.6., 246.7., 2461.2., 2461.4.

Spring-Ø	d ₁ × s	h*	d ₂	d ₃	d ₄	s ₁	s ₂
25	10 × 1,8		M 6	18	32	3	4
32	12 × 1,8		M 8		40		5
40				30	50	4	
50	16 × 2,5		M 10		60		6
63					80		8
80	20 × 3,5		M 12		100		10
100					120		12
125	25 × 4,5		M 16	39	150	6	15

*h see selection chart spacer tube 244.9. and spring data



Ordering Code (example):

Spring unit for elastomer spring = 244.14.

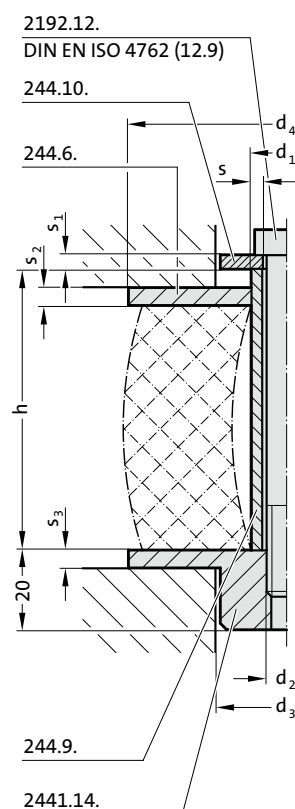
not loaded = 0.

for spring-Ø = 40 mm = 040.

Spacer tube length h = 48 mm = 048

Order number = 244.14.0.040.048

2441.14.1.



2441.14.1. Spring unit for elastomer spring

Spring unit consists of:

Socket cap screw DIN EN ISO 4762 (12.9) 2192.12.

Spring abutment washer 244.6.

Spacer tube 244.9.

Stop washer 244.10.

Threaded disc 2441.14.

Elastomer spring (separate order): 246.5., 246.6., 246.7., 2461.2., 2461.4.

Spring-Ø	d ₁ × s	h*	d ₂	d ₃	d ₄	s ₁	s ₂	s ₃
25	10 × 1,8	M 6	20	32	3	4	5	
32	12 × 1,8	M 8	20	40	3	5	5	
40	12 × 1,8	M 8	20	50	4	5	5	
50	16 × 2,5	M 10	22	60	4	6	6	
63	16 × 2,5	M 10	22	80	4	8	8	
80	20 × 3,5	M 12	28	100	4	10	10	
100	20 × 3,5	M 12	28	120	4	12	12	

*h see selection chart spacer tube 244.9. and spring data



Ordering Code (example):

Spring unit for elastomer spring = 2441.14.

preloaded = 1.

for spring-Ø = 40 mm = 040.

Spacer tube length h = 48 mm = 048

Order number = 2441.14.1.040.048

Spring unit for helical spring

244.15.0. Spring unit for helical spring

Spring unit consists of:

Socket cap screw DIN EN ISO 4762 (12.9) 2192.12.

Spring abutment washer 244.7.

Spacer tube 244.9.

Stop washer 244.10.

Helical spring (separate order): 241.14., 241.15., 241.16., 241.17.

Spring-Ø	d ₁ × s	h*	d ₂	d ₃	d ₄	s ₁	s ₂
20	10 × 1,8	M 6	18	25	3	4	
25	12 × 1,8	M 8	18	25	3	4	
32	16 × 2,5	M 10	30	38	4	5	
40	20 × 3,5	M 12	30	38	4	5	
50	25 × 4,0	M 16	39	50	6	6	
63	35 × 6,0	M 20	52	65	6	8	

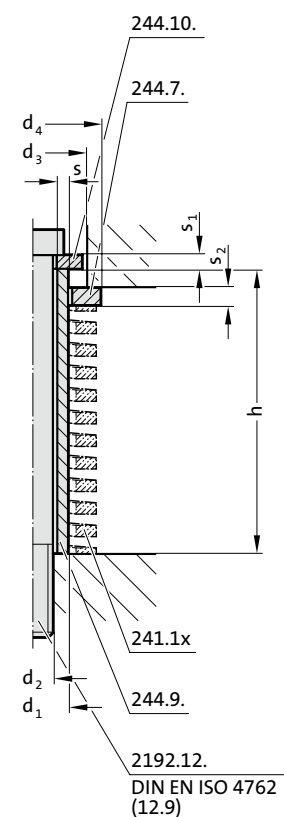
*h see selection chart spacer tube 244.9. and spring Data



Ordering Code (example):

Spring unit for helical spring	=	244.15.
not loaded	=	0.
for spring-Ø = 40 mm	=	040.
Spacer tube length h = 48 mm	=	048
Order number	=	244.15.0.040.048

244.15.0.



2441.15.1. Spring unit for helical spring

Spring unit consists of:

Socket cap screw DIN EN ISO 4762 (12.9) 2192.12.

Spring abutment washer 244.7.

Spacer tube 244.9.

Stop washer 244.10.

Threaded disc 2441.15.

Helical spring (separate order): 241.14., 241.15., 241.16., 241.17.

Spring-Ø	d ₁ × s	h*	d ₂	d ₃	d ₄	s ₁	s ₂
20	10 × 1,8	M 6	11	25	3	4	
25	12 × 1,8	M 8	14	25	3	4	
32	16 × 2,5	M 10	18	38	4	5	
40	20 × 3,5	M 12	22	38	4	5	
50	25 × 4,0	M 16	27	50	6	6	

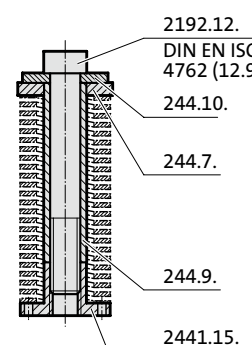
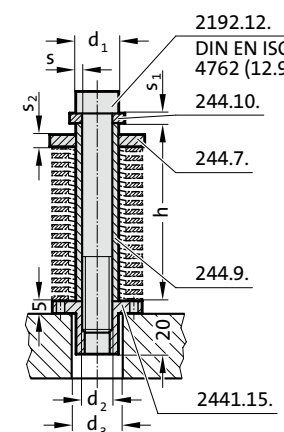
*h see selection chart spacer tube 244.9. and spring Data



Ordering Code (example):

Spring unit for helical spring	=	2441.15.
preloaded	=	1.
for spring-Ø = 40 mm	=	040.
Spacer tube length h = 48 mm	=	048
Order number	=	2441.15.1.040.048

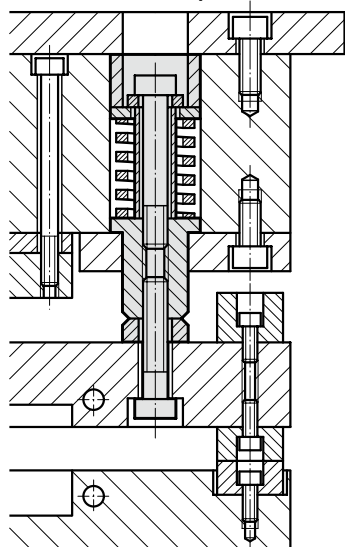
2441.15.1. Mounting examples





Spring- and Spacer Unit

Installation Example:



Note:

The headed spacer plugs are ground equal after assembly in the punch holder.

Note that regrinding on punch points must be compensated by grinding an equal amount off the compensation sleeves.

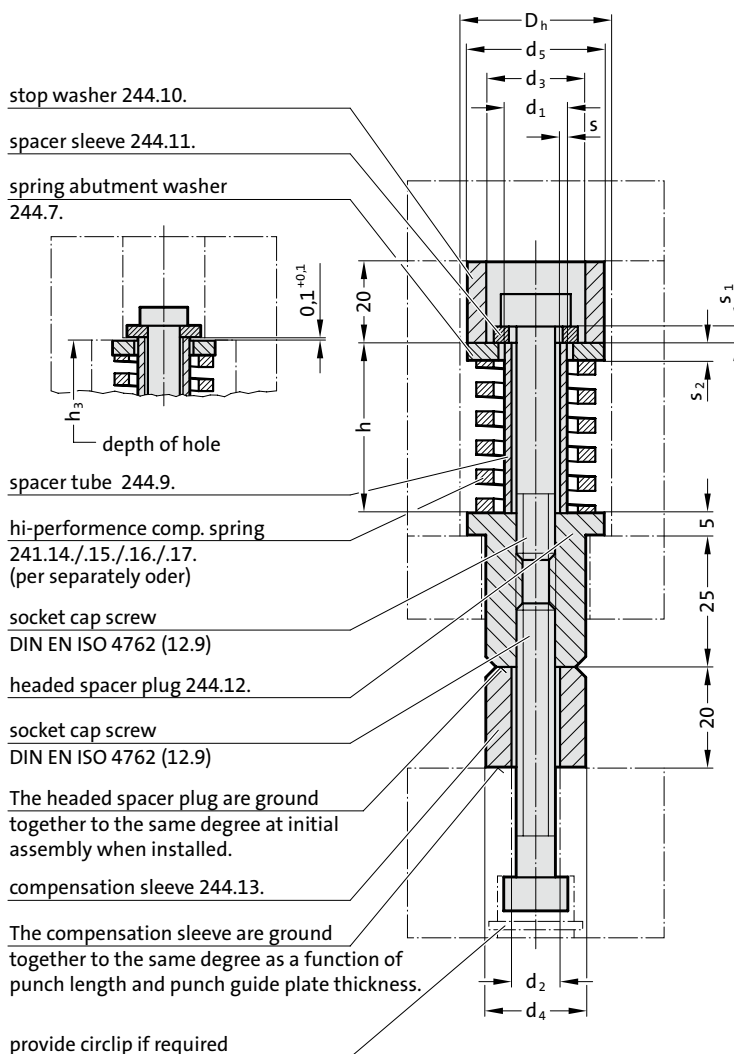
Adjust depth of c'bore h₃ or height of spacer sleeve so that spacer tube cap screw is relieved by about 0,1 mm.

244.□□.□□□.10

Application without Spacer Sleeve
(c'bored hole)

244.□□.□□□.11

Application with Spacer Sleeve
(straight hole)



244.20./25./32./40. Spring- and Spacer Unit

Spring-Ø	d ₁ × s	h*	socket cap screw d ₂	d ₃	d ₄	d ₅	D _h	s ₁	d ₂
20	10 × 1,8		M 6	18	20	25	26	3	4
25	12 × 1,8		M 8	18	20	25	26	3	4
32	16 × 2,5		M 10	30	32	38	40	4	5
40	20 × 3,5		M 12	30	32	38	40	4	5

h* see spacer tube length 244.9. and spring selection 241.1x.

Ordering Code (example):

Spring- and Spacer Unit

Spring-Ø = 20 mm = 244.20.

spacer tube length h = 38 mm with screw = 038.

spacer tube length 244.11. = 11

Order No = 244.20.038.11

Combination Spring- and Spacer Units

Application Examples

Spring Characteristics

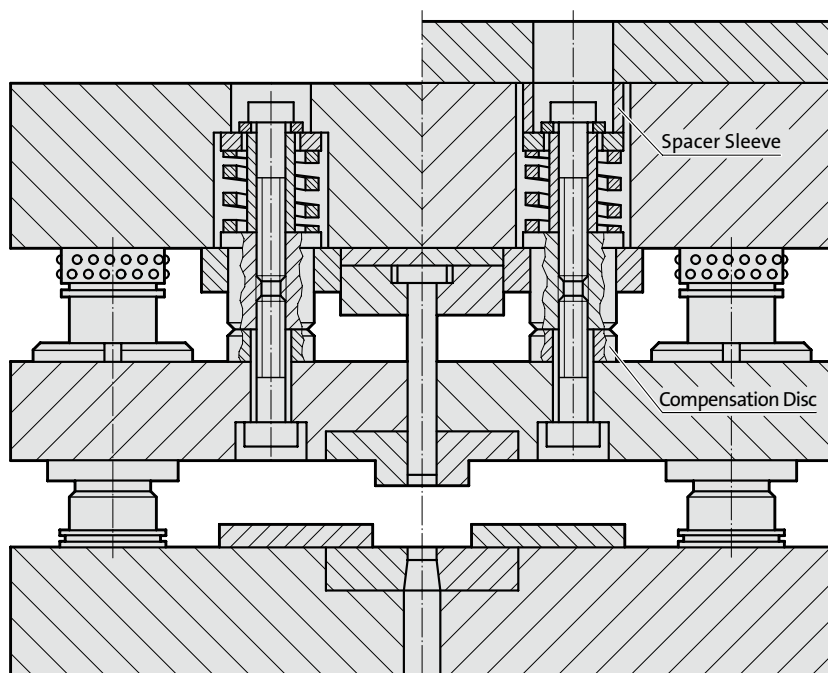


Without Spacer Sleeve

(with c' bored hole)
244.□□.□□□.10.

With Spacer Sleeve

(with straight hole)
244.□□.□□□.11.



Description:

The preloaded Combination Spring- and Spacer Unit combines the functions of providing the spring force and of spacing the stripper in one constructional element, whilst conventional designs employed two.

The resulting advantages therefore consist of space savings and reduced machining cost with regard to the various die members.

The execution with spacer sleeve makes it possible to exchange the whole unit by simply removing the top clamping plate. Removal of the compensation disc gives unimpeded access to the punches – for the purpose of sharpening/grinding.

Important Notice:

In order to preserve pre-existing conditions in regard of spring force and displacement, it is essential that regrinding of the punches equals regrinding of the compensation disc – i. e. the metal removal from either component must be kept the same.

Helical compression springs must be ordered separately, see at the beginning of chapter F.

244.20. 244.32. 244.25. 244.40. Combination Spring- and Spacer Units

Spring Characteristics

Order No	spring sizes D _h × l ₀	Com- pression	spring preload forces (N) Typ				max. working stroke of spring (excl. preload) Typ				spring coefficient (N/mm) Typ				max. spring forces (N) at 80% max. deflection s ₂ Type			
			241.14	241.15	241.16	241.17	.14	.15	.16	.17	.14	.15	.16	.17	.14	.15	.16	.17
244.20.027.□□	20 x 25	2	111,6	196,2	432,0	586,4	10,4	8,8	6,7	6,2	55,8	98,1	216,0	293,2	580	863	1447	1818
244.20.033.□□	20 x 32	3	135,0	218,1	504,0	672,6	12,8	10,4	8,4	7,8	45,0	72,7	168,0	224,2	576	756	1411	1749
244.20.038.□□	20 x 38	4	133,6	224,0	516,0	708,4	15,2	12,8	10,0	9,6	33,4	56,0	129,0	177,1	508	717	1290	1700
244.20.044.□□	20 x 44	4	120,0	190,4	448,0	596,4	18,4	15,2	11,6	11,2	30,0	47,6	112,0	149,1	552	724	1299	1670
244.20.048.□□	20 x 51	7	171,5	291,9	658,0	896,7	20,8	16,8	13,2	12,8	24,5	41,7	94,0	128,1	510	701	1241	1640
244.25.027.□□	25 x 25	2	200,0	294,0	750,0	–	10,4	8,8	7,2	–	100,0	147,0	375,0	–	1040	1294	2700	–
244.25.033.□□	25 x 32	3	240,9	354,3	891,0	1123,8	12,8	10,4	8,4	8,0	80,3	118,1	297,0	374,6	1028	1228	2495	2997
244.25.038.□□	25 x 38	4	248,0	372,4	876,0	1384,8	15,2	12,8	10,4	9,6	62,0	93,1	219,0	346,2	942	1192	2278	3324
244.25.044.□□	25 x 44	4	212,0	323,2	748,0	976,8	18,4	15,2	12,4	11,2	53,0	80,9	187,0	244,2	975	1228	2319	2735
244.25.048.□□	25 x 51	7	308,7	480,9	1092,0	1453,9	20,0	16,8	14,4	12,8	44,1	68,7	156,0	207,7	882	1154	2246	2659
244.32.038.□□	32 x 38	5	470,5	925,5	1940,0	2643,0	15,2	12,8	9,6	8,8	94,1	185,1	388,0	528,6	1430	2369	3725	4652
244.32.044.□□	32 x 44	5	398,0	790,5	1620,0	2135,5	17,6	15,2	11,2	10,4	79,6	158,1	324,0	424,7	1401	2403	3629	4417
244.32.048.□□	32 x 51	8	536,0	1072,8	2176,0	2826,4	20,0	16,8	13,2	12,0	67,0	134,1	272,0	353,3	1340	2253	3590	4240
244.32.061.□□	32 x 64	8	424,0	792,8	1696,0	2155,2	25,6	21,6	17,2	16,0	53,0	99,1	212,0	269,4	1357	2141	3646	4310
244.32.072.□□	32 x 76	9	396,9	724,5	1548,0	1968,3	31,2	25,6	20,8	19,2	44,1	80,5	172,0	218,7	1376	2061	3578	4199
244.40.048.□□	40 x 51	8	736,0	1432,0	2801,6	5027,2	20,0	16,8	13,6	12,0	92,0	179,0	350,2	628,4	1840	3007	4763	7541
244.40.061.□□	40 x 64	8	584,8	1120,0	2152,0	3905,6	25,6	20,8	17,6	15,2	73,1	140,0	269,0	488,2	1871	2912	4734	7421
244.40.072.□□	40 x 76	9	567,9	972,9	1971,0	3413,7	30,4	25,6	21,6	19,2	63,1	108,1	219,0	379,3	1918	2767	4730	7283

Spring- and Spacer Unit low installation space



244.□□.3.□□□.10

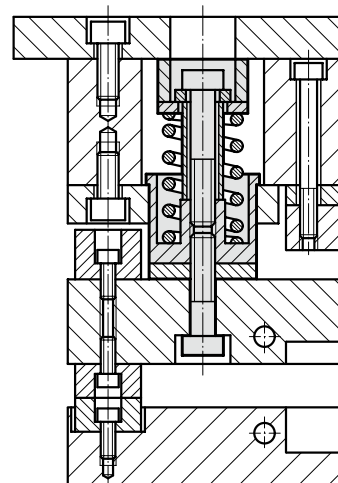
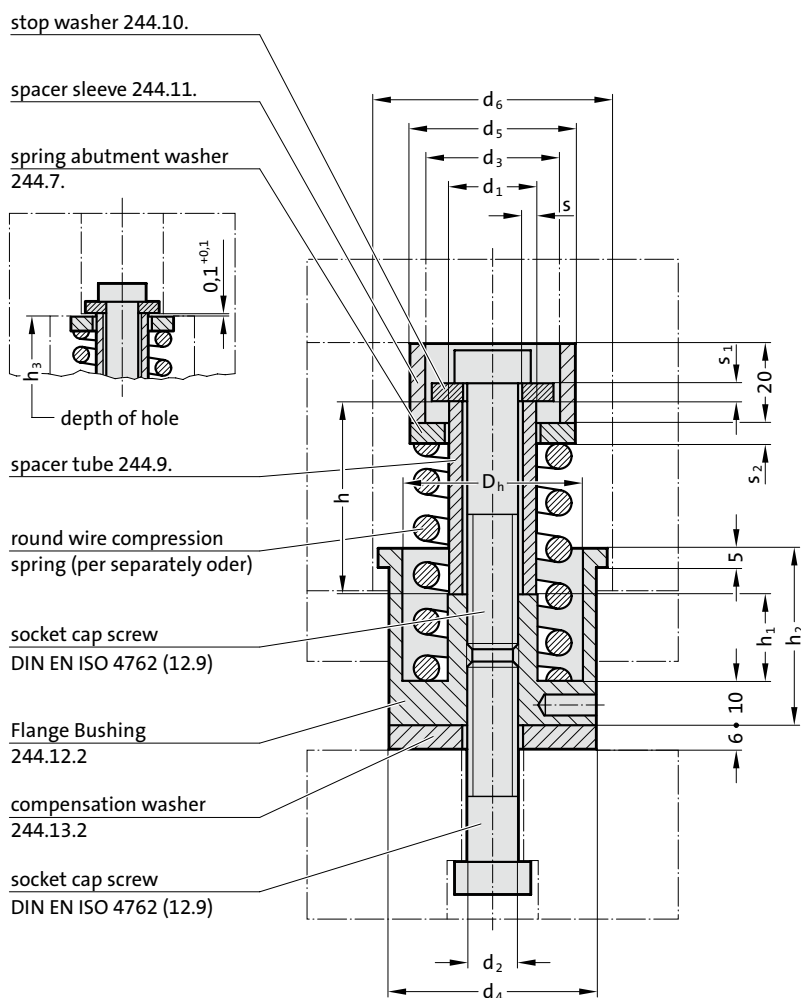
Application without Spacer Sleeve
(c'bored hole)

244.□□.3.□□□.11

Application with Spacer Sleeve
(straight hole)

Installation Example:

with spacer sleeve



Note:

After fitting, the flange bushings are ground to the same length.

Note that regrind allowance on punch points must equal that taken off the compensation washers.

Adjust depth of c' bore or spacer sleeve length resp. so that spacer tube cap screw is relieved by about 0,1 mm.

244.20./25./32./40.3. Spring- and Spacer Unit low installation space

Spring-Ø	d ₁ × s	h*	d ₂	d ₃	d ₄	d ₅	d ₆	D _h	s ₁	s ₂	h ₁	h ₂
20	10 × 1,8		M 6	18	25	25	31	20	3	4	5	36
25	12 × 1,8		M 8	18	32	25	38	25	3	4	10	36
32	16 × 2,5		M 10	30	38	38	44	32	4	5	16	40
40	20 × 3,5		M 12	30	47	38	54	40	4	5	18	40

h* see spacer tube length 244.9. and spring selection 241.1x.

Ordering Code (example):

Spring- and Spacer Unit low installation space

for spring-Ø = 20 mm = 244.20.3.

spacer tube length h = 33 mm = 033.

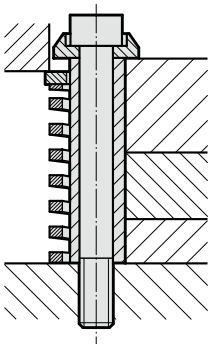
with spacer sleeve 244.11. = 11

Order No = 244.20.3.033.11

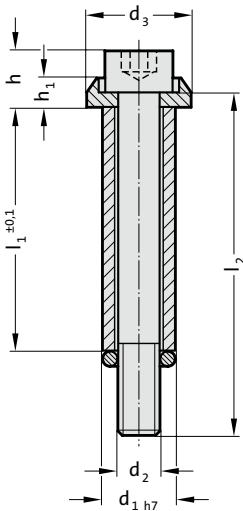
Spring and spacer unit



Mounting example



244.16.



Description:

These units can be used as an alternative to shoulder screws.

Advantages:

Precision length adjustments by way of grinding. The units have many uses – as can be seen from the installation examples below.

Material:

Spacer tube: Steel, hardened

Socket cap screw DIN EN ISO 4762 (12.9)

Execution:

Outside diameter ground

Tolerance: h_7

Note:

The units are supplied with a retaining O-ring **wich must be removed before application.**

244.16. Spring and spacer unit

d_1	10	12.5	15	17.5	23	25
d_2	M6	M8	M10	M12	M16	M16
Tightening torque [Nm]	13	32	65	120	290	290
d_3	15	19	23	27	34	40
h	10	13	15	18	24	24
h_1	5.5	6.5	7.5	9	11	11
l_1	l_2					
20	35	35				
25	40					
30	45	45	50	50		
35	50	50	55			
40	55	55	60	60		
45	60	60	65	65		
50	65	65	70	70	80	
55	70	70 80	75	80		
60	80	80	80 90	90	90	
70	90	90	90 100	100	100	
80	100	100	100 110	110 115 120	110 125 130	110
90	110	110	110	120	120	120
100	120	120	120	130 135 140	130 140 145	130
110				140	140 150	
120			140	150	150 160	
140				180	180	
150					180	
160					200	

Spring and spacer unit =244.16.

Nominal diameter d_1 15 mm = 150.

Length l_1 100 mm = 100.

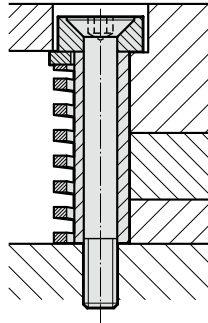
Screw length l_2 120 mm = 120

Order No =244.16. 150. 100. 120

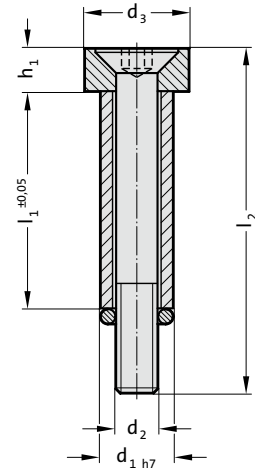
Spring and spacer unit, with hexagon socket countersunk head cap screw



Mounting example



244.18.



Description:

These units can be used as an alternative to shoulder screws.

Advantages:

Precision length adjustments by way of grinding. The units have many uses – as can be seen from the installation examples below.

Material:

Spacer tube: Steel, hardened

Countersunk head cap screw DIN EN ISO 10642 (10.9)

Execution:

Outside diameter ground

Tolerance: h_7

Note:

The units are supplied with a retaining O-ring **wich must be removed before application.**

244.18. Spring and spacer unit, with hexagon socket countersunk head cap screw

d_1	10	12.5	15	17.5	23
d_2	M6	M8	M10	M12	M16
Tightening torque [Nm]	12	28	56	98	240
d_3	15	19	23	27	34
h	10	13	15	18	24
h_1	6	8	10	12	16
l_1	l_2				
20	35				
25	40	45			
30	45	50	55	60	
35	50	55	60	70	
40	55	60	65	70	
45	60	70	70	80	
50	65	70	80	80	90
55		80	80	90	90
60		80	90	90	100
70		90	100	100	110
80		100	110	110	120
90			120	120	140
100					140
110					150
120					150

Ordering Code (example):

Spring and spacer unit, with hexagon socket countersunk head cap screw

=244.18.

Nominal diameter d_1

15 mm = 150.

Length l_1

60 mm = 060.

Screw length l_2

90 mm = 090

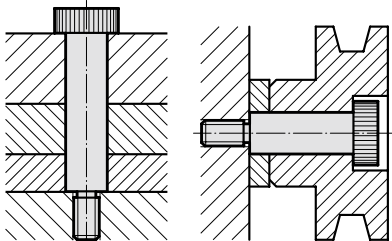
Order No

=244.18.150.060.090

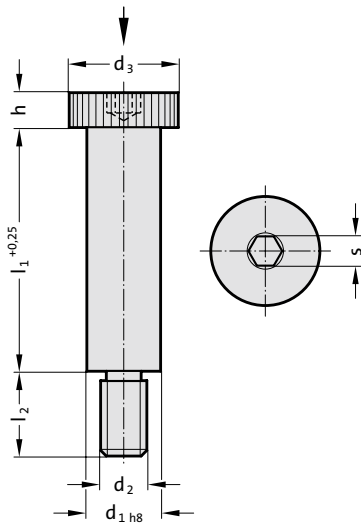
Shoulder screw



Mounting example



244.17.



Material:
High tensile steel,
heat treated to 12.9 ISO 898-1.

Execution:
d₁ ground,
heads knurled.

244.17. Shoulder screw

d ₁	6	8	10	12	16	20	24
d ₂	M5	M6	M8	M10	M12	M16	M20
Tightening torque [Nm]	7	13	32	65	120	290	500
d ₃	10	13	16	18	24	30	36
h	4.5	5.5	7	9	11	14	16
s	3	4	5	6	8	10	12
l ₂	9.5	11	13	16	18	22	27
l ₁							
10	•	•					
12	•	•					
16	•	•	•	•			
20	•	•	•	•			
25	•	•	•	•	•		
30	•	•	•	•	•	•	
35	•	•	•	•	•	•	
40	•	•	•	•	•	•	•
45			•	•	•	•	
50		•	•	•	•	•	•
55			•	•	•	•	
60			•	•	•	•	•
65			•	•	•	•	
70			•	•	•	•	•
80			•	•	•	•	•
90				•	•	•	•
100				•	•	•	•
120					•	•	•

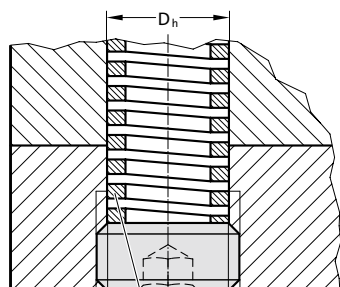
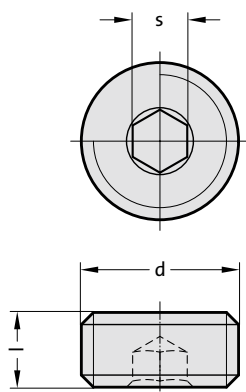
Ordering Code (example):

Shoulder screw	=244.17.
Nominal diameter d ₁ 12 mm =	120.
Guide length l ₁ 55 mm =	055
Order No	=244.17. 120.055



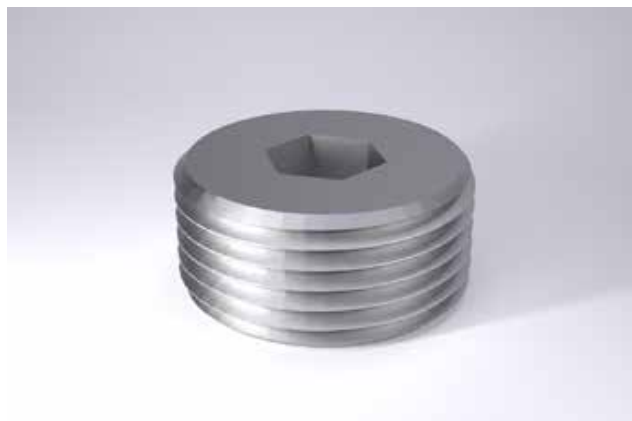
Compression spring set screw

241.00.1.



secured with
LOCTITE
Type 281.243

compression spring to separate
order - see High Performance
Compression Springs



Description:

These set screws can be used as adjustable spring stops. They are available for all customary spring sizes from $\varnothing 10$ to $\varnothing 40$. The set screws are suitable for springs 241.14. to .17.

Their use offers the following advantages:

- Adjustable spring tension from under the bottom bolster, without any dismantling.
- Exchange of springs without dismantling.
- Through-holes instead of blind holes for spring accommodation.

Ordering Code (example):

Compression spring set screw	=241.00.1.
d 22 mm	= 22
Order No	=241.00.1. 22

241.00.1. Compression spring set screw

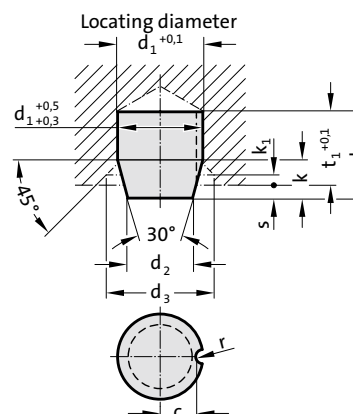
d	M12x1,5	M14x1,5	M18x1,5	M22x1,5	M28x1,5	M35x1,5	M42x1,5
l	10	10	10	10	12	12	12
s	6	6	8	8	10	10	10
Spring \varnothing	10	12.5	16	20	25	32	40
D _h	10.5	12.5	16.5	20.5	26.5	33.5	40.5

Compression Pad Shedder insert



Material:
FIBROFLEX®
Hardness 90 Shore A

2471.6.

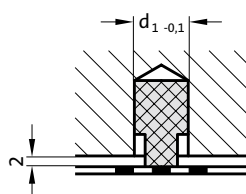


2471.6. Compression Pad

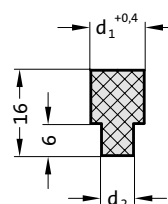
Order No	d ₁	d ₂	d ₃	l	k	k ₁	t ₁	r	c	Compressive force [N]	at s
2471.6.006	6	3.6	10	9.5	4.5	1	8	-	-	100	1.5
2471.6.010	10	6	16	15.5	7.5	2	13	1	4	450	2.5
2471.6.016	16	9.5	22	25	12	5	21	1.5	6.5	1500	4
2471.6.024	24	18	32	25	10	2	21	2	10	3000	4
2471.6.030	30	20	38	35	19	10	30	2.5	12.5	3000	5
2471.6.032	32	24	40	32	14	4	26	3	13	12000	6
2471.6.039	39.5	30	50	40	16	4.75	34	3	16.8	25000	6



Mounting example



247.6.



Description:

Instead of conventional shedder pins and their springs as well as set screws, FIBROFLEX® Shedder Inserts are simply pressed into matching holes (see mounting example).

Material:

FIBROFLEX®
Hardness 90 Shore A

247.6. Shedder insert

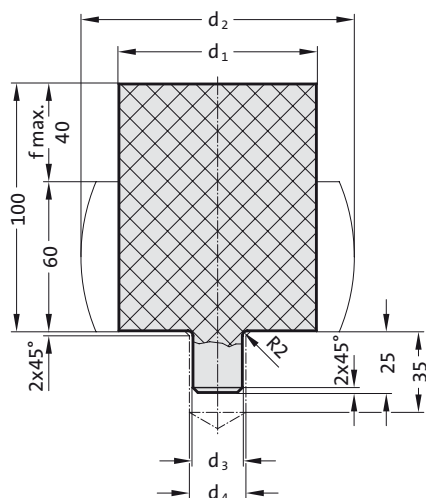
Order No	d ₁	d ₂	Stripping force [daN]
247.6.008.016	8	4	20
247.6.010.016	10	6	25
247.6.012.016	12	8	30





Setting-up bumper, round

2531.7.



Description:

Setting up bumpers are used for setting down and setting up tools and replace shear pins.

Material:

FIBROFLEX®
Hardness 95 Shore A

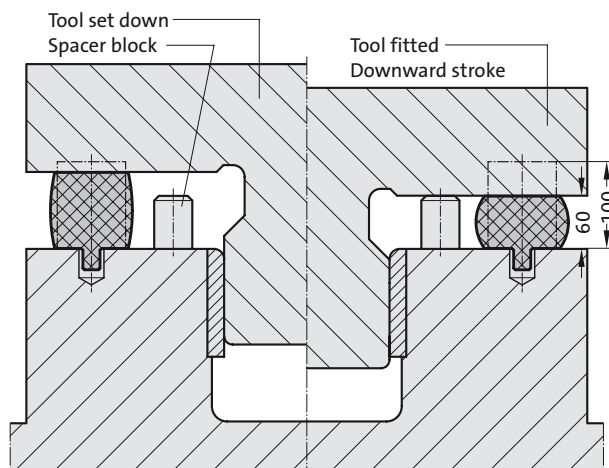
Attention:

Setting up bumpers are not suitable for continuous use. To prevent damage when setting down tools, ensure that the setting up bumpers are large enough to withstand 1.5 times the weight of the tool (see table).

Implementation:

1. When setting up slowly move the ram into the bottom position.
2. Clamp the tool, then move the ram back to the top position (with the setting up bumper compressed to a height of 60 mm).
3. After setting up, remove the setting up bumpers and place them in the storage hole on the tool.

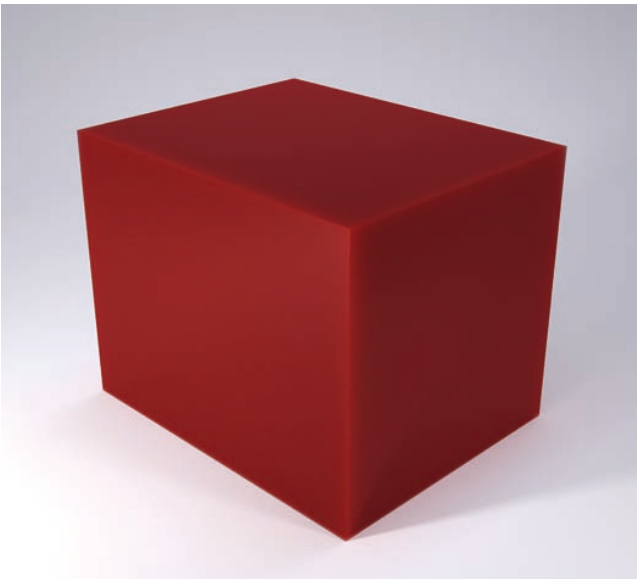
Mounting example



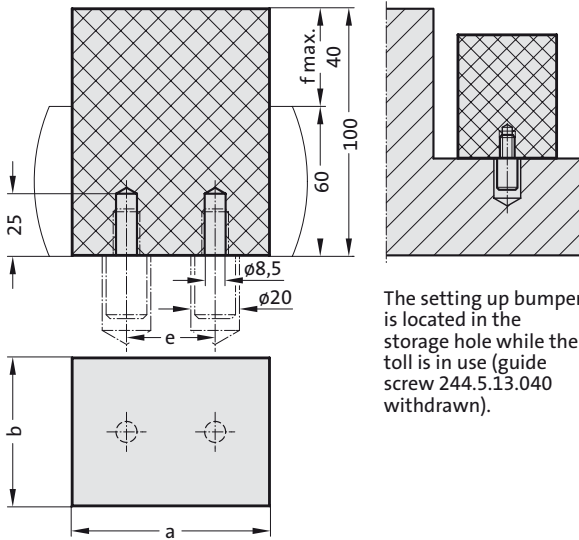
2531.7. Setting-up bumper, round

Order No	d ₁	d ₂	d ₃	d ₄	f max.	Load capacity in daN at f=20	Load capacity in daN at f=25	Load capacity in daN at f=40	Admissible tool weight in kg for 4 setting up bumpers f=20/safety factor 1,5
2531.7.063	63	86	16	18	40	2200	2800	4800	5800
2531.7.080	80	111	20	22	40	3500	4600	8500	9300
2531.7.100	100	136	20	22	40	5000	6700	11700	13300
2531.7.125	125	171	25	28	40	7600	9400	18900	20200

Setting-up bumper, square

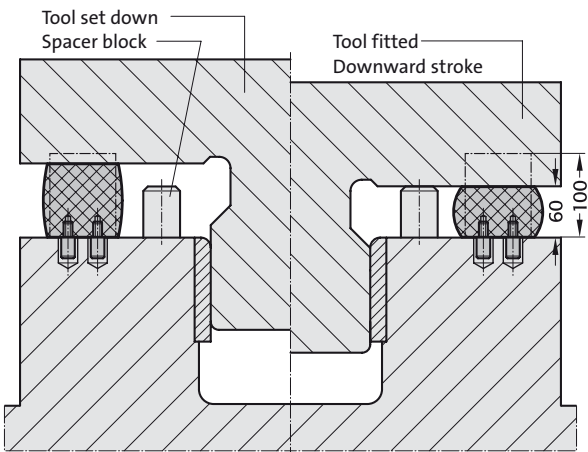


252.7.



The setting up bumper is located in the storage hole while the toll is in use (guide screw 244.5.13.040 withdrawn).

Mounting example



Description:

Setting up bumpers are used for setting down and setting up tools and replace shear pins.

Material:

FIBROFLEX®
Hardness 95 Shore A

Attention:

Setting up bumpers are not suitable for continuous use. To prevent damage when setting down tools, ensure that the setting up bumpers are large enough to withstand 1.5 times the weight of the tool (see table).

Implementation:

1. When setting up slowly move the ram into the bottom position.
2. Clamp the tool, then move the ram back to the top position (with the setting up bumper compressed to a height of 60 mm).
3. After setting up, remove the setting up bumpers and place them in the storage hole on the tool.

252.7. Setting-up bumper, square

Order No	a	b	e	Load capacity in daN at f=20	Admissible tool weight in kg for 4 setting up bumpers f=20/safety factor 1,5
252.7.080.060	80	60	36	2700	7100
252.7.100.080	100	80	50	6200	16500
252.7.125.100	125	100	60	8600	22900
252.7.180.100	180	100	100	13600	36200