






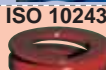
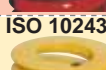
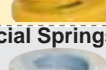








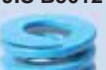


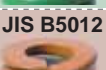




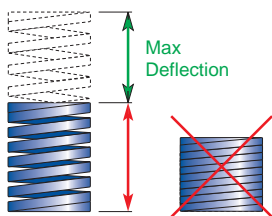
# COILED SPRINGS SPRĘŻYNY KRĘTE



Series	Standard	Color	Load	 + 3.000.000	 ~1.500.000	 300-500.000	 100-200.000 cycles
<b>VL</b>	Special Springs Std 	Light green (RAL6019)	Extra-light	30 % L <sub>0</sub>	40 % L <sub>0</sub>	45 % L <sub>0</sub>	50 % L <sub>0</sub>
<b>V</b>	ISO 10243 	Green (RAL 6002)	Light	25 % L <sub>0</sub>	30 % L <sub>0</sub>	35 % L <sub>0</sub>	40 % L <sub>0</sub>
<b>B</b>	ISO 10243 	Blue (RAL 5003)	Medium	25 % L <sub>0</sub>	30 % L <sub>0</sub>	33,75 % L <sub>0</sub>	37,75 % L <sub>0</sub>
<b>R</b>	ISO 10243 	Red (RAL 3000)	Heavy	20 % L <sub>0</sub>	25 % L <sub>0</sub>	27,5 % L <sub>0</sub>	30 % L <sub>0</sub>
<b>G</b>	ISO 10243 	Yellow (RAL 1004)	Extra-Heavy	17 % L <sub>0</sub>	20 % L <sub>0</sub>	22,5 % L <sub>0</sub>	25 % L <sub>0</sub>
<b>A</b>	Special Springs Std 	Silver (RAL 9006)	Ultra-Heavy	10 % L <sub>0</sub>	12 % L <sub>0</sub>	13,5 % L <sub>0</sub>	15 % L <sub>0</sub>
<b>W</b>	Special Springs Std 	White	Hyper strong	5 % L <sub>0</sub>	6,5 % L <sub>0</sub>	7,5 % L <sub>0</sub>	8,4 - 14 % L <sub>0</sub>
<b>TV</b>	Special Springs Std 	Green (RAL 6002)	Light	25 % L <sub>0</sub>	30 % L <sub>0</sub>	35 % L <sub>0</sub>	40 % L <sub>0</sub>
<b>TB</b>	Special Springs Std 	Blue (RAL 5003)	Medium	25 % L <sub>0</sub>	30 % L <sub>0</sub>	33,75 % L <sub>0</sub>	37,5 % L <sub>0</sub>
<b>TR</b>	Special Springs Std 	Red (RAL 3000)	Heavy	20 % L <sub>0</sub>	25 % L <sub>0</sub>	27,5 % L <sub>0</sub>	30 % L <sub>0</sub>

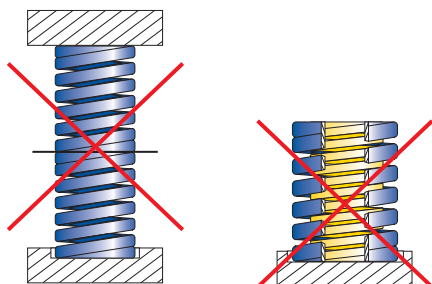
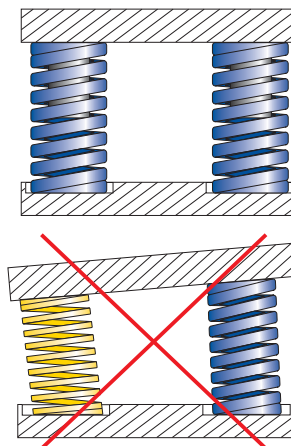
Series	Standard	Color	Load	 1.000.000 cycles	 500.000 cycles	 300.000 cycles	 Solid deflections Do not use!
<b>SF</b>	JIS B5012 	Yellow (RAL 1004)	Extra-light	40 % L <sub>0</sub>	45 % L <sub>0</sub>	50 % L <sub>0</sub>	58 % L <sub>0</sub>
<b>SL</b>	JIS B5012 	Blue (RAL 5012)	Light	32 % L <sub>0</sub>	36 % L <sub>0</sub>	40 % L <sub>0</sub>	48 % L <sub>0</sub>
<b>SM</b>	JIS B5012 	Red (RAL 3000)	Medium	25,6 % L <sub>0</sub>	28,8 % L <sub>0</sub>	32 % L <sub>0</sub>	38 % L <sub>0</sub>
<b>SH</b>	JIS B5012 	Green (RAL 6002)	Heavy	19,2 % L <sub>0</sub>	21,6 % L <sub>0</sub>	24 % L <sub>0</sub>	28 % L <sub>0</sub>
<b>SB</b>	JIS B5012 	Brown (RAL 8003)	Extra-Heavy	16 % L <sub>0</sub>	18 % L <sub>0</sub>	20 % L <sub>0</sub>	24 % L <sub>0</sub>
<b>L</b>	JIS B5012 	Not painted, oiled	-	-	-	-	-
<b>SR</b>	JIS B5012 	Ivory (RAL 1014)	-	-	50 % L <sub>0</sub>	-	60 % L <sub>0</sub>

**EN** The correct use of Special Springs' die springs assure performance levels well above the lifetime values indicated. Before using the springs, carefully read all the recommendations. Incorrect use can significantly reduce the expected lifetime and may cause damages or injury.



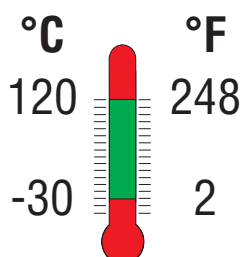
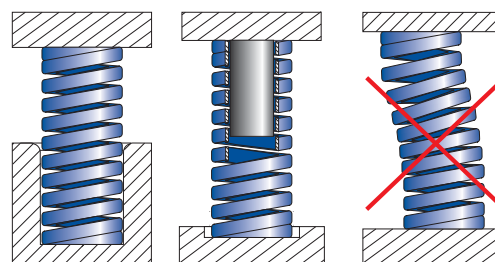
**EN** Do not exceed the maximum deflection as indicated in the tabs (column D) as it may cause sudden failure of the springs and damages on the tool. Do not store springs in compressed state for long time as it may cause abnormal fatigue to the springs.

**EN** When using different type of springs in parallel simultaneously ensure that overall deflection and force guarantee a balanced load. When setting the springs ensure the best perpendicularity to the working surface to avoid early failure of the springs.

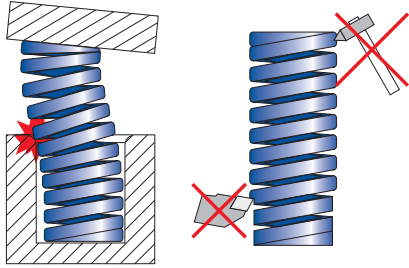


**EN** Avoid to using springs in vertical group not fully guided or using springs inserted in each other as it may cause serious damage or injury.

**EN** The bigger the guide the longer the lifetime. It is essential to guide all springs with a free length /diameter ratio exceeding 3.5.

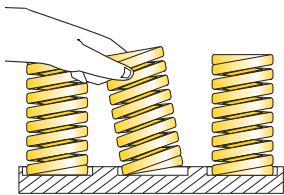
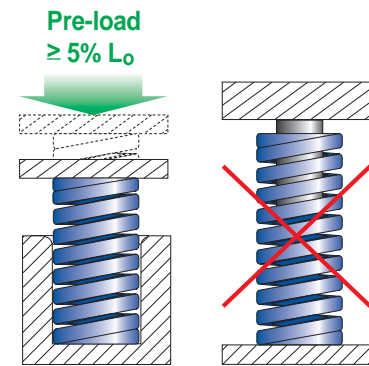


**EN** Best working temperature – 30°C + 120°C. Over 120°C and up to 250°C should be considered an average loss of 1% on springs rate for every 40°C.

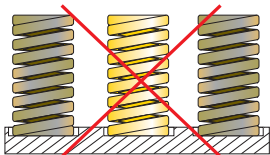


**EN** Any alteration on the surface of the springs (cutting, grinding, scratches, etc.) may significantly reduce the expected lifetime. Always replace the damaged springs with new ones.

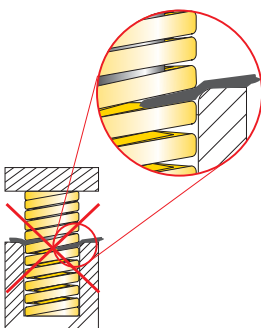
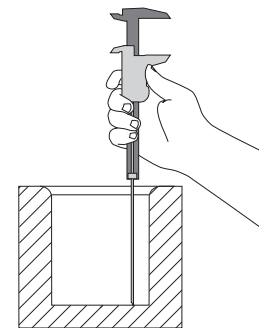
**EN** The bigger the pre-load the longer the lifetime of the springs for the same total deflection (% of  $L_0$ ). Thus longer springs with bigger pre-load will assure longer lifetime. It is recommended to apply a minimum pre-load of 5% of the free length.



**EN** If one spring collapses, an imbalanced load will occur, possibly damaging the other springs. Replace all springs. An advance planned maintenance according to the indicated lifetime of the springs will benefit in avoiding damages and saving of money.



**EN** Tool maintenance can vary the original working deflection of the springs. Please always check the real working stroke of the springs to avoid early failure of the springs or damages in the tool.



**EN** The presence of scraps or any solid piece between coils causes a reduction of springs deflection with overloads and early failure of the springs with damage in the tool. Take care to avoid that.

**EN** The following selecting guide-line is essential for an easy and fast selection of the springs. Please specify the following working parameters: expected lifetime (ex.: 3.000.000 cycles), hole diameter (ex.: 16 mm), total spring force (ex.: 380 N) and total spring working deflection including pre-load (ex.: 5 mm).

**EN** Through the tabs on pages 7 and 8 cross the expected lifetime section (ex.: 3.000.000 cycles) with the hole diameter required (ex.: 16 mm).

RECTANGULAR WIRE SECTION

Estimated Life	Hole diameter (mm)									Series
	10	12,5	16	20	25	32	40	50	63	
+ 3.000.000 cycles	-	-	-	220	410	485	745	1560	-	VL
	70	130	185	315	560	830	1130	2320	3250	V
	110	190	330	525	845	1520	2030	3050	5310	B
	125	200	380	935	1560	2530	3270	4860	8440	R
	145	230	455	1090	1760	2800	4770	6820	11890	C
-	-	-	-	4090	6350	7700	12280	-	-	A

**EN** The intersection of the expected lifetime with the hole diameter shows different forces. Select the one closest to your need.

RECTANGULAR WIRE SECTION

Estimated Life	Hole diameter (mm)									Series
	10	12,5	16	20	25	32	40	50	63	
+ 3.000.000 cycles	-	-	-	220	410	485	745	1560	-	VL
	70	130	185	315	560	830	1130	2320	3250	V
	110	190	330	525	845	1520	2030	3050	5310	B
	125	200	380	935	1560	2530	3270	4860	8440	R
	145	230	455	1090	1760	2800	4770	6820	11890	C
-	-	-	-	4090	6350	7700	12280	-	-	A

**EN** After selecting the proper force box (ex.: 380 N) look to the corresponding load range of springs (ex.: R - heavy load).

RECTANGULAR WIRE SECTION

Estimated Life	Hole diameter (mm)									Series
	10	12,5	16	20	25	32	40	50	63	
+ 3.000.000 cycles	-	-	-	220	410	485	745	1560	-	VL
	70	130	185	315	560	830	1130	2320	3250	V
	110	190	330	525	845	1520	2030	3050	5310	B
	125	200	380	935	1560	2530	3270	4860	8440	R
	145	230	455	1090	1760	2800	4770	6820	11890	C
-	-	-	-	4090	6350	7700	12280	-	-	A

**EN** Then go to the standard tabs on the column A corresponding to the expected lifetime of 3.000.000 cycles and select the required total spring deflection.

Code	D <sub>i</sub>	D <sub>o</sub>	L <sub>0</sub>	R	A	B	C	D	E				
					20% L	25% L	27.5% L	30% L	do not use				
					3.000.000	1.500.000	300-500.000	100-200.000	do not use				
R 16 - 025	16	25	75.7	5.0	379	6.3	477	6.9	520	7.5	568	8.4	50
R 16 - 032	16	32	52.8	6.4	338	8.0	422	8.8	465	9.6	507	10.5	50
R 16 - 038	16	38	48.5	7.6	309	9.5	401	10.5	507	11.4	553	13.6	25
R 16 - 044	16	44	42.8	8.8	377	11.0	471	12.1	518	13.2	565	15.8	25
R 16 - 051	16	51	37.1	10.2	378	12.8	435	14.0	520	15.3	568	18.9	25
R 16 - 064	16	64	30.3	12.8	368	16.0	485	17.6	533	19.2	582	24.9	25
R 16 - 076	16	76	25.7	15.2	391	19.0	488	20.9	537	22.8	586	29.2	20
R 16 - 089	16	89	21.7	17.8	366	22.3	484	24.5	531	26.7	579	34.5	20
R 16 - 102	16	102	19.3	20.4	394	25.5	492	28.1	541	30.6	591	39.1	20
R 16 - 115	16	115	15.7	23.0	361	28.8	452	31.6	497	34.5	542	44.0	10
R 16 - 305	3.1 x 2.5	305	7.1	61.0	433	76.3	542	83.9	596	91.5	650	103.6	10
RHL 37 - 100		25	22.1	5.0	111	6.3	139	6.9	152	7.5	166	9.2	50

**EN** Once selected the total spring deflection (ex.: 5 mm) select the corresponding spring code (ex.: R 16 - 025). The bigger the pre-load the longer the lifetime of springs for the same total deflection(%ofL<sub>0</sub>).

Code	D <sub>i</sub>	D <sub>o</sub>	L <sub>0</sub>	R	A	B	C	D	E				
					20% L	25% L	27.5% L	30% L	do not use				
					3.000.000	1.500.000	300-500.000	100-200.000	do not use				
R 16 - 025	16	25	75.7	5.0	379	6.3	477	6.9	520	7.5	568	8.4	50
R 16 - 032	16	32	52.8	6.4	338	8.0	422	8.8	465	9.6	507	10.5	50
R 16 - 038	16	38	48.5	7.6	309	9.5	401	10.5	507	11.4	553	13.6	25
R 16 - 044	16	44	42.8	8.8	377	11.0	471	12.1	518	13.2	565	15.8	25
R 16 - 051	16	51	37.1	10.2	378	12.8	435	14.0	520	15.3	568	18.9	25
R 16 - 064	16	64	30.3	12.8	368	16.0	485	17.6	533	19.2	582	24.9	25
R 16 - 076	16	76	25.7	15.2	391	19.0	488	20.9	537	22.8	586	29.2	20
R 16 - 089	16	89	21.7	17.8	366	22.3	484	24.5	531	26.7	579	34.5	20
R 16 - 102	16	102	19.3	20.4	394	25.5	492	28.1	541	30.6	591	39.1	20
R 16 - 115	16	115	15.7	23.0	361	28.8	452	31.6	497	34.5	542	44.0	10
R 16 - 305	3.1 x 2.5	305	7.1	61.0	433	76.3	542	83.9	596	91.5	650	103.6	10
RHL 37 - 100		25	22.1	5.0	111	6.3	139	6.9	152	7.5	166	9.2	50



 **RECTANGULAR WIRE SECTION**

Estimated Life	Hole diameter (mm)									Series
	10	12.5	16	20	25	32	40	50	63	
+ 3.000.000 cycles	Load (N)									
	-	-	-	220	410	485	745	1560	-	VL
	70	130	185	315	560	830	1130	2320	3250	V
	110	190	330	525	845	1520	2030	3050	5310	B
	125	200	380	935	1560	2530	3270	4860	8440	R
	145	230	455	1090	1760	2800	4770	6820	11890	G
-	-	-	-	4090	6350	7700	12280	-	A	
~ 1.500.000 cycles	Load (N)									
	-	-	-	290	540	650	1000	2120	-	VL
	80	150	220	380	675	990	1360	2780	3900	V
	130	230	400	625	1010	1830	2430	3660	6370	B
	155	250	480	1170	1950	3170	4090	6070	10560	R
	170	270	535	1280	2070	3290	5610	8030	13990	G
-	-	-	-	4910	7620	9240	14730	-	A	
300 -500.000 cycles	Load (N)									
	-	-	-	330	610	730	1120	2380	-	VL
	95	180	260	440	780	1160	1590	3240	4540	V
	150	255	450	705	1140	2060	2730	4120	7170	B
	170	275	525	1290	2140	3480	4490	6670	11610	R
	195	305	605	1440	2320	3700	6300	9020	15740	G
-	-	-	-	5530	8570	10400	16580	-	A	
100 -200.000 cycles	Load (N)									
	-	-	-	365	680	810	1250	2650	-	VL
	110	200	300	500	890	1320	1810	3710	5190	V
	170	280	500	780	1260	2280	3040	4580	7960	B
	185	300	570	1400	2340	3800	4900	7280	12660	R
	215	340	670	1605	2585	4120	7010	10040	17330	G
-	-	-	-	6140	9520	11550	18420	-	A	

**EN**

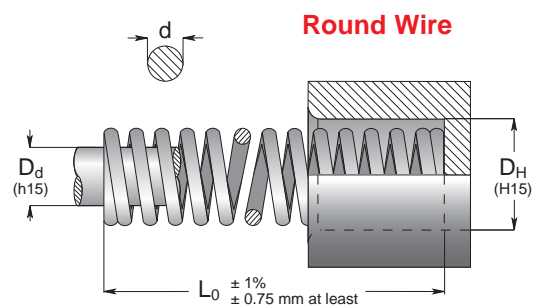
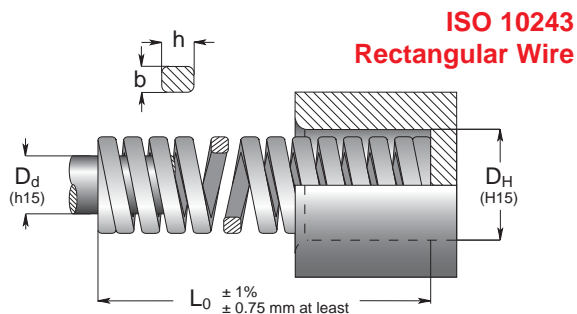
The stated service life values are obtained from in-house reliability tests and are not guaranteed due to the impossibility to consider all variables on the real working conditions of the springs.  
The selecting guide-line is an approximate method of spring selection, it is always recommended to refer to the standard tabs before using the spring.

## ROUND WIRE SECTION

Estimated Life	Hole diameter (mm)									Series
	10	12.5	16	20	25	32	40	50	63	
+ 3,000,000 cycles	Load (N)									
	25	50	100	-	-	-	-	-	-	TV
	70	130	175	-	-	-	-	-	-	TB
~1,500,000 cycles	Load (N)									
	30	60	115	-	-	-	-	-	-	TV
	90	150	210	-	-	-	-	-	-	TB
300,000 - 500,000 cycles	Load (N)									
	35	70	135	-	-	-	-	-	-	TV
	100	170	240	-	-	-	-	-	-	TB
100,000 - 200,000 cycles	Load (N)									
	40	80	150	-	-	-	-	-	-	TV
	110	190	290	-	-	-	-	-	-	TB
										TR

## JIS B5012 - RECTANGULAR WIRE SECTION

Estimated Life	Outside diameter (mm)													Series	
	10	12	14	16	18	20	22	25	27	30	35	40	50		60
1,000,000 cycles	Load (N)														
	78.5	107.9	142.2	166.7	206	255	314	392	471	569	768.3	1000	1569	2260	SF
	112.8	166.7	216	275	333	422	530	657	785	893	1295	1697	2650	3810	SL
	156.9	226	304	402	510	628	765	981	1147	1412	1912	2510	3920	5640	SM
	235	333	461	608	765	941	1138	1471	1716	2120	2870	3770	5880	8470	SH
500,000 cycles	Load (N)														
	88.3	122.6	156.9	186.3	225	284	353	441	530	637	864.4	1128	1765	2540	SF
	127.5	186.3	245	314	382	481	588	745	883	1005	1461	1903	2980	4290	SL
	176.5	255	343	451	569	706	853	1098	1285	1579	2160	2820	4410	6350	SM
	265	373	520	677	853	1059	1275	1657	1932	2380	3240	4240	6620	9540	SH
300,000 cycles	Load (N)														
	98.1	137.3	176.5	206	255	314	392	490	588	706	961	1255	1961	2820	SF
	142.2	206	275	343	422	530	657	824	981	1117	1618	2120	3310	4770	SL
	196.1	284	383	500	637	785	951	1226	1432	1785	2400	3140	4900	7060	SM
	294	422	579	755	951	1177	1422	1834	2150	2550	3600	4710	7360	10590	SH
															SB



Code	D <sub>H</sub>	D <sub>d</sub>	L <sub>0</sub>	R	A	B	C	D	E		
	Hole Diameter	Rod Diameter	Free Length	Spring Constant	% L <sub>0</sub>	% L <sub>0</sub>	% L <sub>0</sub>	% L <sub>0</sub>	% L <sub>0</sub>	approx. <b>do not use</b>	
	b x h, d			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000			Pcs
	mm	mm	mm	N/mm	mm	N	mm	N	mm		

**D<sub>H</sub>** hole diameter

**D<sub>d</sub>** rod diameter

**b x h** cross wire section  
**d**

**L<sub>0</sub>** spring free length

**R** spring rate (load required for 1mm deflection)

**A** advised working deflection for + 3.000.000 cycles

**B** advised working deflection for ~ 1.500.000 cycles

**C** advised working deflection for 300.000 - 500.000 cycles

**D** advised working deflection for 100.000 - 200.000 cycles

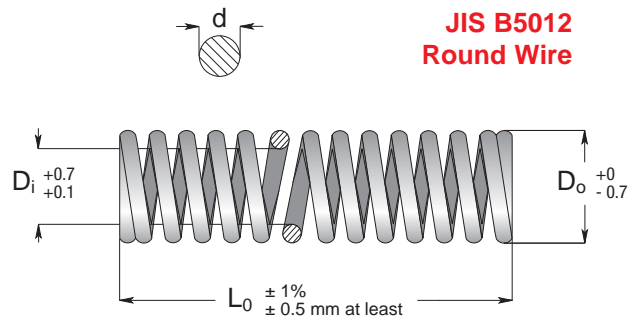
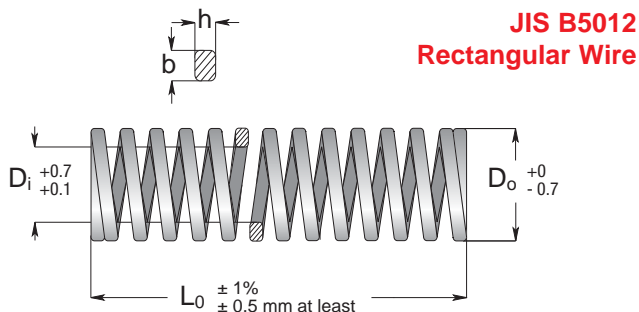
**E** solid deflection (approximate value)



approx.



quantity for standard packaging



Code	D <sub>0</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A	B	C	E	
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	% L <sub>0</sub>	% L <sub>0</sub>	% L <sub>0</sub>	approx. <b>do not use</b>	
				± 10%	1.000.000 cycles	500.000 cycles	300.000 cycles		Pcs
	mm	mm	mm	N/mm	mm	N	mm	mm	

**D<sub>0</sub>** spring outside diameter

**D<sub>i</sub>** spring inside diameter

**L<sub>0</sub>** spring free length

**R** spring rate (load required for 1mm deflection)

**A** advised working deflection for 1.000.000 cycles

**B** advised working deflection for 500.000 cycles

**C** advised working deflection for 300.000 cycles

**E** solid deflection (approximate value)



approx.

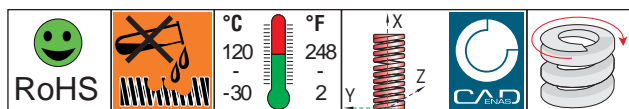
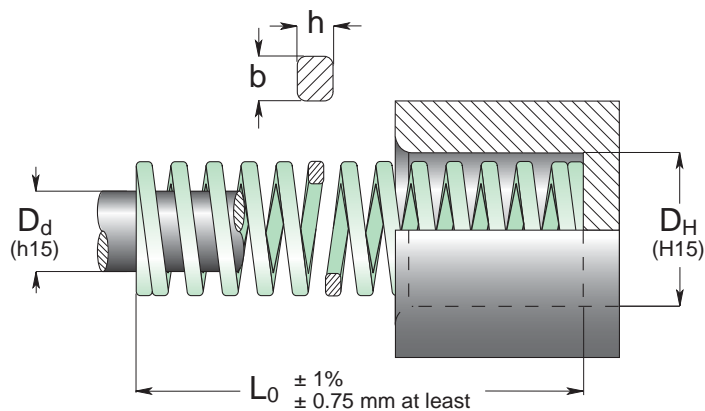


quantity for standard packaging



VL SERIES

**EN** Extra-light load springs



Code	D <sub>H</sub>		L <sub>0</sub>	R	A		B		C		D		E	Pcs
	Hole Diameter	Rod Diameter			Free Length	Spring Constant	30% L <sub>0</sub>	40% L <sub>0</sub>	45% L <sub>0</sub>	50% L <sub>0</sub>	do not use			
b x h		± 10%		+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	approx.		do not use				
mm		mm		N/mm	mm	N	mm	N	mm	N	mm	N	mm	
VL 20 - 025	20	10	25	29.4	7.5	221	10.0	294	11.3	331	12.5	368	13.9	50
VL 20 - 032			32	22.6	9.6	217	12.8	289	14.4	325	16.0	362	18.2	50
VL 20 - 038			38	18.6	11.4	212	15.2	283	17.1	318	19.0	353	22.0	25
VL 20 - 044			44	15.7	13.2	207	17.6	276	19.8	311	22.0	345	25.8	25
VL 20 - 051			51	13.7	15.3	210	20.4	279	23.0	314	25.5	349	30.3	25
VL 20 - 064			64	11.3	19.2	217	25.6	289	28.8	325	32.0	362	38.9	25
VL 20 - 076			76	9.8	22.8	223	30.4	298	34.2	335	38.0	372	47.0	25
VL 20 - 089			89	8.3	26.7	222	35.6	295	40.1	332	44.5	369	55.7	20
VL 20 - 102			102	7.4	30.6	226	40.8	302	45.9	340	51.0	377	64.2	20
VL 20 - 115			115	6.4	34.5	221	46.0	294	51.8	331	57.5	368	72.9	10
VL 20 - 127			127	5.9	38.1	225	50.8	300	57.2	337	63.5	375	80.7	10
VL 20 - 139			139	5.4	41.7	225	55.6	300	62.6	338	69.5	375	88.4	10
VL 20 - 152	152	4.9	45.6	223	60.8	298	68.4	335	76.0	372	96.7	10		
VL 20 - 305	4.3 x 1.7		305	2.5	91.5	229	122	305	137	343	153	381	196	10
VL 25 - 025	25	12.5	25	53.9	7.5	404	10.0	539	11.3	606	12.5	674	12.9	50
VL 25 - 032			32	42.2	9.6	405	12.8	540	14.4	608	16.0	675	17.2	25
VL 25 - 038			38	35.8	11.4	408	15.2	544	17.1	612	19.0	680	20.7	25
VL 25 - 044			44	31.4	13.2	414	17.6	553	19.8	622	22.0	691	24.4	25
VL 25 - 051			51	27.0	15.3	413	20.4	551	23.0	620	25.5	689	28.5	25
VL 25 - 064			64	21.6	19.2	415	25.6	553	28.8	622	32.0	691	36.5	25
VL 25 - 076			76	18.1	22.8	413	30.4	550	34.2	619	38.0	688	43.9	20
VL 25 - 089			89	15.2	26.7	406	35.6	541	40.1	609	44.5	676	51.4	20
VL 25 - 102			102	13.2	30.6	404	40.8	539	45.9	606	51.0	673	59.3	20
VL 25 - 115			115	11.8	34.5	407	46.0	543	51.8	611	57.5	679	67.2	10
VL 25 - 127			127	10.6	38.1	404	50.8	538	57.2	606	63.5	673	74.4	10
VL 25 - 139			139	9.6	41.7	400	55.6	534	62.6	600	69.5	667	81.6	10
VL 25 - 152	152	8.8	45.6	401	60.8	535	68.4	602	76.0	669	89.5	10		
VL 25 - 178	178	7.6	53.4	406	71.2	541	80.1	609	89.0	676	105	10		
VL 25 - 203	203	6.7	60.9	408	81.2	544	91.4	612	102	680	121	10		
VL 25 - 305	5.4 x 2.2		305	4.4	91.5	403	122	537	137	604	153	671	182	5
VL 32 - 038	32	16	38	43.1	11.4	491	15.2	655	17.1	737	19.0	819	19.9	20
VL 32 - 044			44	37.3	13.2	492	17.6	656	19.8	739	22.0	821	23.5	20
VL 32 - 051			51	32.4	15.3	496	20.4	661	23.0	744	25.5	826	27.6	20
VL 32 - 064			64	25.5	19.2	490	25.6	653	28.8	734	32.0	816	35.2	20
VL 32 - 076			76	21.6	22.8	492	30.4	657	34.2	739	38.0	821	42.4	20
VL 32 - 089			89	18.1	26.7	483	35.6	644	40.1	725	44.5	805	50.0	10
VL 32 - 102			102	15.7	30.6	480	40.8	641	45.9	721	51.0	801	57.6	10
VL 32 - 115			115	14.2	34.5	490	46.0	653	51.8	735	57.5	817	65.5	10
VL 32 - 127			127	12.7	38.1	484	50.8	645	57.2	726	63.5	806	72.5	10
VL 32 - 139			139	11.6	41.7	484	55.6	645	62.6	726	69.5	806	79.4	10
VL 32 - 152			152	10.6	45.6	483	60.8	644	68.4	725	76.0	806	87.3	10
VL 32 - 178			178	9.0	53.4	481	71.2	641	80.1	721	89.0	801	103	5
VL 32 - 203	203	7.8	60.9	475	81.2	633	91.4	713	102	792	118	5		
VL 32 - 254	254	6.4	76.2	488	102	650	114	732	127	813	148	5		
VL 32 - 305	6.5 x 2.6		305	5.3	91.5	485	122	647	137	727	153	808	178	5

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



VL 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>)

Code	$D_H$		$L_0$	R	30% $L_0$		40% $L_0$		45% $L_0$		50% $L_0$		E	Pcs			
	Hole Diameter				Free Length	Spring Constant	+ 3.000.000		~ 1.500.000		300 - 500.000				100 - 200.000		do not use
	b x h				mm	± 10% N/mm	mm	N	mm	N	mm	N			mm	N	mm
mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	Pcs				
VL 40 - 051	40	20	51	48.1	15.3	736	20.4	981	23.0	1104	25.5	1227	28.0	20			
VL 40 - 064			64	39.2	19.2	753	25.6	1004	28.8	1129	32.0	1254	36.2	10			
VL 40 - 076			76	33.3	22.8	759	30.4	1012	34.2	1139	38.0	1265	43.7	10			
VL 40 - 089			89	28.4	26.7	758	35.6	1011	40.1	1137	44.5	1264	51.7	10			
VL 40 - 102			102	24.5	30.6	750	40.8	1000	45.9	1125	51.0	1250	59.8	10			
VL 40 - 115			115	22.1	34.5	762	46.0	1017	51.8	1144	57.5	1271	67.9	10			
VL 40 - 127			127	19.6	38.1	747	50.8	996	57.2	1120	63.5	1245	75.2	5			
VL 40 - 139			139	17.7	41.7	738	55.6	984	62.6	1107	69.5	1230	82.4	5			
VL 40 - 152			152	16.2	45.6	739	60.8	985	68.4	1108	76.0	1231	90.6	5			
VL 40 - 178			178	13.7	53.4	732	71.2	975	80.1	1097	89.0	1219	106	5			
VL 40 - 203			203	12.3	60.9	749	81.2	999	91.4	1124	101	1248	122	5			
VL 40 - 254			254	9.8	76.2	747	102	996	114	1120	127	1245	154	2			
VL 40 - 305	8.0 x 3.4	305	8.3	91.5	759	122	1013	137	1139	152	1266	185	2				
VL 50 - 064	50	25	64	86.3	19.2	1657	25.6	2209	28.8	2485	32.0	2762	35.1	5			
VL 50 - 076			76	70.6	22.8	1610	30.4	2146	34.2	2415	38.0	2683	42.2	5			
VL 50 - 089			89	59.8	26.7	1597	35.6	2129	40.1	2395	44.5	2661	50.3	5			
VL 50 - 102			102	52.0	30.6	1591	40.8	2122	45.9	2387	51.0	2652	58.4	5			
VL 50 - 115			115	46.1	34.5	1590	46.0	2121	51.8	2386	57.5	2651	66.1	5			
VL 50 - 127			127	42.2	38.1	1608	50.8	2144	57.2	2412	63.5	2680	73.8	5			
VL 50 - 139			139	38.2	41.7	1593	55.6	2124	62.6	2389	69.5	2655	80.9	5			
VL 50 - 152			152	34.3	45.6	1564	60.8	2085	68.4	2346	76.0	2607	89.0	2			
VL 50 - 178			178	29.4	53.4	1570	71.2	2093	80.1	2355	89.0	2617	105	2			
VL 50 - 203			203	25.5	60.9	1553	81.2	2071	91.4	2329	101	2588	121	2			
VL 50 - 254			254	20.6	76.2	1570	102	2093	114	2355	127	2616	152	2			
VL 50 - 305			10.5 x 4.1	305	17.2	91.5	1574	122	2098	137	2361	152	2623	184	2		

1 N = 0.1 daN = 0.102 kgf

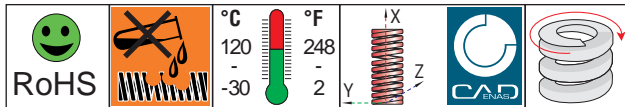
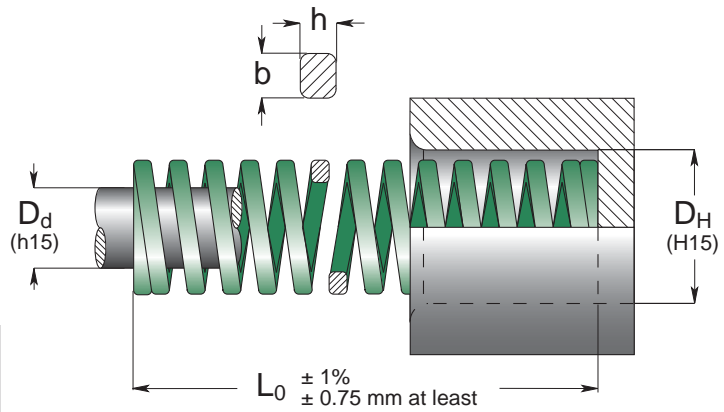
Load (N) = R (N/mm) x Deflection (mm)

VL 50 - 152 (Series  $D_H$  -  $L_0$ )

V SERIES

ISO 10 2 4 3

EN Light load springs



Code	D <sub>H</sub>		D <sub>d</sub>	L <sub>0</sub>	R	A		B		C		D		E	Pcs
	Hole Diameter					Free Length	Spring Constant	25% L <sub>0</sub>	30% L <sub>0</sub>	35% L <sub>0</sub>	40% L <sub>0</sub>	do not use			
	b x h			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	approx.		do not use				
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm		
V 10 - 025	10	5	25	10	6.3	63	7.5	75	8.8	88	10.0	100	13.5	50	
V 10 - 032			32	8.5	8.0	68	9.6	82	11.2	95	12.8	109	17.5	50	
V 10 - 038			38	6.8	9.5	65	11.4	78	13.3	90	15.2	103	20.8	50	
V 10 - 044			44	6.0	11.0	66	13.2	79	15.4	92	17.6	106	23.9	50	
V 10 - 051			51	5.0	12.8	64	15.3	77	17.9	89	20.4	102	28.9	25	
V 10 - 064			64	4.3	16.0	69	19.2	83	22.4	96	25.6	110	36.1	25	
V 10 - 076			76	3.2	19.0	61	22.8	73	26.6	85	30.4	97	43.2	25	
V 10 - 305	1.7 x 1.1		305	1.1	76.3	84	91.5	101	107	117	122	134	178	10	
V 13 - 025	12.5	6.3	25	17.9	6.3	113	7.5	134	8.8	157	10.0	179	13.2	50	
V 13 - 032			32	16.4	8.0	131	9.6	157	11.2	184	12.8	210	18.0	50	
V 13 - 038			38	13.6	9.5	129	11.4	155	13.3	181	15.2	207	21.0	50	
V 13 - 044			44	12.1	11.0	133	13.2	160	15.4	186	17.6	213	24.0	25	
V 13 - 051			51	11.4	12.8	146	15.3	174	17.9	203	20.4	233	28.7	25	
V 13 - 064			64	9.3	16.0	149	19.2	179	22.4	208	25.6	238	35.8	25	
V 13 - 076			76	7.1	19.0	135	22.8	162	26.6	189	30.4	216	42.7	25	
V 13 - 089			89	5.4	22.3	120	26.7	144	31.2	168	35.6	192	50.4	20	
V 13 - 102			102	4.1	25.5	105	30.6	125	35.7	146	40.8	167	58.4	10	
V 13 - 305	2.4 x 1.4		305	1.4	76.3	107	91.5	128	107	149	122	171	172	10	
V 16 - 025	16	8	25	23.4	6.3	147	7.5	176	8.8	205	10.0	234	12.6	50	
V 16 - 032			32	22.9	8.0	183	9.6	220	11.2	256	12.8	293	16.4	50	
V 16 - 038			38	19.3	9.5	183	11.4	220	13.3	257	15.2	293	19.7	25	
V 16 - 044			44	17.1	11.0	188	13.2	226	15.4	263	17.6	301	22.5	25	
V 16 - 051			51	15.7	12.8	201	15.3	240	17.9	280	20.4	320	26.3	25	
V 16 - 064			64	10.7	16.0	171	19.2	205	22.4	240	25.6	274	33.3	25	
V 16 - 076			76	10.0	19.0	190	22.8	228	26.6	266	30.4	304	40.2	20	
V 16 - 089			89	8.6	22.3	192	26.7	230	31.2	268	35.6	306	47.6	20	
V 16 - 102			102	7.8	25.5	199	30.6	239	35.7	278	40.8	318	55.4	20	
V 16 - 115			115	6.6	28.8	190	34.5	228	40.3	266	46.0	304	60.8	10	
V 16 - 305	3.2 x 1.5		305	2.5	76.3	191	91.5	229	107	267	122	305	165	10	
V 20 - 025	20	10	25	55.8	6.3	352	7.5	419	8.8	488	10.0	558	12.1	50	
V 20 - 032			32	45.0	8.0	360	9.6	432	11.2	504	12.8	576	15.3	50	
V 20 - 038			38	33.3	9.5	316	11.4	380	13.3	443	15.2	506	18.9	25	
V 20 - 044			44	30.0	11.0	330	13.2	396	15.4	462	17.6	528	21.5	25	
V 20 - 051			51	24.5	12.8	314	15.3	375	17.9	437	20.4	500	25.0	25	
V 20 - 064			64	20.0	16.0	320	19.2	384	22.4	448	25.6	512	31.1	25	
V 20 - 076			76	16.0	19.0	304	22.8	365	26.6	426	30.4	486	37.3	25	
V 20 - 089			89	14.0	22.3	312	26.7	374	31.2	436	35.6	498	44.5	20	
V 20 - 102			102	12.0	25.5	306	30.6	367	35.7	428	40.8	490	51.1	20	
V 20 - 115			115	10.9	28.8	314	34.5	376	40.3	439	46.0	501	58.2	10	
V 20 - 127			127	9.5	31.8	302	38.1	362	44.5	422	50.8	483	64.9	10	
V 20 - 139			139	8.4	35.0	294	42.0	353	48.7	409	56.0	470	71.5	10	
V 20 - 152			152	7.5	38.0	285	45.6	342	53.2	399	60.8	456	78.8	10	
V 20 - 305	4.0 x 2.1		305	4.0	76.3	305	91.5	366	107	427	122	488	157	10	

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



V 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>)

Code	D <sub>H</sub>	D <sub>d</sub>	L <sub>0</sub>	R	A	B	C	D	E	Pcs					
	Hole Diameter	Rod Diameter	Free Length	Spring Constant											
	b x h			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use						
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm				
V 25 - 025	25	12.5	25	100	6.3	630	7.5	750	8.8	875	10.0	1000	11.9	50	
V 25 - 032			32	80.3	8.0	642	9.6	771	11.2	899	12.8	1028	16.0	25	
V 25 - 038			38	62.0	9.5	589	11.4	707	13.3	825	15.2	942	18.3	25	
V 25 - 044			44	52.9	11.0	582	13.2	698	15.4	815	17.6	931	21.4	25	
V 25 - 051			51	44.0	12.8	563	15.3	673	17.9	785	20.4	898	24.9	25	
V 25 - 064			64	35.2	16.0	563	19.2	676	22.4	788	25.6	901	31.4	25	
V 25 - 076			76	28.0	19.0	532	22.8	638	26.6	745	30.4	851	37.5	20	
V 25 - 089			89	24.0	22.3	535	26.7	641	31.2	748	35.6	854	43.5	20	
V 25 - 102			102	21.1	25.5	538	30.6	646	35.7	753	40.8	861	51.1	20	
V 25 - 115			115	18.7	28.8	539	34.5	645	40.3	753	46.0	860	58.1	10	
V 25 - 127			127	16.7	31.8	531	38.1	636	44.5	742	50.8	848	64.1	10	
V 25 - 139			139	15.3	35.0	536	42.0	643	48.7	744	56.0	857	70.4	10	
V 25 - 152			152	14.0	38.0	532	45.6	638	53.2	745	60.8	851	77.1	10	
V 25 - 178			178	12.5	44.5	556	53.4	668	62.3	779	71.2	890	93.1	10	
V 25 - 203	203	10.4	50.8	528	60.9	633	71.1	739	81.2	844	103	10			
V 25 - 305	5.4 x 2.7	305	7.0	76.3	534	91.5	641	107	747	122	854	156	5		
V 32 - 038	32	16	38	94.0	9.5	893	11.4	1072	13.3	1250	15.2	1429	18.3	20	
V 32 - 044			44	79.5	11.0	875	13.2	1049	15.4	1224	17.6	1399	21.5	20	
V 32 - 051			51	67.0	12.8	858	15.3	1025	17.9	1196	20.4	1367	25.5	20	
V 32 - 064			64	53.0	16.0	848	19.2	1018	22.4	1187	25.6	1357	31.9	20	
V 32 - 076			76	44.0	19.0	836	22.8	1003	26.6	1170	30.4	1338	38.6	20	
V 32 - 089			89	37.2	22.3	830	26.7	993	31.2	1159	35.6	1324	46.5	10	
V 32 - 102			102	32.0	25.5	816	30.6	979	35.7	1142	40.8	1306	53.2	10	
V 32 - 115			115	29.0	28.8	835	34.5	1001	40.3	1167	46.0	1334	60.0	10	
V 32 - 127			127	25.0	31.8	795	38.1	953	44.5	1111	50.8	1270	66.7	10	
V 32 - 139			139	23.0	35.0	805	42.0	966	48.7	1119	56.0	1288	71.8	10	
V 32 - 152			152	21.5	38.0	817	45.6	980	53.2	1144	60.8	1307	78.5	10	
V 32 - 178			178	18.2	44.5	810	53.4	972	62.3	1134	71.2	1296	94.4	5	
V 32 - 203			203	15.8	50.8	803	60.9	962	71.1	1123	81.2	1283	107	5	
V 32 - 254			254	12.5	63.5	794	76.2	953	88.9	1111	102	1270	136	5	
V 32 - 305	6.8 x 3.3	305	10.3	76.3	786	91.5	942	107	1100	122	1257	163	5		
V 40 - 051	40	20	51	92.0	12.8	1178	15.3	1408	17.9	1642	20.4	1877	25.5	20	
V 40 - 064			64	73.0	16.0	1168	19.2	1402	22.4	1635	25.6	1869	31.4	10	
V 40 - 076			76	63.0	19.0	1197	22.8	1436	26.6	1676	30.4	1915	37.8	10	
V 40 - 089			89	51.0	22.3	1137	26.7	1362	31.2	1589	35.6	1816	44.3	10	
V 40 - 102			102	43.0	25.5	1097	30.6	1316	35.7	1535	40.8	1754	50.7	10	
V 40 - 115			115	39.6	28.8	1140	34.5	1366	40.3	1594	46.0	1822	58.1	10	
V 40 - 127			127	37.0	31.8	1177	38.1	1410	44.5	1645	50.8	1880	64.6	5	
V 40 - 139			139	32.0	35.0	1120	42.0	1344	48.7	1557	56.0	1792	70.1	5	
V 40 - 152			152	28.0	38.0	1064	45.6	1277	53.2	1490	60.8	1702	76.6	5	
V 40 - 178			178	25.2	44.5	1121	53.4	1346	62.3	1570	71.2	1794	90.4	5	
V 40 - 203			203	22.7	50.8	1153	60.9	1382	71.1	1613	81.2	1843	102	5	
V 40 - 254			254	17.0	63.5	1080	76.2	1295	88.9	1511	102	1727	129	2	
V 40 - 305			8.1 x 4.0	305	14.8	76.3	1129	91.5	1354	107	1580	122	1806	156	2
V 50 - 064			50	25	64	156	16.0	2496	19.2	2995	22.4	3494	25.6	3994	31.0
V 50 - 076	76	125			19.0	2375	22.8	2850	26.6	3325	30.4	3800	37.2	5	
V 50 - 089	89	109			22.3	2431	26.7	2910	31.2	3395	35.6	3880	43.6	5	
V 50 - 102	102	94.0			25.5	2397	30.6	2876	35.7	3356	40.8	3835	50.3	5	
V 50 - 115	115	81.0			28.8	2333	34.5	2795	40.3	3260	46.0	3726	58.1	5	
V 50 - 127	127	71.0			31.8	2258	38.1	2705	44.5	3156	50.8	3607	63.7	5	
V 50 - 139	139	66.5			35.0	2328	42.0	2793	48.7	3235	56.0	3724	69.5	5	
V 50 - 152	152	60.0			38.0	2280	45.6	2736	53.2	3192	60.8	3648	76.5	2	
V 50 - 178	178	52.0			44.5	2314	53.4	2777	62.3	3240	71.2	3702	91.9	2	
V 50 - 203	203	44.0			50.8	2235	60.9	2680	71.1	3126	81.2	3573	105	2	
V 50 - 254	254	35.0			63.5	2223	76.2	2667	88.9	3112	102	3556	131	2	
V 50 - 305	10.9 x 5.3	305	28.5	76.3	2175	91.5	2608	107	3042	122	3477	155	2		
V 63 - 076	63	38	76	189	19.0	3591	22.8	4309	26.6	5027	30.4	5746	36.5	5	
V 63 - 089			89	158	22.3	3523	26.7	4219	31.2	4922	35.6	5625	43.4	5	
V 63 - 102			102	131	25.5	3341	30.6	4009	35.7	4677	40.8	5345	49.7	5	
V 63 - 115			115	116	28.8	3341	34.5	4002	40.3	4669	46.0	5336	55.6	5	
V 63 - 127			127	103	31.8	3275	38.1	3924	44.5	4578	50.8	5232	62.7	2	
V 63 - 152			152	84.3	38.0	3203	45.6	3844	53.2	4485	60.8	5125	77.1	2	
V 63 - 178			178	71.5	44.5	3182	53.4	3818	62.3	4454	71.2	5091	92.2	2	
V 63 - 203			203	61.7	50.8	3134	60.9	3758	71.1	4384	81.2	5010	103	2	
V 63 - 254			254	47.0	63.5	2985	76.2	3581	88.9	4178	102	4775	130	2	
V 63 - 305			11.0 x 7.8	305	38.2	76.3	2915	91.5	3495	107	4078	122	4660	157	2

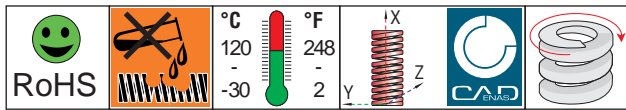
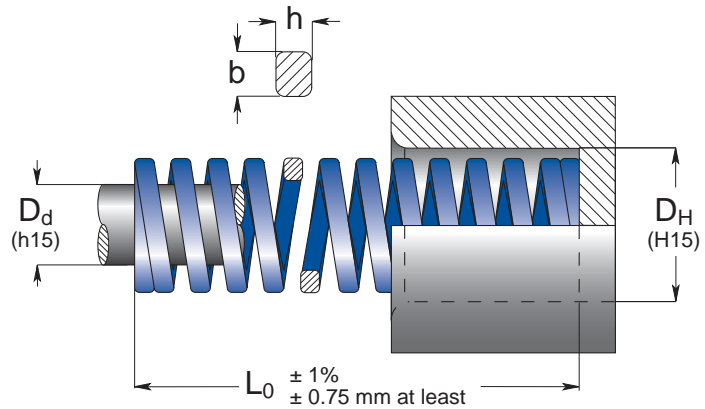
1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

V 50 - 152 (Series | D<sub>H</sub> | - | L<sub>0</sub>)



EN Medium load springs



Code	D <sub>H</sub>		D <sub>d</sub>	L <sub>0</sub>	R	A	B	C	D	E	Pcs			
	Hole Diameter	Rod Diameter												
b x h		Free Length	Spring Constant	± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use					
mm	mm								mm	N/mm	mm	N	mm	N
B 10 - 025	10	5	25	16.0	6.3	101	7.5	120	8.4	135	9.4	150	10.2	50
B 10 - 032			32	13.0	8.0	104	9.6	125	10.8	140	12.0	156	14.2	50
B 10 - 038			38	11.9	9.5	113	11.4	136	12.8	153	14.3	170	16.8	50
B 10 - 044			44	10.3	11.0	113	13.2	136	14.9	153	16.5	170	19.4	50
B 10 - 051			51	8.9	12.8	114	15.3	136	17.2	153	19.1	170	23.4	25
B 10 - 064			64	7.5	16.0	120	19.2	144	21.6	162	24.0	180	28.2	25
B 10 - 076			76	5.3	19.0	101	22.8	121	25.7	136	28.5	151	34.2	25
B 10 - 305	1.9 x 1.3		305	1.6	76.3	122	91.5	146	103	165	114	183	134	10
B 13 - 025	12.5	6.3	25	30.0	6.3	189	7.5	225	8.4	253	9.4	282	11.9	50
B 13 - 032			32	24.8	8.0	198	9.6	238	10.8	268	12.0	298	16.2	50
B 13 - 038			38	21.4	9.5	203	11.4	244	12.8	274	14.3	306	18.7	50
B 13 - 044			44	18.5	11.0	204	13.2	244	14.9	275	16.5	305	21.3	25
B 13 - 051			51	15.5	12.8	198	15.3	237	17.2	267	19.1	296	25.6	25
B 13 - 064			64	12.1	16.0	194	19.2	232	21.6	261	24.0	290	32.4	25
B 13 - 076			76	10.2	19.0	194	22.8	233	25.7	262	28.5	291	39.0	25
B 13 - 089	89	8.4	22.3	187	26.7	224	30.0	252	33.4	281	45.9	20		
B 13 - 102	102	6.3	25.5	161	30.6	193	34.4	217	38.3	241	52.3	10		
B 13 - 305	2.5 x 1.5		305	2.1	76.3	160	91.5	192	103	216	114	240	153	10
B 16 - 025	16	8	25	49.4	6.3	311	7.5	371	8.4	417	9.4	464	10.5	50
B 16 - 032			32	37.1	8.0	297	9.6	356	10.8	401	12.0	445	13.2	50
B 16 - 038			38	33.9	9.5	322	11.4	386	12.8	435	14.3	485	17.2	25
B 16 - 044			44	30.0	11.0	330	13.2	396	14.9	446	16.5	495	19.4	25
B 16 - 051			51	26.4	12.8	338	15.3	404	17.2	454	19.1	504	24.2	25
B 16 - 064			64	20.5	16.0	328	19.2	394	21.6	443	24.0	492	29.2	25
B 16 - 076			76	17.8	19.0	338	22.8	406	25.7	457	28.5	507	36.3	20
B 16 - 089	89	15.2	22.3	339	26.7	406	30.0	457	33.4	508	41.7	20		
B 16 - 102	102	13.5	25.5	344	30.6	413	34.4	465	38.3	517	48.9	20		
B 16 - 115	115	11.8	28.8	340	34.5	407	38.8	458	43.1	509	53.1	10		
B 16 - 305	3.2 x 2.0		305	4.8	76.3	366	91.5	439	103	494	114	549	142	10
B 20 - 025	20	10	25	98.0	6.3	617	7.5	735	8.4	827	9.4	921	10.5	50
B 20 - 032			32	72.6	8.0	581	9.6	697	10.8	784	12.0	871	13.9	50
B 20 - 038			38	56.0	9.5	532	11.4	638	12.8	718	14.3	801	16.6	25
B 20 - 044			44	47.5	11.0	523	13.2	627	14.9	705	16.5	784	18.8	25
B 20 - 051			51	41.7	12.8	534	15.3	638	17.2	718	19.1	796	23.1	25
B 20 - 064			64	32.3	16.0	517	19.2	620	21.6	698	24.0	775	27.5	25
B 20 - 076			76	25.1	19.0	477	22.8	572	25.7	644	28.5	715	33.8	25
B 20 - 089	89	22.0	22.3	491	26.7	587	30.0	661	33.4	735	39.7	20		
B 20 - 102	102	19.8	25.5	505	30.6	606	34.4	682	38.3	758	47.3	20		
B 20 - 115	115	18.1	28.8	521	34.5	624	38.8	703	43.1	780	52.5	10		
B 20 - 127	127	16.6	31.8	528	38.1	632	42.9	712	47.6	790	56.9	10		
B 20 - 139	139	15.1	35.0	529	42.0	634	46.9	708	52.5	793	62.1	10		
B 20 - 152	152	13.2	38.0	500	45.6	600	51.3	677	57.0	750	67.6	10		
B 20 - 305	4.1 x 2.4		305	6.1	76.3	465	91.5	558	103	628	114	698	143	10

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



B 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>)



Code	D <sub>H</sub> D <sub>d</sub>		L <sub>0</sub>	R	A		B		C		D		E	Pcs		
	Hole Diameter	Rod Diameter			Free Length	Spring Constant	25% L <sub>0</sub>	30% L <sub>0</sub>	33.75% L <sub>0</sub>	37.5% L <sub>0</sub>	do not use					
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000					
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm			
B 25 - 025	25	12.5	25	147	6.3	926	7.5	1103	8.4	1240	9.4	1382	10.2	50		
B 25 - 032			32	118	8.0	944	9.6	1133	10.8	1274	12.0	1416	13.7	25		
B 25 - 038			38	93.0	9.5	884	11.4	1060	12.8	1193	14.3	1330	15.7	25		
B 25 - 044			44	80.8	11.0	889	13.2	1067	14.9	1200	16.5	1333	18.2	25		
B 25 - 051			51	68.6	12.8	878	15.3	1050	17.2	1181	19.1	1310	21.7	25		
B 25 - 064			64	53.0	16.0	848	19.2	1018	21.6	1145	24.0	1272	26.0	25		
B 25 - 076			76	43.2	19.0	821	22.8	985	25.7	1108	28.5	1231	32.3	20		
B 25 - 089			89	38.2	22.3	852	26.7	1020	30.0	1147	33.4	1276	38.0	20		
B 25 - 102			102	33.0	25.5	842	30.6	1010	34.4	1136	38.3	1264	43.0	20		
B 25 - 115			115	28.0	28.8	806	34.5	966	38.8	1087	43.1	1207	48.6	10		
B 25 - 127			127	25.9	31.8	824	38.1	987	42.9	1110	47.6	1233	53.7	10		
B 25 - 139			139	23.2	35.0	812	42.0	974	46.9	1088	52.5	1218	59.4	10		
B 25 - 152			152	20.8	38.0	790	45.6	948	51.3	1067	57.0	1186	63.8	10		
B 25 - 178			178	17.8	44.5	792	53.4	951	60.1	1069	66.8	1189	76.6	10		
B 25 - 203			203	15.8	50.8	803	60.9	962	68.5	1082	76.1	1202	88.4	10		
B 25 - 305	5.4 x 3.3	305	10.2	76.3	778	91.5	933	103	1050	114	1167	135	5			
B 32 - 038	32	16	38	185	9.5	1758	11.4	2109	12.8	2373	14.3	2646	16.3	20		
B 32 - 044			44	158	11.0	1738	13.2	2086	14.9	2346	16.5	2607	18.9	20		
B 32 - 051			51	134	12.8	1715	15.3	2050	17.2	2306	19.1	2559	23.1	20		
B 32 - 064			64	99.0	16.0	1584	19.2	1901	21.6	2138	24.0	2376	28.5	20		
B 32 - 076			76	108	19.0	1530	22.8	1835	25.7	2065	28.5	2294	34.2	20		
B 32 - 089			89	69.1	22.3	1541	26.7	1845	30.0	2076	33.4	2308	40.4	10		
B 32 - 102			102	58.8	25.5	1499	30.6	1799	34.4	2024	38.3	2252	48.0	10		
B 32 - 115			115	51.5	28.8	1483	34.5	1777	38.8	1999	43.1	2220	54.3	10		
B 32 - 127			127	44.8	31.8	1425	38.1	1707	42.9	1920	47.6	2132	59.2	10		
B 32 - 139			139	42.3	35.0	1481	42.0	1777	46.9	1984	52.5	2221	65.3	10		
B 32 - 152			152	37.8	38.0	1436	45.6	1724	51.3	1939	57.0	2155	73.0	10		
B 32 - 178			178	32.5	44.5	1446	53.4	1736	60.1	1952	66.8	2171	84.5	5		
B 32 - 203			203	28.9	50.8	1468	60.9	1760	68.5	1980	76.1	2199	96.9	5		
B 32 - 254			254	21.4	63.5	1359	76.2	1631	85.7	1835	95.3	2039	121	5		
B 32 - 305			6.8 x 4.0	305	18.3	76.3	1396	91.5	1674	103	1884	114	2094	147	5	
B 40 - 051	40	20	51	182	12.8	2330	15.3	2785	17.2	3130	19.1	3476	21.4	20		
B 40 - 064			64	140	16.0	2240	19.2	2688	21.6	3024	24.0	3360	26.8	10		
B 40 - 076			76	108	19.0	2052	22.8	2462	25.7	2770	28.5	3078	32.7	10		
B 40 - 089			89	90.7	22.3	2023	26.7	2422	30.0	2724	33.4	3029	39.0	10		
B 40 - 102			102	81.0	25.5	2066	30.6	2479	34.4	2788	38.3	3102	44.1	10		
B 40 - 115			115	71.8	28.8	2068	34.5	2477	38.8	2787	43.1	3095	50.6	10		
B 40 - 127			127	62.7	31.8	1994	38.1	2389	42.9	2687	47.6	2985	55.9	5		
B 40 - 139			139	57.5	35.0	2013	42.0	2415	46.9	2697	52.5	3019	61.8	5		
B 40 - 152			152	51.6	38.0	1961	45.6	2353	51.3	2647	57.0	2941	67.5	5		
B 40 - 178			178	44.1	44.5	1962	53.4	2355	60.1	2649	66.8	2946	77.2	5		
B 40 - 203			203	36.7	50.8	1864	60.9	2235	68.5	2514	76.1	2793	91.8	5		
B 40 - 254			254	30.1	63.5	1911	76.2	2294	85.7	2580	95.3	2869	113	2		
B 40 - 305			8.2 x 4.7	305	24.6	76.3	1877	91.5	2251	103	2532	114	2814	138	2	
B 50 - 064			50	25	64	209	16.0	3344	19.2	4013	21.6	4514	24.0	5016	28.2	5
B 50 - 076					76	168	19.0	3192	22.8	3830	25.7	4309	28.5	4788	34.9	5
B 50 - 089	89	140			22.3	3122	26.7	3738	30.0	4205	33.4	4676	39.2	5		
B 50 - 102	102	119			25.5	3035	30.6	3641	34.4	4097	38.3	4558	47.3	5		
B 50 - 115	115	106			28.8	3053	34.5	3657	38.8	4114	43.1	4569	52.6	5		
B 50 - 127	127	97.0			31.8	3085	38.1	3696	42.9	4158	47.6	4617	59.8	5		
B 50 - 139	139	87.0			35.0	3045	42.0	3654	46.9	4081	52.5	4568	65.1	5		
B 50 - 152	152	80.0			38.0	3040	45.6	3648	51.3	4104	57.0	4560	70.8	2		
B 50 - 178	178	69.5			44.5	3093	53.4	3711	60.1	4175	66.8	4643	84.2	2		
B 50 - 203	203	59.8			50.8	3038	60.9	3642	68.5	4097	76.1	4551	96.5	2		
B 50 - 229	229	50.9			57.3	2917	68.7	3497	77.3	3934	85.9	4372	108	2		
B 50 - 254	254	43.9			63.5	2788	76.2	3345	85.7	3763	95.3	4184	122	2		
B 50 - 305	11.1 x 5.8	305			38.6	76.3	2945	91.5	3532	103	3973	114	4416	147	2	
B 63 - 076	63	38			76	312	19.0	5928	22.8	7114	25.7	8003	28.5	8892	30.7	5
B 63 - 089					89	260	22.3	5798	26.7	6942	30.0	7810	33.4	8684	36.5	5
B 63 - 102			102	221	25.5	5636	30.6	6763	34.4	7608	38.3	8464	43.6	5		
B 63 - 115			115	187	28.8	5386	34.5	6452	38.8	7258	43.1	8060	48.9	5		
B 63 - 127			127	168	31.8	5342	38.1	6401	42.9	7201	47.6	7997	54.2	2		
B 63 - 152			152	136	38.0	5168	45.6	6202	51.3	6977	57.0	7752	65.7	2		
B 63 - 178			178	114	44.5	5073	53.4	6088	60.1	6849	66.8	7615	76.5	2		
B 63 - 203			203	100	50.8	5080	60.9	6090	68.5	6851	76.1	7610	88.0	2		
B 63 - 229			229	89.2	57.3	5111	68.7	6128	77.3	6894	85.9	7662	104	2		
B 63 - 254			254	78.4	63.5	4978	76.2	5974	85.7	6721	95.3	7472	112	2		
B 63 - 305			11.5 x 9.1	305	64.7	76.3	4937	91.5	5920	103	6660	114	7402	134	2	

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

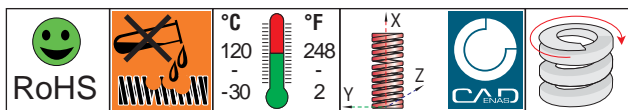
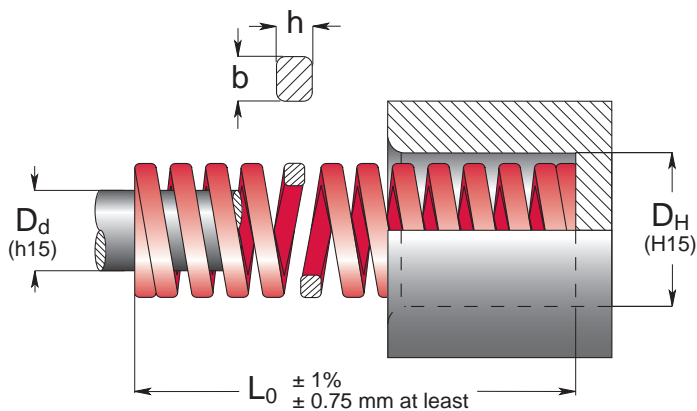


B 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>)

R SERIES

ISO 10243

EN Heavy load springs



Code	D <sub>H</sub>		D <sub>d</sub>	L <sub>0</sub>	R	A		B		C		D		E	Pcs
	Hole Diameter	mm				Rod Diameter	mm	Free Length	mm	N	mm	N	mm		
	b x h				± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use		approx.			
	mm	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	Pcs
R 10 - 025	10	5	25	22.1	5.0	111	6.3	139	6.9	152	7.5	166	9.2	50	
R 10 - 032			32	17.5	6.4	112	8.0	140	8.8	154	9.6	168	12.1	50	
R 10 - 038			38	17.1	7.6	130	9.5	162	10.5	179	11.4	195	13.2	50	
R 10 - 044			44	15.0	8.8	132	11.0	165	12.1	182	13.2	198	15.1	50	
R 10 - 051			51	12.8	10.2	131	12.8	164	14.0	180	15.3	196	19.5	25	
R 10 - 064			64	10.7	12.8	137	16.0	171	17.6	188	19.2	205	21.8	25	
R 10 - 076			76	7.5	15.2	114	19.0	143	20.9	157	22.8	171	27.9	25	
R 10 - 305			1.9 x 1.5	305	2.1	61.0	128	76.3	160	83.9	176	91.5	192	127	10
R 13 - 025	12.5	6.3	25	42.1	5.0	211	6.3	265	6.9	289	7.5	316	9.8	50	
R 13 - 032			32	33.2	6.4	212	8.0	266	8.8	292	9.6	319	13.6	50	
R 13 - 038			38	29.3	7.6	223	9.5	278	10.5	306	11.4	334	14.6	50	
R 13 - 044			44	24.6	8.8	216	11.0	271	12.1	298	13.2	325	18.1	25	
R 13 - 051			51	19.6	10.2	200	12.8	251	14.0	275	15.3	300	22.3	25	
R 13 - 064			64	15.0	12.8	192	16.0	240	17.6	264	19.2	288	27.3	25	
R 13 - 076			76	13.2	15.2	201	19.0	251	20.9	276	22.8	301	33.1	25	
R 13 - 089			89	11.4	17.8	203	22.3	254	24.5	279	26.7	304	38.9	20	
R 13 - 102	102	8.4	20.4	171	25.5	214	28.1	236	30.6	257	43.8	10			
R 13 - 305	2.4 x 1.9	305	2.8	61.0	171	76.3	214	83.9	235	91.5	256	140	10		
R 16 - 025	16	8	25	75.7	5.0	379	6.3	477	6.9	520	7.5	568	8.4	50	
R 16 - 032			32	52.8	6.4	338	8.0	422	8.8	465	9.6	507	10.5	50	
R 16 - 038			38	48.5	7.6	369	9.5	461	10.5	507	11.4	553	13.6	25	
R 16 - 044			44	42.8	8.8	377	11.0	471	12.1	518	13.2	565	15.9	25	
R 16 - 051			51	37.1	10.2	378	12.8	475	14.0	520	15.3	568	18.9	25	
R 16 - 064			64	30.3	12.8	388	16.0	485	17.6	533	19.2	582	24.9	25	
R 16 - 076			76	25.7	15.2	391	19.0	488	20.9	537	22.8	586	29.2	20	
R 16 - 089			89	21.7	17.8	386	22.3	484	24.5	531	26.7	579	34.5	20	
R 16 - 102	102	19.3	20.4	394	25.5	492	28.1	541	30.6	591	39.1	20			
R 16 - 115	115	15.7	23.0	361	28.8	452	31.6	497	34.5	542	44.0	10			
R 16 - 305	3.1 x 2.5	305	7.1	61.0	433	76.3	542	83.9	596	91.5	650	104	10		
R 20 - 025	20	10	25	216	5.0	1080	6.3	1361	6.9	1485	7.5	1620	8.3	50	
R 20 - 032			32	168	6.4	1075	8.0	1344	8.8	1478	9.6	1613	10.9	50	
R 20 - 038			38	129	7.6	980	9.5	1226	10.5	1348	11.4	1471	12.5	25	
R 20 - 044			44	112	8.8	986	11.0	1232	12.1	1355	13.2	1478	15.0	25	
R 20 - 051			51	94.0	10.2	959	12.8	1203	14.0	1318	15.3	1438	17.6	25	
R 20 - 064			64	72.1	12.8	923	16.0	1154	17.6	1269	19.2	1384	22.6	25	
R 20 - 076			76	59.7	15.2	907	19.0	1134	20.9	1248	22.8	1361	27.5	25	
R 20 - 089			89	50.5	17.8	899	22.3	1126	24.5	1236	26.7	1348	31.7	20	
R 20 - 102			102	44.2	20.4	902	25.5	1127	28.1	1240	30.6	1353	37.5	20	
R 20 - 115			115	38.4	23.0	883	28.8	1106	31.6	1214	34.5	1325	42.6	10	
R 20 - 127			127	34.1	25.4	866	31.8	1084	34.9	1191	38.1	1299	45.5	10	
R 20 - 139			139	31.0	28.0	868	35.0	1085	38.2	1185	42.0	1302	50.1	10	
R 20 - 152			152	28.2	30.4	857	38.0	1072	41.8	1179	45.6	1286	55.8	10	
R 20 - 305			4.0 x 3.3	305	15.0	61.0	915	76.3	1145	83.9	1258	91.5	1373	114	10

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

R 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>)

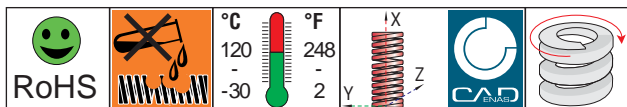
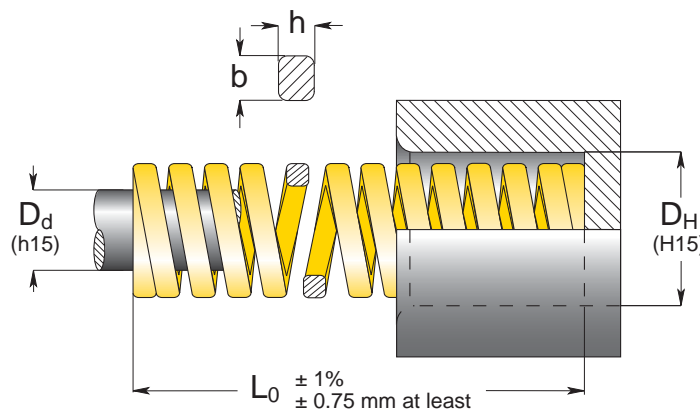
Code	D <sub>H</sub>	D <sub>d</sub>	L <sub>0</sub>	R	A	B	C	D	E	Pcs						
	Hole Diameter	Rod Diameter	Free Length	Spring Constant	20% L <sub>0</sub>	25% L <sub>0</sub>	27.5% L <sub>0</sub>	30% L <sub>0</sub>	approx.							
	b x h			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use							
	mm	mm	mm	N/mm	mm	N	mm	N	mm	mm						
R 25 - 025	25	12.5	25	375	5.0	1875	6.3	2363	6.9	2578	7.5	2813	8.5	50		
R 25 - 032			32	297	6.4	1901	8.0	2376	8.8	2614	9.6	2851	11.0	25		
R 25 - 038			38	219	7.6	1664	9.5	2081	10.5	2289	11.4	2497	12.6	25		
R 25 - 044			44	187	8.8	1646	11.0	2057	12.1	2263	13.2	2468	14.8	25		
R 25 - 051			51	156	10.2	1591	12.8	1997	14.0	2188	15.3	2387	17.9	25		
R 25 - 064			64	123	12.8	1574	16.0	1968	17.6	2165	19.2	2362	23.1	25		
R 25 - 076			76	99.0	15.2	1505	19.0	1881	20.9	2069	22.8	2257	26.3	20		
R 25 - 089			89	84.0	17.8	1495	22.3	1873	24.5	2056	26.7	2243	30.5	20		
R 25 - 102			102	73.0	20.4	1489	25.5	1862	28.1	2048	30.6	2234	37.3	20		
R 25 - 115			115	65.0	23.0	1495	28.8	1872	31.6	2056	34.5	2243	41.9	10		
R 25 - 127			127	57.7	25.4	1466	31.8	1835	34.9	2015	38.1	2198	46.2	10		
R 25 - 139			139	52.7	28.0	1476	35.0	1845	38.2	2014	42.0	2213	49.3	10		
R 25 - 152			152	47.8	30.4	1453	38.0	1816	41.8	1998	45.6	2180	55.7	10		
R 25 - 178			178	41.0	35.6	1460	44.5	1825	49.0	2007	53.4	2189	65.1	10		
R 25 - 203			203	35.8	40.6	1453	50.8	1819	55.8	1999	60.9	2180	74.5	10		
R 25 - 305			5.5 x 4.2	305	22.9	61.0	1397	76.3	1747	83.9	1921	91.5	2095	110	5	
R 32 - 038	32	16	38	388	7.6	2949	9.5	3686	10.5	4055	11.4	4423	12.5	20		
R 32 - 044			44	324	8.8	2851	11.0	3564	12.1	3920	13.2	4277	14.9	20		
R 32 - 051			51	272	10.2	2774	12.8	3482	14.0	3815	15.3	4162	17.8	20		
R 32 - 064			64	212	12.8	2714	16.0	3392	17.6	3731	19.2	4070	22.4	20		
R 32 - 076			76	172	15.2	2614	19.0	3268	20.9	3595	22.8	3922	26.1	20		
R 32 - 089			89	141	17.8	2510	22.3	3144	24.5	3451	26.7	3765	30.8	10		
R 32 - 102			102	122	20.4	2489	25.5	3111	28.1	3422	30.6	3733	36.8	10		
R 32 - 115			115	107	23.0	2461	28.8	3082	31.6	3384	34.5	3692	41.4	10		
R 32 - 127			127	93.0	25.4	2362	31.8	2957	34.9	3248	38.1	3543	44.4	10		
R 32 - 139			139	86.0	28.0	2408	35.0	3010	38.2	3287	42.0	3612	48.5	10		
R 32 - 152			152	78.0	30.4	2371	38.0	2964	41.8	3260	45.6	3557	54.8	10		
R 32 - 178			178	67.2	35.6	2392	44.5	2990	49.0	3289	53.4	3588	63.6	5		
R 32 - 203			203	59.1	40.6	2399	50.8	3002	55.8	3299	60.9	3599	72.5	5		
R 32 - 254			254	46.4	50.8	2357	63.5	2946	69.9	3241	76.2	3536	92.8	5		
R 32 - 305			7.1 x 5.4	305	38.0	61.0	2318	76.3	2899	83.9	3187	91.5	3477	112	5	
R 40 - 051			40	20	51	350	10.2	3570	12.8	4480	14.0	4909	15.3	5355	17.0	20
R 40 - 064	64	269			12.8	3443	16.0	4304	17.6	4734	19.2	5165	21.9	10		
R 40 - 076	76	219			15.2	3329	19.0	4161	20.9	4577	22.8	4993	26.7	10		
R 40 - 089	89	190			17.8	3382	22.3	4237	24.5	4650	26.7	5073	31.3	10		
R 40 - 102	102	163			20.4	3325	25.5	4157	28.1	4572	30.6	4988	37.1	10		
R 40 - 115	115	142			23.0	3266	28.8	4090	31.6	4491	34.5	4899	41.0	10		
R 40 - 127	127	128			25.4	3251	31.8	4070	34.9	4470	38.1	4877	46.5	5		
R 40 - 139	139	115			28.0	3220	35.0	4025	38.2	4396	42.0	4830	53.1	5		
R 40 - 152	152	105			30.4	3192	38.0	3990	41.8	4389	45.6	4788	56.1	5		
R 40 - 178	178	89			35.6	3168	44.5	3961	49.0	4357	53.4	4753	67.4	5		
R 40 - 203	203	77			40.6	3126	50.8	3912	55.8	4299	60.9	4689	76.2	5		
R 40 - 254	254	61			50.8	3099	63.5	3874	69.9	4261	76.2	4648	96.2	2		
R 40 - 305	8.4 x 6.2	305			51	61.0	3111	76.3	3891	83.9	4278	91.5	4667	115	2	
R 50 - 064	50	25			64	413	12.8	5286	16.0	6608	17.6	7269	19.2	7930	22.4	5
R 50 - 076					76	339	15.2	5153	19.0	6441	20.9	7085	22.8	7729	26.5	5
R 50 - 089					89	288	17.8	5126	22.3	6422	24.5	7049	26.7	7690	31.5	5
R 50 - 102			102	245	20.4	4998	25.5	6248	28.1	6872	30.6	7497	37.6	5		
R 50 - 115			115	215	23.0	4945	28.8	6192	31.6	6799	34.5	7418	42.7	5		
R 50 - 127			127	192	25.4	4877	31.8	6106	34.9	6706	38.1	7315	47.5	5		
R 50 - 139			139	168	28.0	4704	35.0	5880	38.2	6422	42.0	7056	51.8	5		
R 50 - 152			152	154	30.4	4682	38.0	5852	41.8	6437	45.6	7022	57.8	2		
R 50 - 178			178	134	35.6	4770	44.5	5963	49.0	6559	53.4	7156	68.5	2		
R 50 - 203			203	117	40.6	4750	50.8	5944	55.8	6532	60.9	7125	77.6	2		
R 50 - 254			254	89	50.8	4521	63.5	5652	69.9	6217	76.2	6782	97.9	2		
R 50 - 305			11.1 x 7.6	305	73	61.0	4453	76.3	5570	83.9	6123	91.5	6680	121	2	
R 63 - 076			63	38	76	618	15.2	9394	19.0	11742	20.9	12916	22.8	14090	24.7	5
R 63 - 089					89	515	17.8	9167	22.3	11485	24.5	12605	26.7	13751	30.0	5
R 63 - 102					102	438	20.4	8935	25.5	11169	28.1	12286	30.6	13403	35.1	5
R 63 - 115					115	370	23.0	8510	28.8	10656	31.6	11701	34.5	12765	37.5	5
R 63 - 127	127	333			25.4	8458	31.8	10589	34.9	11630	38.1	12687	45.9	2		
R 63 - 152	152	269			30.4	8178	38.0	10222	41.8	11244	45.6	12266	56.5	2		
R 63 - 178	178	226			35.6	8046	44.5	10057	49.0	11063	53.4	12068	66.8	2		
R 63 - 203	203	198			40.6	8039	50.8	10058	55.8	11053	60.9	12058	78.8	2		
R 63 - 254	254	155			50.8	7874	63.5	9843	69.9	10827	76.2	11811	102	2		
R 63 - 305	11.6 x 12.3	305			128	61.0	7808	76.3	9766	83.9	10736	91.5	11712	122	2	

1 N = 0.1 daN = 0.102 kgf Load (N) = R (N/mm) x Deflection (mm) R 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>) Estimated life 100.000 cycles

G SERIES

ISO 10 2 4 3

EN Extra-heavy load springs



Code	D <sub>H</sub>		L <sub>0</sub>	R	A		B		C		D		E	Pcs
	Hole Diameter	Rod Diameter			Free Length	Spring Constant	17% L <sub>0</sub>	20% L <sub>0</sub>	22.5% L <sub>0</sub>	25% L <sub>0</sub>	do not use			
	b x h		mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
G 10 - 025	10	5	25	36.8	4.3	158	5.0	184	5.6	207	6.3	232	7.7	50
G 10 - 032			32	27.9	5.4	151	6.4	179	7.2	201	8.0	223	10.6	50
G 10 - 038			38	23.7	6.5	154	7.6	180	8.6	203	9.5	225	12.6	50
G 10 - 044			44	19.2	7.5	144	8.8	169	9.9	190	11.0	211	13.8	50
G 10 - 051			51	16.5	8.7	144	10.2	168	11.5	189	12.8	211	16.2	25
G 10 - 064			64	13.2	10.9	144	12.8	169	14.4	190	16.0	211	20.4	25
G 10 - 076			76	10.9	12.9	141	15.2	166	17.1	186	19.0	207	25.2	25
G 10 - 305			1.9 x 1.6	305	2.6	51.9	135	61.0	159	68.6	178	76.3	198	111
G 13 - 025	12.5	6.3	25	58.5	4.3	252	5.0	293	5.6	329	6.3	369	8.1	50
G 13 - 032			32	43.9	5.4	237	6.4	281	7.2	316	8.0	351	9.9	50
G 13 - 038			38	36.0	6.5	234	7.6	274	8.6	308	9.5	342	12.9	50
G 13 - 044			44	30.3	7.5	227	8.8	267	9.9	300	11.0	333	14.1	25
G 13 - 051			51	26.2	8.7	228	10.2	267	11.5	301	12.8	335	17.4	25
G 13 - 064			64	21.2	10.9	231	12.8	271	14.4	305	16.0	339	21.0	25
G 13 - 076			76	17.1	12.9	221	15.2	260	17.1	292	19.0	325	26.4	25
G 13 - 089			89	14.5	15.1	219	17.8	258	20.0	290	22.3	323	31.5	20
G 13 - 102	102	12.7	17.3	220	20.4	259	23.0	291	25.5	324	36.0	10		
G 13 - 305	2.6 x 2.0	305	4.3	51.9	223	61.0	262	68.6	295	76.3	328	111	10	
G 16 - 025	16	8	25	118	4.3	507	5.0	590	5.6	664	6.3	743	8.5	50
G 16 - 032			32	89.0	5.4	481	6.4	570	7.2	641	8.0	712	11.0	50
G 16 - 038			38	72.1	6.5	469	7.6	548	8.6	616	9.5	685	13.2	25
G 16 - 044			44	60.9	7.5	457	8.8	536	9.9	603	11.0	670	14.7	25
G 16 - 051			51	52.3	8.7	455	10.2	533	11.5	600	12.8	669	17.7	25
G 16 - 064			64	41.2	10.9	449	12.8	527	14.4	593	16.0	659	21.9	25
G 16 - 076			76	34.1	12.9	440	15.2	518	17.1	583	19.0	648	27.8	20
G 16 - 089			89	29.5	15.1	445	17.8	525	20.0	591	22.3	658	31.2	20
G 16 - 102	102	25.6	17.3	443	20.4	522	23.0	588	25.5	653	37.9	20		
G 16 - 115	115	22.4	19.6	439	23.0	515	25.9	580	28.8	645	44.5	10		
G 16 - 305	3.2 x 2.9	305	8.4	51.9	436	61.0	512	68.6	576	76.3	641	113	10	
G 20 - 025	20	10	25	293	4.3	1260	5.0	1465	5.6	1648	6.3	1846	6.9	50
G 20 - 032			32	224	5.4	1210	6.4	1434	7.2	1613	8.0	1792	9.4	50
G 20 - 038			38	177	6.5	1151	7.6	1345	8.6	1513	9.5	1682	12.0	25
G 20 - 044			44	149	7.5	1118	8.8	1311	9.9	1475	11.0	1639	13.5	25
G 20 - 051			51	128	8.7	1114	10.2	1306	11.5	1469	12.8	1638	16.2	25
G 20 - 064			64	99.0	10.9	1079	12.8	1267	14.4	1426	16.0	1584	21.2	25
G 20 - 076			76	81.7	12.9	1054	15.2	1242	17.1	1397	19.0	1552	24.7	25
G 20 - 089			89	69.5	15.1	1049	17.8	1237	20.0	1392	22.3	1550	28.8	20
G 20 - 102			102	60.6	17.3	1048	20.4	1236	23.0	1391	25.5	1545	34.8	20
G 20 - 115			115	53.0	19.6	1039	23.0	1219	25.9	1371	28.8	1526	39.0	10
G 20 - 127			127	47.5	21.6	1026	25.4	1207	28.6	1357	31.8	1511	43.0	10
G 20 - 139			139	43.0	23.8	1023	28.0	1204	31.3	1345	35.0	1505	45.3	10
G 20 - 152	152	39.0	25.8	1006	30.4	1186	34.2	1334	38.0	1482	50.4	10		
G 20 - 305	4.1 x 3.8	305	21.2	51.9	1100	61.0	1293	68.6	1455	76.3	1618	103	10	

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

G 50 - 152 (Series D<sub>H</sub> - L<sub>0</sub>)



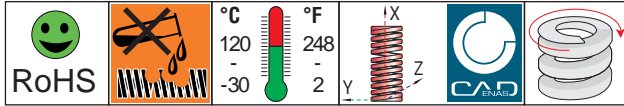
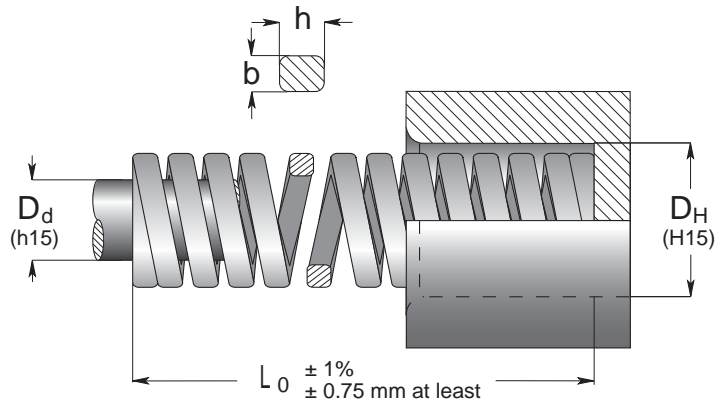
Code	D <sub>H</sub>	D <sub>d</sub>	L <sub>0</sub>	R	A	B	C	D	E	Pcs							
	Hble Diameter	Rod Diameter	Free Length	Spring Constant	17% L <sub>0</sub>	20% L <sub>0</sub>	22.5% L <sub>0</sub>	25% L <sub>0</sub>	do not use approx.								
	b x h		± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use									
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm						
G 25 - 025	25	12.5	25	459	4.3	1974	5.0	2295	5.6	2582	6.3	2892	7.3	50			
G 25 - 032			32	374	5.4	2020	6.4	2394	7.2	2693	8.0	2992	10.7	25			
G 25 - 038			38	300	6.5	1950	7.6	2280	8.6	2580	9.5	2850	12.0	25			
G 25 - 044			44	244	7.5	1830	8.8	2147	9.9	2416	11.0	2684	14.4	25			
G 25 - 051			51	208	8.7	1810	10.2	2122	11.5	2392	12.8	2662	17.4	25			
G 25 - 064			64	161	10.9	1755	12.8	2061	14.4	2318	16.0	2576	21.4	25			
G 25 - 076			76	131	12.9	1690	15.2	1991	17.1	2240	19.0	2489	26.9	20			
G 25 - 089			89	111	15.1	1676	17.8	1976	20.0	2220	22.3	2475	30.9	20			
G 25 - 102			102	96.3	17.3	1666	20.4	1965	23.0	2210	25.5	2456	36.7	20			
G 25 - 115			115	85.7	19.6	1680	23.0	1971	25.9	2217	28.8	2468	40.3	10			
G 25 - 127			127	76.3	21.6	1648	25.4	1938	28.6	2180	31.8	2426	45.1	10			
G 25 - 139			139	66.0	23.8	1571	28.0	1848	31.3	2066	35.0	2310	47.6	10			
G 25 - 152			152	63.5	25.8	1638	30.4	1930	34.2	2172	38.0	2413	53.5	10			
G 25 - 178			178	53.9	30.3	1633	35.6	1919	40.1	2159	44.5	2399	63.9	10			
G 25 - 203			203	47.0	34.5	1622	40.6	1908	45.7	2147	50.8	2388	70.2	10			
G 25 - 305	5.4 x 4.6	305	30.9	51.9	1604	61.0	1885	68.6	2121	76.3	2358	110	5				
G 32 - 038	32	16	38	480	6.5	3120	7.6	3648	8.6	4128	9.5	4560	11.4	20			
G 32 - 044			44	390	7.5	2925	8.8	3432	9.9	3861	11.0	4290	13.7	20			
G 32 - 051			51	320	8.7	2784	10.2	3264	11.5	3680	12.8	4096	15.6	20			
G 32 - 064			64	269	10.9	2934	12.8	3446	14.4	3876	16.0	4307	20.0	20			
G 32 - 076			76	219	12.9	2825	15.2	3329	17.1	3745	19.0	4161	24.4	20			
G 32 - 089			89	180	15.1	2723	17.8	3209	20.0	3611	22.3	4021	29.7	10			
G 32 - 102			102	155	17.3	2682	20.4	3162	23.0	3557	25.5	3953	35.1	10			
G 32 - 115			115	140	19.6	2744	23.0	3220	25.9	3623	28.8	4032	39.0	10			
G 32 - 127			127	124	21.6	2678	25.4	3150	28.6	3543	31.8	3943	42.8	10			
G 32 - 139			139	112	23.8	2673	28.0	3144	31.3	3512	35.0	3931	48.6	10			
G 32 - 152			152	102	25.8	2632	30.4	3101	34.2	3488	38.0	3876	52.4	10			
G 32 - 178			178	88.2	30.3	2672	35.6	3140	40.1	3532	44.5	3925	60.9	5			
G 32 - 203			203	76.0	34.5	2622	40.6	3086	45.7	3471	50.8	3861	69.2	5			
G 32 - 254			254	60.8	43.2	2627	50.8	3089	57.2	3475	63.5	3861	88.1	5			
G 32 - 305			7.3 x 5.9	305	49.0	51.9	2543	61.0	2989	68.6	3363	76.3	3739	104	5		
G 40 - 051	40	20	51	628	8.7	5464	10.2	6406	11.5	7206	12.8	8038	15.0	20			
G 40 - 064			64	487	10.9	5308	12.8	6234	14.4	7013	16.0	7792	19.5	10			
G 40 - 076			76	379	12.9	4889	15.2	5761	17.1	6481	19.0	7201	23.3	10			
G 40 - 089			89	321	15.1	4847	17.8	5714	20.0	6428	22.3	7158	26.7	10			
G 40 - 102			102	281	17.3	4861	20.4	5732	23.0	6449	25.5	7166	33.8	10			
G 40 - 115			115	245	19.6	4802	23.0	5635	25.9	6339	28.8	7056	36.2	10			
G 40 - 127			127	221	21.6	4774	25.4	5613	28.6	6315	31.8	7028	40.7	5			
G 40 - 139			139	190	23.8	4522	28.0	5320	31.3	5942	35.0	6650	44.5	5			
G 40 - 152			152	168	25.8	4334	30.4	5107	34.2	5746	38.0	6384	49.6	5			
G 40 - 178			178	146	30.3	4424	35.6	5198	40.1	5847	44.5	6497	59.9	5			
G 40 - 203			203	132	34.5	4554	40.6	5359	45.7	6029	50.8	6706	67.1	5			
G 40 - 254			254	107	43.2	4622	50.8	5436	57.2	6115	63.5	6795	86.3	2			
G 40 - 305			8.4 x 7.5	305	87.8	51.9	4557	61.0	5356	68.6	6025	76.3	6699	104	2		
G 50 - 064			50	25	64	709	10.9	7728	12.8	9075	14.4	10210	16.0	11344	19.3	5	
G 50 - 076					76	572	12.9	7379	15.2	8694	17.1	9781	19.0	10868	24.2	5	
G 50 - 089	89	475			15.1	7173	17.8	8455	20.0	9512	22.3	10593	28.0	5			
G 50 - 102	102	405			17.3	7007	20.4	8262	23.0	9295	25.5	10328	33.5	5			
G 50 - 115	115	352			19.6	6899	23.0	8096	25.9	9108	28.8	10138	38.6	5			
G 50 - 127	127	316			21.6	6826	25.4	8026	28.6	9030	31.8	10049	41.4	5			
G 50 - 139	139	289			23.8	6878	28.0	8092	31.3	9046	35.0	10115	47.3	5			
G 50 - 152	152	239			25.8	6166	30.4	7266	34.2	8174	38.0	9082	50.2	2			
G 50 - 178	178	215			30.3	6515	35.6	7654	40.1	8611	44.5	9568	61.1	2			
G 50 - 203	203	187			34.5	6452	40.6	7592	45.7	8541	50.8	9500	67.7	2			
G 50 - 254	254	153			43.2	6610	50.8	7772	57.2	8744	63.5	9716	87.0	2			
G 50 - 305	11.5 x 9.0	305			127	51.9	6591	61.0	7747	68.6	8715	76.3	9690	104	2		
G 63 - 076	63	38			76	952	12.9	12280	15.2	14470	-	-	-	-	15.5	5	
G 63 - 089					89	819	15.1	12360	17.8	14580	-	-	-	-	-	20.0	5
G 63 - 102					102	700	17.3	12110	20.4	14280	23.0	16065	25.5	17850	30.7	5	
G 63 - 115			115	620	19.6	12152	23.0	14260	25.9	16043	28.8	17860	34.9	5			
G 63 - 127			127	565	21.6	12204	25.4	14351	28.6	16145	31.8	17967	38.0	2			
G 63 - 152			152	458	25.8	11816	30.4	13923	34.2	15664	38.0	17404	47.2	2			
G 63 - 178			178	384	30.3	11635	35.6	13670	40.1	15379	44.5	17088	55.8	2			
G 63 - 203			203	337	34.5	11627	40.6	13682	45.7	15392	50.8	17120	64.8	2			
G 63 - 254			254	263	43.2	11362	50.8	13360	57.2	15030	63.5	16701	86.7	2			
G 63 - 305			11.6 x 14.9	305	218	51.9	11314	61.0	13298	68.6	14960	76.3	16633	106	2		

1 N = 0.1 daN = 0.102 kgf Load (N) = R (N/mm) x Deflection (mm)  G 50 - 152 (Series) (D<sub>H</sub>) - (L<sub>0</sub>) Estimated life 100.000 cycles



A SERIES

**EN** Ultra-heavy load springs



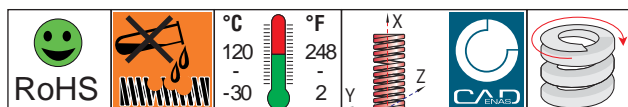
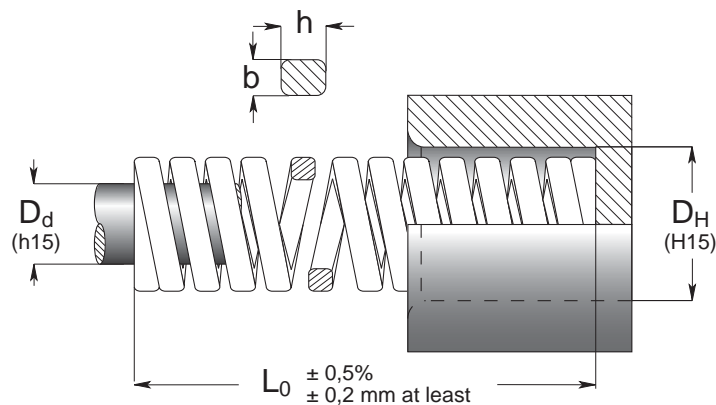
Code	$D_H$		$L_0$	R	A		B		C		D		E	Pcs
	Hble Diameter	Rbd Diameter			10% $L_0$	12% $L_0$	13.5% $L_0$	15% $L_0$	do not use					
	b x h		Free Length	Spring Constant	mm	N	mm	N	mm	N	mm	N	mm	
	mm	mm	mm	N/mm	± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	approx.	do not use	mm		
A 25 - 064	25	12.5	64	644	6.4	4122	7.7	4959	8.6	5564	9.6	6182	13	25
A 25 - 076			76	556	7.6	4226	9.1	5060	10.3	5705	11.4	6338	16	20
A 25 - 089			89	462	8.9	4112	10.7	4943	12.0	5551	13.4	6168	20	20
A 25 - 102			102	390	10.2	3978	12.2	4758	13.8	5370	15.3	5967	23	20
A 25 - 115			115	360	11.5	4140	13.8	4968	15.5	5589	17.3	6210	26	10
A 25 - 127			127	326	12.7	4140	15.2	4955	17.1	5589	19.1	6210	28	10
A 25 - 152			152	255	15.2	3876	18.2	4641	20.5	5233	22.8	5814	34	10
A 25 - 178			178	230	17.8	4094	21.4	4922	24.0	5527	26.7	6141	39	10
A 25 - 203			203	202	20.3	4101	24.4	4929	27.4	5536	30.5	6151	45	10
A 25 - 305	5.6 x 7.5	305	136	30.5	4148	36.6	4978	41.2	5600	45.8	6222	63	5	
A 32 - 064	32	16	64	1077	6.4	6892	7.7	8270	8.6	9305	9.6	10337	13	20
A 32 - 076			76	874	7.6	6642	9.1	7971	10.3	8967	11.4	9964	16	20
A 32 - 089			89	721	8.9	6419	11	7702	12.0	8663	13.3	9628	20	10
A 32 - 102			102	620	10	6324	12	7589	13.8	8537	15.3	9486	23	10
A 32 - 115			115	560	11.5	6440	14	7728	15.5	8694	17.2	9660	26	10
A 32 - 127			127	496	12.7	6299	15	7559	17.1	8504	19.05	9449	28	10
A 32 - 152			152	408	15.2	6202	18	7442	20.5	8372	22.8	9302	34	10
A 32 - 178			178	353	17.8	6280	21	7536	24.0	8483	26.7	9420	39	5
A 32 - 203			203	304	20.3	6171	24	7405	27.4	8331	30.4	9257	45	5
A 32 - 254	254	243	25	6177	30	7413	34.3	8332	38.1	9266	62	5		
A 32 - 305	7.5 x 9.2	305	196	31	5978	37	7174	41.2	8070	45.7	8967	75	5	
A 40 - 089	40	20	89	880	8.9	7832	10.7	9416	12.0	10573	13.4	11748	20	10
A 40 - 102			102	762	10.2	7772	12.2	9296	13.8	10493	15.3	11659	23	10
A 40 - 115			115	679	11.5	7809	13.8	9370	15.5	10541	17.3	11713	26	10
A 40 - 127			127	622	12.7	7899	15.2	9454	17.1	10664	19.1	11849	28	5
A 40 - 152			152	509	15.2	7737	18.2	9264	20.5	10445	22.8	11605	36	5
A 40 - 178			178	429	17.8	7636	21.4	9181	24.0	10309	26.7	11454	43	5
A 40 - 203			203	374	20.3	7592	24.4	9126	27.4	10249	30.5	11388	49	5
A 40 - 254			254	296	25.4	7518	30.5	9028	34.3	10150	38.1	11278	62	2
A 40 - 305			8.5 x 11.0	305	246	30.5	7530	36.6	9004	41.2	10129	45.8	11255	75
A 50 - 089	50	25	89	1410	8.9	12549	10.7	15087	12.0	16941	13.4	18824	19	5
A 50 - 102			102	1215	10.2	12393	12.2	14823	13.8	16731	15.3	18590	22	5
A 50 - 115			115	1076	11.5	12374	13.8	14849	15.5	16705	17.3	18561	25	5
A 50 - 127			127	968	12.7	12294	15.2	14714	17.1	16596	19.1	18440	28	5
A 50 - 152			152	806	15.2	12251	18.2	14669	20.5	16539	22.8	18377	34	2
A 50 - 178			178	698	17.8	12424	21.4	14937	24.0	16773	26.7	18637	40	2
A 50 - 203			203	612	20.3	12424	24.4	14933	27.4	16772	30.5	18635	45	2
A 50 - 254			254	472	25.4	11989	30.5	14396	34.3	16185	38.1	17983	58	2
A 50 - 305			11.8 x 13.5	305	388	30.5	11834	36.6	14201	41.2	15976	45.8	17751	70

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

A 50 - 152 (Series  $D_H$  -  $L_0$ )

**EN** Hyper-strong springs



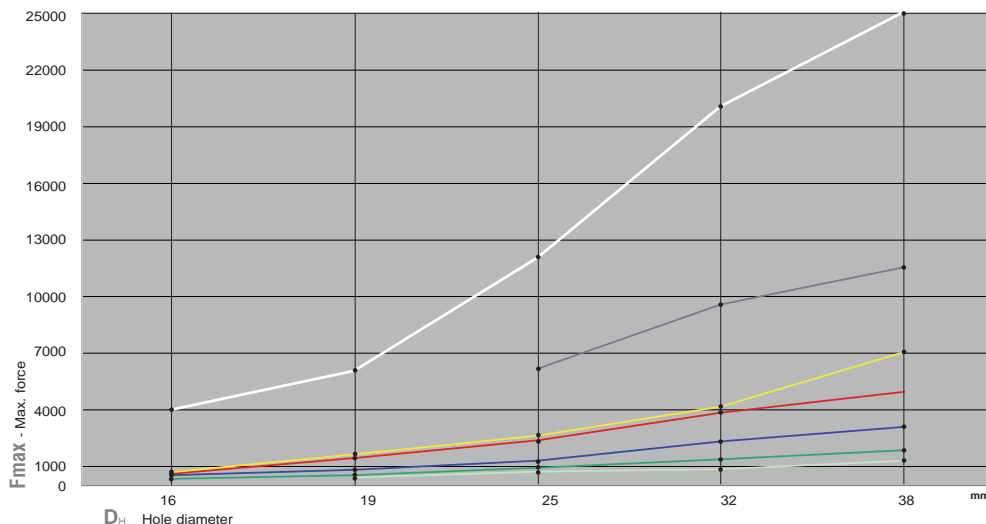
Code	D <sub>H</sub> Hole Diameter	D <sub>d</sub> Rod Diameter	L <sub>0</sub> Free Length	R Spring Constant	F <sub>max</sub> mm	N	Pcs
	mm	mm	mm	N/mm	mm		
W 16 - 020	16	6,3	20	1.818	2,2	4.000	16
W 16 - 035			35	1.000	4,0		
W 16 - 050			50	615	6,5		
W 16 - 075			75	400	10,0		
W 16 - 100			100	286	14,0		
	4,6 x 5,0						
W 19 - 025	19	8	25	2.400	2,5	6.000	16
W 19 - 040			40	1.333	4,5		
W 19 - 050			50	1.000	6,0		
W 19 - 075			75	600	10,0		
W 19 - 100			100	429	14,0		
	5,1 x 6,5						
W 25 - 030	25	10	30	4.800	2,5	12.000	10
W 25 - 050			50	2.400	5,0		
W 25 - 075			75	1.500	8,0		
W 25 - 100			100	1.000	12,0		
W 25 - 125			125	857	14,0		
	6,9 x 9,1						
W 32 - 035	32	12,5	35	6.667	3,0	20.000	8
W 32 - 050			50	3.636	5,5		
W 32 - 075			75	2.222	9,0		
W 32 - 100			100	1.538	13,0		
W 32 - 125			125	1.250	16,0		
W 32 - 150	150	1.053	19,0		21,7	2	
	9,25 x 10,8						
W 38 - 040	38	16	40	7.143	3,5	25.000	4
W 38 - 050			50	5.000	5,0		
W 38 - 075			75	2.778	9,0		
W 38 - 100			100	1.923	13,0		
W 38 - 150			150	1.316	19,0		
W 38 - 200	200	926	27,0		29,9	2	
	10,5 x 12,6						

**EN** Hyper-strong load springs

Features that are unparalleled on the market thanks to the superior Special Springs production technology.

- MAXIMUM FORCE UP TO 6 TIMES THE EXTRA STRONG SPRINGS (ISO standard yellow color).
- MAXIMUM FORCE OVER 2 TIMES THE ULTRA STRONG SPRINGS (Special Springs standard silver color).

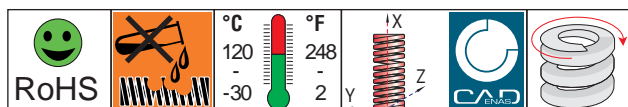
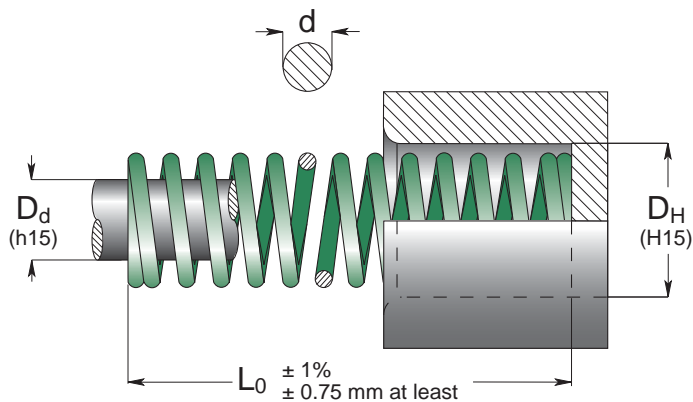
Ideal for applications that involve extremely large loads with short working strokes and that have to go for as long as possible without maintenance, in difficult environments with large amounts of contaminants and high temperatures.



	SERIES	STANDARD	LOAD
●	VL	Special Springs	Extra-light
●	V	ISO	Light
●	B	ISO	Medium
●	R	ISO	Strong
●	G	ISO	Extra-Strong
●	A	Special Springs	Ultra-Strong
●	W	Special Springs	Hyper-strong

TV SERIES

**EN** Light load springs



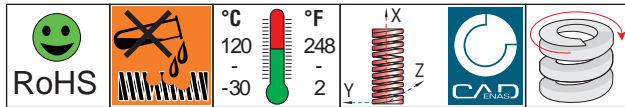
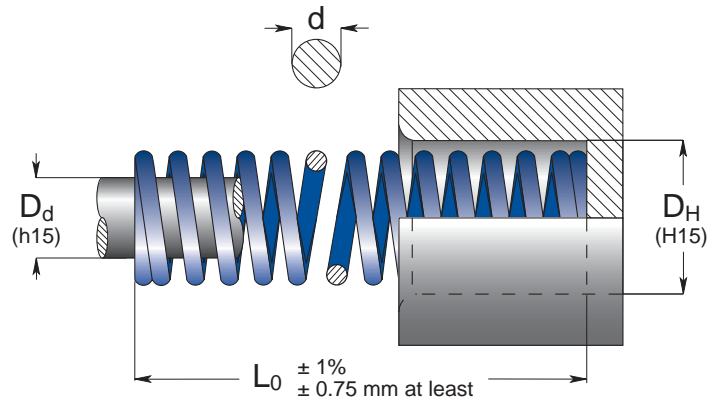
Code	D <sub>H</sub>		L <sub>0</sub>	R	A	B	C	D	E	Pcs					
	Hble Diameter	Rod Diameter													
	d			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use approx.						
	mm	mm	mm	N/mm	mm	mm	mm	mm	mm						
TV 10 - 025	10	5	25	4.4	6.3	28	7.5	33	8.8	39	10.0	44	13.2	50	
TV 10 - 032			32	3.4	8.0	27	9.6	33	11.2	38	12.8	44	44	16.5	50
TV 10 - 038			38	2.8	9.5	26	11.4	32	13.3	37	15.2	42	42	19.8	50
TV 10 - 044			44	2.4	11.0	26	13.2	31	15.4	37	17.6	42	42	23.1	50
TV 10 - 051			51	2.1	12.8	27	15.3	32	17.9	37	20.4	43	43	26.9	25
TV 10 - 064			64	1.6	16.0	26	19.2	31	22.4	36	25.6	42	42	33.3	25
TV 10 - 076			76	1.3	19.0	25	22.8	30	26.6	35	30.4	40	40	39.6	25
TV 10 - 305			305	1.1	76.3	24	91.5	29	107	32	122	38	38	157	10
TV 13 - 025			12.5	6.3	25	8.5	6.3	53	7.5	64	8.8	74	10.0	85	13.5
TV 13 - 032	32	6.5			8.0	52	9.6	62	11.2	73	12.8	83	83	16.8	50
TV 13 - 038	38	5.3			9.5	51	11.4	61	13.3	70	15.2	81	81	20.3	50
TV 13 - 044	44	4.4			11.0	49	13.2	59	15.4	68	17.6	78	78	23.9	25
TV 13 - 051	51	3.8			12.8	48	15.3	58	17.9	68	20.4	78	78	26.9	25
TV 13 - 064	64	2.9			16.0	47	19.2	56	22.4	65	25.6	75	75	33.3	25
TV 13 - 076	76	2.5			19.0	48	22.8	57	26.6	67	30.4	76	76	41.1	25
TV 13 - 089	89	2.1			22.3	48	26.7	57	31.2	65	35.6	76	76	48.3	20
TV 13 - 305	305	1.5			76.3	45	91.5	54	107	64	122	73	73	163	10
TV 16 - 025	16	8	25	17.9	6.3	112	7.5	134	8.8	157	10.0	179	14.7	50	
TV 16 - 032			32	13.5	8.0	108	9.6	129	11.2	151	12.8	173	173	18.5	50
TV 16 - 038			38	10.5	9.5	100	11.4	120	13.3	140	15.2	160	160	22.4	25
TV 16 - 044			44	8.8	11.0	96	13.2	116	15.4	136	17.6	154	154	25.9	25
TV 16 - 051			51	7.6	12.8	97	15.3	116	17.9	136	20.4	155	155	30.0	25
TV 16 - 064			64	5.9	16.0	95	19.2	114	22.4	132	25.6	152	152	37.8	25
TV 16 - 076			76	4.8	19.0	91	22.8	109	26.6	128	30.4	145	145	45.2	20
TV 16 - 089			89	4.0	22.3	90	26.7	108	31.2	125	35.6	144	144	52.8	20
TV 16 - 102			102	3.5	25.5	90	30.6	108	35.7	125	40.8	144	144	60.7	20
TV 16 - 305	305	2	76.3	85	91.5	103	107	117	122	137	137	184	10		

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

TV 16 - 102 (Series D<sub>H</sub> - L<sub>0</sub>)

**EN** Medium load springs



Code	D <sub>H</sub>		L <sub>0</sub>	R	A		B		C		D		E	Pcs
	Hole Diameter	Rod Diameter			Free Length	Spring Constant	25% L <sub>0</sub>	30% L <sub>0</sub>	33.75% L <sub>0</sub>	37.5% L <sub>0</sub>	do not use approx.			
	d			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use					
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
TB 10 - 025	10	5	25	12.3	6.3	77	7.5	92	8.4	104	9.4	115	10.4	50
TB 10 - 032			32	9.5	8.0	76	9.6	91	10.8	103	12.0	113	13.2	50
TB 10 - 038			38	7.8	9.5	74	11.4	88	12.8	100	14.3	111	16.0	50
TB 10 - 044			44	6.5	11.0	72	13.2	86	14.9	97	16.5	108	18.5	50
TB 10 - 051			51	5.6	12.8	72	15.3	86	17.2	96	19.1	108	21.1	25
TB 10 - 064			64	4.5	16.0	71	19.2	86	21.6	97	24.0	107	26.4	25
TB 10 - 076			76	3.7	19.0	70	22.8	84	25.7	95	28.5	105	31.8	25
TB 10 - 305	1.5		305	0.9	76.3	68	91.5	82	103	93	114	102	129	10
TB 13 - 025	12.5	6.3	25	21.7	6.3	136	7.5	163	8.4	183	9.4	204	11.2	50
TB 13 - 032			32	16.8	8.0	134	9.6	161	10.8	181	12.0	202	14.0	50
TB 13 - 038			38	13.8	9.5	131	11.4	158	12.8	177	14.3	197	17.3	50
TB 13 - 044			44	11.6	11.0	127	13.2	153	14.9	172	16.5	191	19.8	25
TB 13 - 051			51	10.0	12.8	127	15.3	153	17.2	172	19.1	191	22.9	25
TB 13 - 064			64	7.8	16.0	125	19.2	150	21.6	168	24.0	187	28.4	25
TB 13 - 076			76	6.4	19.0	122	22.8	146	25.7	164	28.5	183	34.3	25
TB 13 - 089	89	5.6	22.3	125	26.7	150	30.0	168	33.4	188	41.4	20		
TB 13 - 305	1.8		305	1.5	76.3	118	91.5	141	103	154	114	176	139	10
TB 16 - 025	16	8	25	31.9	6.3	199	7.5	239	8.4	269	9.4	299	10.9	50
TB 16 - 032			32	24.0	8.0	192	9.6	230	10.8	259	12.0	288	13.7	50
TB 16 - 038			38	19.4	9.5	185	11.4	222	12.8	249	14.3	277	16.5	25
TB 16 - 044			44	16.1	11.0	177	13.2	213	14.9	239	16.5	266	19.3	25
TB 16 - 051			51	13.8	12.8	176	15.3	212	17.2	238	19.1	265	22.1	25
TB 16 - 064			64	10.7	16.0	171	19.2	205	21.6	231	24.0	256	27.4	25
TB 16 - 076			76	8.8	19.0	166	22.8	200	25.7	226	28.5	250	33.0	20
TB 16 - 089	89	7.5	22.3	167	26.7	200	30.0	225	33.4	250	38.6	20		
TB 16 - 102	102	6.5	25.5	167	30.6	200	34.4	224	38.3	250	44.5	20		
TB 16 - 305	2.2		305	2.1	76.3	159	91.5	191	103	216	114	238	134	10

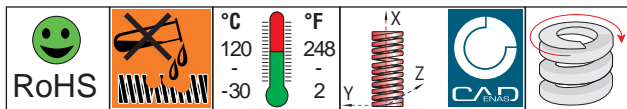
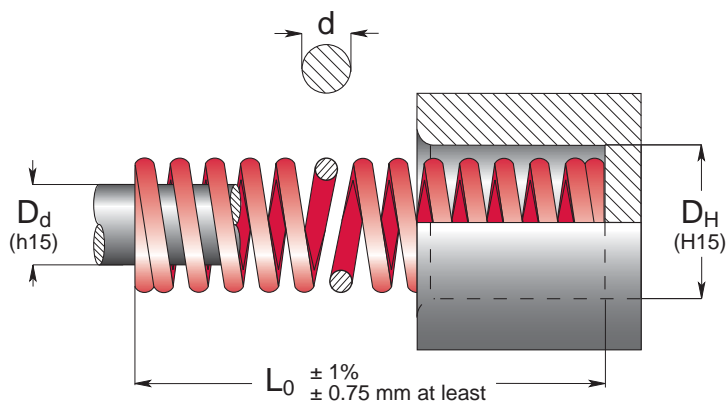
1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

TB 16 - 102 (Series) [D<sub>H</sub>] - [L<sub>0</sub>]

TR SERIES

EN Heavy load springs



Code	$D_H$ Hole Diameter	$D_d$ Rod Diameter	$L_0$ Free Length	R Spring Constant	A 20% $L_0$		B 25% $L_0$		C 27.5% $L_0$		D 30% $L_0$		E do not use approx.	Pcs
					mm	N	mm	N	mm	N	mm	N		
TR 10 - 025	10	5	25	20.7	5.0	103	6.3	129	6.9	142	7.5	155	8.6	50
TR 10 - 032			32	16.1	6.4	103	8.0	129	8.8	142	9.6	155	10.9	50
TR 10 - 038			38	13.0	7.6	98	9.5	123	10.5	136	11.4	148	13.2	50
TR 10 - 044			44	10.9	8.8	96	11.0	119	12.1	132	13.2	143	14.7	50
TR 10 - 051			51	9.6	10.2	98	12.8	123	14.0	135	15.3	147	17.8	25
TR 10 - 064			64	7.7	12.8	98	16.0	123	17.6	136	19.2	147	22.9	25
TR 10 - 076			76	6.3	15.2	96	19.0	119	20.9	132	22.8	143	26.9	25
TR 10 - 305			305	1.6	61.0	1.5	93	76.3	116	83.9	126	91.5	139	110
TR 13 - 025	12.5	6.3	25	37.5	5.0	187	6.3	234	6.9	258	7.5	281	8.9	50
TR 13 - 032			32	28.9	6.4	185	8.0	231	8.8	254	9.6	277	11.2	50
TR 13 - 038			38	23.5	7.6	178	9.5	223	10.5	246	11.4	268	13.7	50
TR 13 - 044			44	19.6	8.8	173	11.0	216	12.1	237	13.2	259	15.7	25
TR 13 - 051			51	17.3	10.2	177	12.8	221	14.0	243	15.3	265	18.8	25
TR 13 - 064			64	13.5	12.8	173	16.0	216	17.6	238	19.2	259	23.6	25
TR 13 - 076			76	11.2	15.2	170	19.0	213	20.9	234	22.8	256	28.4	25
TR 13 - 089			89	9.5	17.8	168	22.3	210	24.5	233	26.7	252	33.0	20
TR 13 - 305	305	2.2	61.0	162	76.3	203	83.9	226	91.5	244	114	10		
TR 16 - 025	16	8	25	81.6	5.0	408	6.3	510	6.9	561	7.5	612	9.1	50
TR 16 - 032			32	61.3	6.4	392	8.0	490	8.8	539	9.6	588	11.4	50
TR 16 - 038			38	49.9	7.6	379	9.5	474	10.5	521	11.4	569	14.2	25
TR 16 - 044			44	40.8	8.8	359	11.0	449	12.1	494	13.2	539	16.3	25
TR 16 - 051			51	35.6	10.2	363	12.8	453	14.0	499	15.3	544	18.8	25
TR 16 - 064			64	27.8	12.8	356	16.0	446	17.6	489	19.2	535	23.9	25
TR 16 - 076			76	22.8	15.2	346	19.0	433	20.9	477	22.8	519	29.0	20
TR 16 - 089			89	19.6	17.8	349	22.3	436	24.5	480	26.7	524	34.3	20
TR 16 - 102	102	17.0	20.4	347	25.5	433	28.1	477	30.6	520	39.4	20		
TR 16 - 305	305	2.8	61.0	330	76.3	413	83.9	453	91.5	495	119	10		

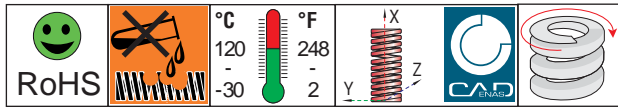
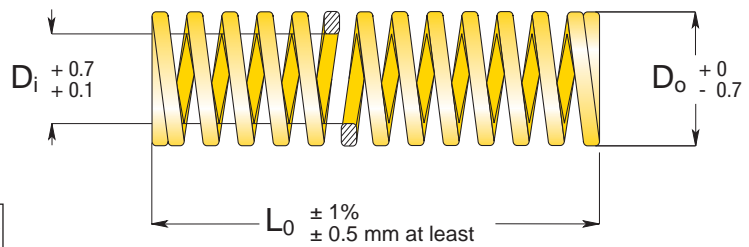
1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

TR 16 - 102 (Series  $D_H$  -  $L_0$ )



**EN** Lightest load springs



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 40% L <sub>0</sub>		B 45% L <sub>0</sub>		C 50% L <sub>0</sub>		E do not use	Pcs
					± 10% 1.000.000 cycles	Kgf (N)	500.000 cycles	Kgf (N)	300.000 cycles	Kgf (N)		
SF 10 - 020	10	5	20	1.00	8.0		9.0	10.0	11.6	50		
SF 10 - 025			25	0.80	10.0		11.2	12.5	14.5	50		
SF 10 - 030			30	0.67	12.0		13.5	15.0	17.4	50		
SF 10 - 035			35	0.57	14.0		15.7	17.5	20.3	50		
SF 10 - 040			40	0.50	16.0		18.0	20.0	23.2	50		
SF 10 - 045			45	0.44	18.0		20.2	22.5	26.1	50		
SF 10 - 050			50	0.40	20.0	8	22.5	25.0	29.0	25		
SF 10 - 055			55	0.36	22.0	(78.5)	24.7	27.5	31.9	25		
SF 10 - 060			60	0.33	24.0		27.0	30.0	34.8	25		
SF 10 - 065			65	0.31	26.0		29.2	32.5	37.7	25		
SF 10 - 070	70	0.29	28.0		31.5	35.0	40.6	25				
SF 10 - 075	75	0.27	30.0		33.7	37.5	43.5	25				
SF 10 - 080	80	0.25	32.0		36.0	40.0	46.4	25				
SF 12 - 020	12	6	20	1.40	8.0		9.0	10.0	11.6	50		
SF 12 - 025			25	1.12	10.0		11.2	12.5	14.5	50		
SF 12 - 030			30	0.93	12.0		13.5	15.0	17.4	50		
SF 12 - 035			35	0.80	14.0		15.7	17.5	20.3	50		
SF 12 - 040			40	0.70	16.0		18.0	20.0	23.2	50		
SF 12 - 045			45	0.62	18.0		20.2	22.5	26.1	50		
SF 12 - 050			50	0.56	20.0	11	22.5	25.0	29.0	25		
SF 12 - 055			55	0.51	22.0	(107.9)	24.7	27.5	31.9	25		
SF 12 - 060			60	0.47	24.0		27.0	30.0	34.8	25		
SF 12 - 065			65	0.43	26.0		29.2	32.5	37.7	25		
SF 12 - 070	70	0.40	28.0		31.5	35.0	40.6	25				
SF 12 - 075	75	0.37	30.0		33.7	37.5	43.5	25				
SF 12 - 080	80	0.35	32.0		36.0	40.0	46.4	25				
SF 14 - 025	14	7	25	1.44	10.0		11.2	12.5	14.5	50		
SF 14 - 030			30	1.20	12.0		13.5	15.0	17.4	50		
SF 14 - 035			35	1.03	14.0		15.7	17.5	20.3	50		
SF 14 - 040			40	0.90	16.0		18.0	20.0	23.2	50		
SF 14 - 045			45	0.80	18.0		20.2	22.5	26.1	25		
SF 14 - 050			50	0.72	20.0		22.5	25.0	29.0	25		
SF 14 - 055			55	0.65	22.0	14.5	24.7	27.5	31.9	25		
SF 14 - 060			60	0.60	24.0	(142.2)	27.0	30.0	34.8	25		
SF 14 - 065			65	0.55	26.0		29.2	32.5	37.7	25		
SF 14 - 070			70	0.51	28.0		31.5	35.0	40.6	25		
SF 14 - 075	75	0.48	30.0		33.7	37.5	43.5	25				
SF 14 - 080	80	0.45	32.0		36.0	40.0	46.4	20				
SF 14 - 090	90	0.40	36.0		40.5	45.0	52.2	20				
SF 16 - 025	16	8	25	1.68	10.0		11.2	12.5	14.5	50		
SF 16 - 030			30	1.40	12.0		13.5	15.0	17.4	50		
SF 16 - 035			35	1.20	14.0		15.7	17.5	20.3	50		
SF 16 - 040			40	1.05	16.0		18.0	20.0	23.2	25		
SF 16 - 045			45	0.94	18.0		20.2	22.5	26.1	25		
SF 16 - 050			50	0.84	20.0		22.5	25.0	29.0	25		
SF 16 - 055			55	0.77	22.0	17	24.7	27.5	31.9	25		
SF 16 - 060			60	0.70	24.0	(166.7)	27.0	30.0	34.8	25		
SF 16 - 065			65	0.65	26.0		29.2	32.5	37.7	25		
SF 16 - 070			70	0.60	28.0		31.5	35.0	40.6	20		
SF 16 - 075	75	0.56	30.0		33.7	37.5	43.5	20				
SF 16 - 080	80	0.53	32.0		36.0	40.0	46.4	20				
SF 16 - 090	90	0.47	36.0		40.5	45.0	52.2	20				
SF 16 - 100	100	0.42	40.0		45.0	50.0	58.0	20				

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

Series [D<sub>o</sub>] - [L<sub>0</sub>]

JIS B 5012 - 1986

SERIES SF

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant ± 10%	A 40% L <sub>0</sub> 1.000.000 cycles		B 45% L <sub>0</sub> 500.000 cycles		C 50% L <sub>0</sub> 300.000 cycles		E do not use approx.	Pcs
					mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)		
SF 18 - 025	18	9	25	2.08	10.0		11.2		12.5		14.5	50
SF 18 - 030			30	1.74	12.0		13.5		15.0		17.4	50
SF 18 - 035			35	1.49	14.0		15.7		17.5		20.3	25
SF 18 - 040			40	1.30	16.0		18.0		20.0		23.2	25
SF 18 - 045			45	1.16	18.0		20.2		22.5		26.1	25
SF 18 - 050			50	1.04	20.0		22.5		25.0		29.0	25
SF 18 - 055			55	0.95	22.0	21	24.7	23	27.5	26	31.9	25
SF 18 - 060			60	0.87	24.0	(206)	27.0	(225)	30.0	(255)	34.8	25
SF 18 - 065			65	0.80	26.0		29.2		32.5		37.7	25
SF 18 - 070			70	0.74	28.0		31.5		35.0		40.6	25
SF 18 - 075			75	0.70	30.0		33.7		37.5		43.5	25
SF 18 - 080			80	0.65	32.0		36.0		40.0		46.4	20
SF 18 - 090			90	0.58	36.0		40.5		45.0		52.2	20
SF 18 - 100			100	0.52	40.0		45.0		50.0		58.0	20
SF 20 - 025	20	11	25	2.56	10.0		11.2		12.5		14.5	50
SF 20 - 030			30	2.13	12.0		13.5		15.0		17.4	50
SF 20 - 035			35	1.83	14.0		15.7		17.5		20.3	25
SF 20 - 040			40	1.60	16.0		18.0		20.0		23.2	25
SF 20 - 045			45	1.42	18.0		20.2		22.5		26.1	25
SF 20 - 050			50	1.28	20.0		22.5		25.0		29.0	25
SF 20 - 055			55	1.16	22.0		24.7		27.5		31.9	25
SF 20 - 060			60	1.07	24.0	26	27.0	29	30.0	32	34.8	25
SF 20 - 065			65	0.98	26.0	(255)	29.2	(284)	32.5	(314)	37.7	25
SF 20 - 070			70	0.91	28.0		31.5		35.0		40.6	25
SF 20 - 075			75	0.85	30.0		33.7		37.5		43.5	25
SF 20 - 080			80	0.80	32.0		36.0		40.0		46.4	20
SF 20 - 090			90	0.71	36.0		40.5		45.0		52.2	20
SF 20 - 100			100	0.64	40.0		45.0		50.0		58.0	20
SF 20 - 125	125	0.51	50.0		56.2		62.5		72.5	10		
SF 20 - 150	150	0.43	60.0		67.5		75.0		87.0	10		
SF 22 - 025	22	11	25	3.20	10.0		11.2		12.5		14.5	50
SF 22 - 030			30	2.67	12.0		13.5		15.0		17.4	25
SF 22 - 035			35	2.29	14.0		15.7		17.5		20.3	25
SF 22 - 040			40	2.00	16.0		18.0		20.0		23.2	25
SF 22 - 045			45	1.78	18.0		20.2		22.5		26.1	25
SF 22 - 050			50	1.60	20.0		22.5		25.0		29.0	25
SF 22 - 055			55	1.46	22.0		24.7		27.5		31.9	25
SF 22 - 060			60	1.33	24.0	32	27.0	36	30.0	40	34.8	25
SF 22 - 065			65	1.23	26.0	(314)	29.2	(353)	32.5	(392)	37.7	25
SF 22 - 070			70	1.14	28.0		31.5		35.0		40.6	20
SF 22 - 075			75	1.07	30.0		33.7		37.5		43.5	20
SF 22 - 080			80	1.00	32.0		36.0		40.0		46.4	20
SF 22 - 090			90	0.89	36.0		40.5		45.0		52.2	20
SF 22 - 100			100	0.80	40.0		45.0		50.0		58.0	20
SF 22 - 125	125	0.64	50.0		56.2		62.5		72.5	10		
SF 22 - 150	150	0.53	60.0		67.5		75.0		87.0	10		
SF 25 - 025	25	13.5	25	4.00	10.0		11.2		12.5		14.5	50
SF 25 - 030			30	3.33	12.0		13.5		15.0		17.4	25
SF 25 - 035			35	2.85	14.0		15.7		17.5		20.3	25
SF 25 - 040			40	2.50	16.0		18.0		20.0		23.2	25
SF 25 - 045			45	2.22	18.0		20.2		22.5		26.1	25
SF 25 - 050			50	2.00	20.0		22.5		25.0		29.0	25
SF 25 - 055			55	1.82	22.0		24.7		27.5		31.9	25
SF 25 - 060			60	1.67	24.0	40	27.0	45	30.0	50	34.8	25
SF 25 - 065			65	1.54	26.0	(392)	29.2	(441)	32.5	(490)	37.7	25
SF 25 - 070			70	1.43	28.0		31.5		35.0		40.6	20
SF 25 - 075			75	1.33	30.0		33.7		37.5		43.5	20
SF 25 - 080			80	1.25	32.0		36.0		40.0		46.4	20
SF 25 - 090			90	1.11	36.0		40.5		45.0		52.2	20
SF 25 - 100			100	1.00	40.0		45.0		50.0		58.0	20
SF 25 - 125	125	0.80	50.0		56.2		62.5		72.5	10		
SF 25 - 150	150	0.67	60.0		67.5		75.0		87.0	10		
SF 25 - 175	175	0.57	70.0		78.7		87.5		101.5	10		

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



SF 20 - 60 (Series D<sub>o</sub> - L<sub>0</sub>)

SF SERIES

JIS B 5012 - 1986

Code	D <sub>o</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A		B		C		E	Pcs
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	40% L <sub>0</sub>	500.000 cycles	45% L <sub>0</sub>	500.000 cycles	50% L <sub>0</sub>	300.000 cycles	approx. do not use	
	mm	mm	mm	± 10% Kgf/mm	mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm	
SF 27 - 025	27	13.5	25	4.80	10.0	48 (471)	11.2	54 (530)	12.5	60 (588)	14.5	20
SF 27 - 030			30	4.00	12.0		13.5		15.0		17.4	20
SF 27 - 035			35	3.43	14.0		15.7		17.5		20.3	20
SF 27 - 040			40	3.00	16.0		18.0		20.0		23.2	20
SF 27 - 045			45	2.67	18.0		20.2		22.5		26.1	20
SF 27 - 050			50	2.40	20.0		22.5		25.0		29.0	20
SF 27 - 055			55	2.18	22.0		24.7		27.5		31.9	20
SF 27 - 060			60	2.00	24.0		27.0		30.0		34.8	20
SF 27 - 065			65	1.85	26.0		29.2		32.5		37.7	20
SF 27 - 070			70	1.71	28.0		31.5		35.0		40.6	20
SF 27 - 075			75	1.60	30.0		33.7		37.5		43.5	20
SF 27 - 080			80	1.50	32.0		36.0		40.0		46.4	10
SF 27 - 090			90	1.33	36.0		40.5		45.0		52.2	10
SF 27 - 100			100	1.20	40.0		45.0		50.0		58.0	10
SF 27 - 125			125	0.96	50.0		56.2		62.5		72.5	10
SF 27 - 150			150	0.80	60.0		67.5		75.0		87.0	10
SF 27 - 175	175	0.69	70.0	78.7	87.5	101.5	5					
SF 30 - 025	30	16	25	5.80	10.0	58 (569)	11.2	65 (637)	12.5	72 (706)	14.5	20
SF 30 - 030			30	4.80	12.0		13.5		15.0		17.4	20
SF 30 - 035			35	4.13	14.0		15.7		17.5		20.3	20
SF 30 - 040			40	3.60	16.0		18.0		20.0		23.2	20
SF 30 - 045			45	3.21	18.0		20.2		22.5		26.1	20
SF 30 - 050			50	2.88	20.0		22.5		25.0		29.0	20
SF 30 - 055			55	2.63	22.0		24.7		27.5		31.9	20
SF 30 - 060			60	2.40	24.0		27.0		30.0		34.8	20
SF 30 - 065			65	2.22	26.0		29.2		32.5		37.7	20
SF 30 - 070			70	2.05	28.0		31.5		35.0		40.6	20
SF 30 - 075			75	1.93	30.0		33.7		37.5		43.5	20
SF 30 - 080			80	1.80	32.0		36.0		40.0		46.4	10
SF 30 - 090			90	1.60	36.0		40.5		45.0		52.2	10
SF 30 - 100			100	1.44	40.0		45.0		50.0		58.0	10
SF 30 - 125			125	1.15	50.0		56.2		62.5		72.5	10
SF 30 - 150			150	0.96	60.0		67.5		75.0		87.0	10
SF 30 - 175	175	0.82	70.0	78.7	87.5	101.5	5					
SF 30 - 200	200	0.72	80.0	90.0	100.0	116.0	5					
SFR 35 - 040	35	21	40	4.90	16.0	78.4 (768.3)	18.0	88.2 (864.4)	20.0	98 (961)	23.2	20
SFR 35 - 045			45	4.36	18.0		20.25		22.5		26.1	20
SFR 35 - 050			50	3.92	20.0		22.5		25.0		29.0	20
SFR 35 - 055			55	3.56	22.0		24.75		27.5		31.9	10
SFR 35 - 060			60	3.26	24.0		27.0		30.0		34.8	10
SFR 35 - 065			65	3.02	26.0		29.25		32.5		37.7	10
SFR 35 - 070			70	2.80	28.0		31.5		35.0		40.6	10
SFR 35 - 075			75	2.61	30.0		33.75		37.5		43.5	10
SFR 35 - 080			80	2.45	32.0		36.0		40.0		46.4	10
SFR 35 - 090			90	2.17	36.0		40.5		45.0		52.2	10
SFR 35 - 100			100	1.96	40.0		45.0		50.0		58.0	10
SFR 35 - 125			125	1.57	50.0		56.25		62.5		72.5	5
SFR 35 - 150			150	1.30	60.0		67.5		75.0		87.0	5
SFR 35 - 175			175	1.12	70.0		78.75		87.5		101.5	5
SFR 35 - 200	200	0.98	80.0	90.0	100.0	116.0	5					
SF 40 - 040	40	22	40	6.38	16.0	102 (1,000)	18.0	115 (1,128)	20.0	128 (1,255)	23.2	20
SF 40 - 045			45	5.68	18.0		20.3		22.5		26.1	20
SF 40 - 050			50	5.12	20.0		22.5		25.0		29.0	20
SF 40 - 055			55	4.65	22.0		24.8		27.5		31.9	20
SF 40 - 060			60	4.26	24.0		27.0		30.0		34.8	10
SF 40 - 065			66	3.93	26.0		29.3		32.5		37.7	10
SF 40 - 070			70	3.65	28.0		31.5		35.0		40.6	10
SF 40 - 075			75	3.41	30.0		33.8		37.5		43.5	10
SF 40 - 080			80	3.20	32.0		36.0		40.0		46.4	10
SF 40 - 090			90	2.84	36.0		40.5		45.0		52.2	10
SF 40 - 100			100	2.56	40.0		45.0		50.0		58.0	10
SF 40 - 125			125	2.04	50.0		56.2		62.5		72.5	5
SF 40 - 150			150	1.70	60.0		67.5		75.0		87.0	5
SF 40 - 175			175	1.46	70.0		78.7		87.5		101.5	5
SF 40 - 200			200	1.28	80.0		90.0		100.0		116.0	5
SF 40 - 250			250	1.02	100.0		112.5		125.0		145.0	2

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

Series D<sub>o</sub> - L<sub>0</sub>

JIS B 5012 - 1986

SERIES SF

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant ± 10%	A 40% L <sub>0</sub> 1.000.000 cycles		B 45% L <sub>0</sub> 500.000 cycles		C 50% L <sub>0</sub> 300.000 cycles		E do not use approx.	Pcs		
					mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)			mm	Kgf (N)
SFR 40 - 040	40	26	40	4.00	16.0		18.0		20.0		23.2	20		
SFR 40 - 050			50	3.20	20.0		22.5		25.0		29.0	20		
SFR 40 - 060			60	2.60	24.0		27.0		30.0		34.8	10		
SFR 40 - 070			70	2.35	28.0		31.5		35.0		40.6	10		
SFR 40 - 080			80	2.05	32.0		36.0		40.0		46.4	10		
SFR 40 - 090			90	1.80	36.0	52	40.5	58.5	45.0	65	52.2	10		
SFR 40 - 100			100	1.50	40.0	(509.6)	45.0	(573.3)	50.0	(637)	58.0	10		
SFR 40 - 125			125	1.15	50.0		56.25		62.5		72.5	5		
SFR 40 - 150			150	0.90	60.0		67.5		75.0		87.0	5		
SFR 40 - 175			175	0.75	70.0		78,75		87.5		101.5	5		
SFR 40 - 200			200	0.60	80.0		90.0		100.0		116.0	5		
SFR 40 - 250			250	0.40	100.0		112,5		125.0		145.0	2		
SF 50 - 050			50	27.5	50	8.00	20.0		22.5		25.0		29.0	5
SF 50 - 055	55	7.27			22.0		24.8		27.5		31.9	5		
SF 50 - 060	60	6.66			24.0		27.0		30.0		34.8	5		
SF 50 - 065	65	6.15			26.0		29.3		32.5		37.7	5		
SF 50 - 070	70	5.71			28.0		31.5		35.0		40.6	5		
SF 50 - 075	75	5.33			30.0		33.8		37.5		43.5	5		
SF 50 - 080	80	5.00			32.0	160	36.0	180	40.0	200	46.4	5		
SF 50 - 090	90	4.44			36.0	(1,569)	40.5	(1,765)	45.0	(1,961)	52.2	5		
SF 50 - 100	100	4.00			40.0		45.0		50.0		58.0	5		
SF 50 - 125	125	3.20			50.0		56.2		62.5		72.5	5		
SF 50 - 150	150	2.66			60.0		67.5		75.0		87.0	2		
SF 50 - 175	175	2.28			70.0		78,7		87.5		101.5	2		
SF 50 - 200	200	2.00			80.0		90.0		100.0		116.0	2		
SF 50 - 250	250	1.60	100.0		112,5		125.0		145.0	2				
SF 50 - 300	300	1.33	120.0		135.0		150.0		174.0	2				
SFR 50 - 050	50	31	50	5.40	20.0		22.5		25.0		29.0	5		
SFR 50 - 060			60	4.50	24.0		27.0		30.0		34.8	5		
SFR 50 - 070			70	3.60	28.0		31.5		35.0		40.6	5		
SFR 50 - 080			80	3.00	32.0		36.0		40.0		46.4	5		
SFR 50 - 090			90	2.65	36.0		40.5		45.0		52.2	5		
SFR 50 - 100			100	2.40	40.0	99	45.0	111.4	50.0	123.3	58.0	5		
SFR 50 - 125			125	1.90	50.0	(970.2)	56.25	(1,091.4)	62.5	(1,212.3)	72.5	5		
SFR 50 - 150			150	1.55	60.0		67.5		75.0		87.0	2		
SFR 50 - 175			175	1.30	70.0		78,75		87.5		101.5	2		
SFR 50 - 200			200	1.10	80.0		90.0		100.0		116.0	2		
SFR 50 - 250			250	0.90	100.0		112,5		125.0		145.0	2		
SFR 50 - 300			300	0.75	120.0		135.0		150.0		174.0	2		
SF 60 - 060			60	33	60	9.59	24.0		27.0		30.0		34.8	5
SF 60 - 070	70	8.22			28.0		31.5		35.0		40.6	5		
SF 60 - 080	80	7.19			32.0		36.0		40.0		46.4	5		
SF 60 - 090	90	6.40			36.0		40.5		45.0		52.2	5		
SF 60 - 100	100	5.76			40.0	230	45.0	259	50.0	288	58.0	5		
SF 60 - 125	125	4.60			50.0	(2,260)	56.2	(2,540)	62.5	(2,820)	72.5	2		
SF 60 - 150	150	3.84			60.0		67.5		75.0		87.0	2		
SF 60 - 175	175	3.29			70.0		78,7		87.5		101.5	2		
SF 60 - 200	200	2.88			80.0		90.0		100.0		116.0	2		
SF 60 - 250	250	2.30			100.0		112,5		125.0		145.0	2		
SF 60 - 300	300	1.92			120.0		135.0		150.0		174.0	2		
SFR 60 - 060	60	36			60	7.40	24.0		27.0		30.0		34.8	5
SFR 60 - 070					70	6.30	28.0		31.5		35.0		40.6	5
SFR 60 - 080			80	5.30	32.0		36.0		40.0		46.4	5		
SFR 60 - 090			90	4.20	36.0		40.5		45.0		52.2	5		
SFR 60 - 100			100	3.10	40.0	148.8	45.0	167.4	50.0	186	58.0	5		
SFR 60 - 125			125	2.35	50.0	(1,458.2)	56.25	(1,640.5)	62.5	(1,822.8)	72.5	2		
SFR 60 - 150			150	2.10	60.0		67.5		75.0		87.0	2		
SFR 60 - 175			175	1.90	70.0		78,75		87.5		101.5	2		
SFR 60 - 200			200	1.60	80.0		90.0		100.0		116.0	2		
SFR 60 - 250			250	1.30	100.0		112,5		125.0		145.0	2		
SFR 60 - 300			300	1.00	120.0		135.0		150.0		174.0	2		

1 N = 0.1 daN = 0.102 kgf

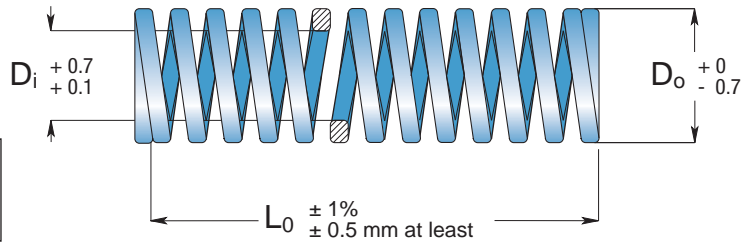
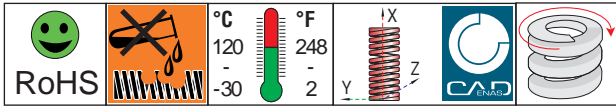
Load (N) = R (N/mm) x Deflection (mm)



SF 40 - 80 (Series D<sub>o</sub> - L<sub>0</sub>)



**EN** Light load springs



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 32% L <sub>0</sub> 1.000.000 cycles		B 36% L <sub>0</sub> 500.000 cycles		C 40% L <sub>0</sub> 300.000 cycles		E do not use approx.	Pcs
					± 10% Kgf/mm	mm	Kgf (N)	mm	Kgf (N)	mm		
SL 10 - 020	10	5	20	1.81	6.4		7.2		8.0		9.6	50
SL 10 - 025			25	1.45	8.0		9.0		10.0		12.0	50
SL 10 - 030			30	1.21	9.6		10.8		12.0		14.4	50
SL 10 - 035			35	1.03	11.2		12.6		14.0		16.8	50
SL 10 - 040			40	0.90	12.8		14.4		16.0		19.2	50
SL 10 - 045			45	0.80	14.4		16.2	13	18.0	14.5	21.6	50
SL 10 - 050			50	0.73	16.0	11.5	18.0	(112.8)	20.0	(142.2)	24.0	25
SL 10 - 055			55	0.66	17.6		19.8		22.0		26.4	25
SL 10 - 060			60	0.60	19.2		21.6		24.0		28.8	25
SL 10 - 065			65	0.55	20.8		23.4		26.0		31.2	25
SL 10 - 070	70	0.51	22.4		25.2		28.0		33.6	25		
SL 10 - 075	75	0.48	24.0		27.0		30.0		36.0	25		
SL 10 - 080	80	0.45	25.6		28.8		32.0		38.4	25		
SL 12 - 020	12	6	20	2.63	6.4		7.2		8.0		9.6	50
SL 12 - 025			25	2.10	8.0		9.0		10.0		12.0	50
SL 12 - 030			30	1.75	9.6		10.8		12.0		14.4	50
SL 12 - 035			35	1.50	11.2		12.6		14.0		16.8	50
SL 12 - 040			40	1.32	12.8		14.4		16.0		19.2	50
SL 12 - 045			45	1.17	14.4		16.2	19	18.0	21	21.6	50
SL 12 - 050			50	1.05	16.0	17	18.0	(166.7)	20.0	(206)	24.0	25
SL 12 - 055			55	0.96	17.6		19.8		22.0		26.4	25
SL 12 - 060			60	0.88	19.2		21.6		24.0		28.8	25
SL 12 - 065			65	0.81	20.8		23.4		26.0		31.2	25
SL 12 - 070	70	0.75	22.4		25.2		28.0		33.6	25		
SL 12 - 075	75	0.70	24.0		27.0		30.0		36.0	25		
SL 12 - 080	80	0.66	25.6		28.8		32.0		38.4	25		
SL 14 - 025	14	7	25	2.80	8.0		9.0		10.0		12.0	50
SL 14 - 030			30	2.34	9.6		10.8		12.0		14.4	50
SL 14 - 035			35	2.00	11.2		12.6		14.0		16.8	50
SL 14 - 040			40	1.75	12.8		14.4		16.0		19.2	50
SL 14 - 045			45	1.56	14.4		16.2		18.0		21.6	25
SL 14 - 050			50	1.40	16.0		18.0	25	20.0	28	24.0	25
SL 14 - 055			55	1.27	17.6	22	19.8	(216)	22.0	(275)	26.4	25
SL 14 - 060			60	1.17	19.2		21.6		24.0		28.8	25
SL 14 - 065			65	1.08	20.8		23.4		26.0		31.2	25
SL 14 - 070			70	1.00	22.4		25.2		28.0		33.6	25
SL 14 - 075	75	0.93	24.0		27.0		30.0		36.0	25		
SL 14 - 080	80	0.87	25.6		28.8		32.0		38.4	20		
SL 14 - 090	90	0.77	28.8		32.4		36.0		43.2	20		
SL 16 - 025	16	8	25	3.50	8.0		9.0		10.0		12.0	50
SL 16 - 030			30	2.92	9.6		10.8		12.0		14.4	50
SL 16 - 035			35	2.50	11.2		12.6		14.0		16.8	50
SL 16 - 040			40	2.19	12.8		14.4		16.0		19.2	25
SL 16 - 045			45	1.95	14.4		16.2		18.0		21.6	25
SL 16 - 050			50	1.75	16.0		18.0		20.0		24.0	25
SL 16 - 055			55	1.60	17.6		19.8	32	22.0	35	26.4	25
SL 16 - 060			60	1.46	19.2	28	21.6	(275)	24.0	(343)	28.8	25
SL 16 - 065			65	1.35	20.8		23.4		26.0		31.2	25
SL 16 - 070			70	1.25	22.4		25.2		28.0		33.6	20
SL 16 - 075	75	1.17	24.0		27.0		30.0		36.0	20		
SL 16 - 080	80	1.10	25.6		28.8		32.0		38.4	20		
SL 16 - 090	90	0.98	28.8		32.4		36.0		43.2	20		
SL 16 - 100	100	0.88	32.0		36.0		40.0		48.0	20		
SL 18 - 025	18	9	25	4.30	8.0		9.0		10.0		12.0	50
SL 18 - 030			30	3.58	9.6		10.8		12.0		14.4	50
SL 18 - 035			35	3.07	11.2		12.6		14.0		16.8	25
SL 18 - 040			40	2.69	12.8		14.4	39	16.0	43	19.2	25
SL 18 - 045			45	2.39	14.4	34	16.2	(382)	18.0	(422)	21.6	25
SL 18 - 050			50	2.15	16.0		18.0		20.0		24.0	25
SL 18 - 055	55	1.96	17.6		19.8		22.0		26.4	25		

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SL 27 - 80 (Series D<sub>o</sub> - L<sub>0</sub>)



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 32% L <sub>0</sub>		B 36% L <sub>0</sub>		C 40% L <sub>0</sub>		E approx. do not use	Pcs
					± 10% 1.000.000 cycles	Kgf (N)	500.000 cycles	Kgf (N)	300.000 cycles	Kgf (N)		
	mm	mm	mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm	Pcs
SL 18 - 060	18	9	60	1.79	19.2	34 (333)	21.6	39 (382)	24.0	43 (422)	28.8	25
SL 18 - 065			65	1.66	20.8		23.4		26.0		31.2	25
SL 18 - 070			70	1.54	22.4		25.2		28.0		33.6	25
SL 18 - 075			75	1.44	24.0		27.0		30.0		36.0	25
SL 18 - 080			80	1.35	25.6		28.8		32.0		38.4	20
SL 18 - 090			90	1.20	28.8		32.4		36.0		43.2	20
SL 18 - 100	100	1.07	32.0	36.0	40.0	48.0	20					
SL 20 - 025	20	10	25	5.40	8.0	43 (422)	9.0	49 (481)	10.0	54 (530)	12.0	50
SL 20 - 030			30	4.50	9.6		10.8		12.0		14.4	50
SL 20 - 035			35	3.86	11.2		12.6		14.0		16.8	25
SL 20 - 040			40	3.38	12.8		14.4		16.0		19.2	25
SL 20 - 045			45	3.00	14.4		16.2		18.0		21.6	25
SL 20 - 050			50	2.70	16.0		18.0		20.0		24.0	25
SL 20 - 055			55	2.45	17.6		19.8		22.0		26.4	25
SL 20 - 060			60	2.25	19.2		21.6		24.0		28.8	25
SL 20 - 065			65	2.08	20.8		23.4		26.0		31.2	25
SL 20 - 070			70	1.93	22.4		25.2		28.0		33.6	25
SL 20 - 075			75	1.80	24.0		27.0		30.0		36.0	25
SL 20 - 080			80	1.69	25.6		28.8		32.0		38.4	20
SL 20 - 090			90	1.50	28.8		32.4		36.0		43.2	20
SL 20 - 100			100	1.35	32.0		36.0		40.0		48.0	20
SL 20 - 125			125	1.08	40.0		45.0		50.0		60.0	10
SL 20 - 150			150	0.90	48.0		54.0		60.0		72.0	10
SL 22 - 025	22	11	25	6.70	8.0	54 (530)	9.0	60 (588)	10.0	67 (657)	12.0	50
SL 22 - 030			30	5.60	9.6		10.8		12.0		14.4	25
SL 22 - 035			35	4.80	11.2		12.6		14.0		16.8	25
SL 22 - 040			40	4.20	12.8		14.4		16.0		19.2	25
SL 22 - 045			45	3.72	14.4		16.2		18.0		21.6	25
SL 22 - 050			50	3.35	16.0		18.0		20.0		24.0	25
SL 22 - 055			55	3.05	17.6		19.8		22.0		26.4	25
SL 22 - 060			60	2.80	19.2		21.6		24.0		28.8	25
SL 22 - 065			65	2.58	20.8		23.4		26.0		31.2	25
SL 22 - 070			70	2.40	22.4		25.2		28.0		33.6	20
SL 22 - 075			75	2.23	24.0		27.0		30.0		36.0	20
SL 22 - 080			80	2.10	25.6		28.8		32.0		38.4	20
SL 22 - 090			90	1.86	28.8		32.4		36.0		43.2	20
SL 22 - 100			100	1.68	32.0		36.0		40.0		48.0	20
SL 22 - 125			125	1.34	40.0		45.0		50.0		60.0	10
SL 22 - 150			150	1.12	48.0		54.0		60.0		72.0	10
SL 25 - 025	25	12,5	25	8.40	8.0	67 (657)	9.0	76 (745)	10.0	84 (824)	12.0	50
SL 25 - 030			30	7.00	9.6		10.8		12.0		14.4	25
SL 25 - 035			35	6.00	11.2		12.6		14.0		16.8	25
SL 25 - 040			40	5.25	12.8		14.4		16.0		19.2	25
SL 25 - 045			45	4.67	14.4		16.2		18.0		21.6	25
SL 25 - 050			50	4.20	16.0		18.0		20.0		24.0	25
SL 25 - 055			55	3.82	17.6		19.8		22.0		26.4	25
SL 25 - 060			60	3.50	19.2		21.6		24.0		28.8	25
SL 25 - 065			65	3.23	20.8		23.4		26.0		31.2	25
SL 25 - 070			70	3.00	22.4		25.2		28.0		33.6	20
SL 25 - 075			75	2.80	24.0		27.0		30.0		36.0	20
SL 25 - 080			80	2.63	25.6		28.8		32.0		38.4	20
SL 25 - 090			90	2.33	28.8		32.4		36.0		43.2	20
SL 25 - 100			100	2.10	32.0		36.0		40.0		48.0	20
SL 25 - 125			125	1.68	40.0		45.0		50.0		60.0	10
SL 25 - 150			150	1.40	48.0		54.0		60.0		72.0	10
SL 25 - 175	175	1.20	56.0	63.0	70.0	84.0	10					
SL 27 - 025	27	13.5	25	10.00	8.0	80 (785)	9.0	90 (883)	10.0	100 (981)	12.0	20
SL 27 - 030			30	8.33	9.6		10.8		12.0		14.4	20
SL 27 - 035			35	7.14	11.2		12.6		14.0		16.8	20
SL 27 - 040			40	6.25	12.8		14.4		16.0		19.2	20
SL 27 - 045			45	5.56	14.4		16.2		18.0		21.6	20
SL 27 - 050			50	5.00	16.0		18.0		20.0		24.0	20
SL 27 - 055			55	4.55	17.6		19.8		22.0		26.4	20
SL 27 - 060			60	4.17	19.2		21.6		24.0		28.8	20
SL 27 - 065			65	3.85	20.8		23.4		26.0		31.2	20
SL 27 - 070			70	3.57	22.4		25.2		28.0		33.6	20
SL 27 - 075			75	3.33	24.0		27.0		30.0		36.0	20
SL 27 - 080			80	3.13	25.6		28.8		32.0		38.4	10
SL 27 - 090			90	2.78	28.8		32.4		36.0		43.2	10
SL 27 - 100			100	2.50	32.0		36.0		40.0		48.0	10
SL 27 - 125			125	2.00	40.0		45.0		50.0		60.0	10
SL 27 - 150			150	1.67	48.0		54.0		60.0		72.0	10
SL 27 - 175	175	1.43	56.0	63.0	70.0	84.0	5					

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SL 27 - 80 (Series | D<sub>n</sub> | - | L<sub>n</sub>)

## SL SERIES

JIS B 5012 - 1986

Code	D <sub>o</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A		B		C		E	Pcs					
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	32% L <sub>0</sub>	Kgf (N)	36% L <sub>0</sub>	Kgf (N)	40% L <sub>0</sub>	Kgf (N)	do not use approx.						
	mm	mm	mm	± 10% Kgf/mm	1.000.000 cycles		500.000 cycles		300.000 cycles		mm						
SLR 30 - 025	30	16	25	12.11	8.0	91.2 (893.8)	9.0	102.6 (1,005.5)	10.0	114 (1,117.2)	12.0	20					
SLR 30 - 030			30	10.08	9.6		10.8		12.0		14.4	20					
SLR 30 - 035			35	8.65	11.2		12.6		14.0		16.8	20					
SLR 30 - 040			40	7.56	12.8		14.4		16.0		19.2	20					
SLR 30 - 045			45	6.73	14.4		16.2		18.0		21.6	20					
SLR 30 - 050			50	6.05	16.0		18.0		20.0		24.0	20					
SLR 30 - 055			55	5.50	17.6		19.8		22.0		26.4	20					
SLR 30 - 060			60	5.04	19.2		21.6		24.0		28.8	20					
SLR 30 - 065			65	4.65	20.8		23.4		26.0		31.2	20					
SLR 30 - 070			70	4.32	22.4		25.2		28.0		33.6	20					
SLR 30 - 075			75	4.03	24.0		27.0		30.0		36.0	20					
SLR 30 - 080			80	3.78	25.6		28.8		32.0		38.4	10					
SLR 30 - 090			90	3.36	28.8		32.4		36.0		43.2	10					
SLR 30 - 100			100	3.02	32.0		36.0		40.0		48.0	10					
SLR 30 - 125			125	2.42	40.0		45.0		50.0		60.0	10					
SLR 30 - 150			150	2.01	48.0		54.0		60.0		72.0	10					
SLR 30 - 175			175	1.72	56.0		63.0		70.0		84.0	5					
SLR 30 - 200	200	1.51	64.0	72.0	80.0	96.0	5										
SL 35 - 040	35	17.5	40	10.31	12.8	132 (1,295)	14.4	149 (1,461)	16.0	165 (1,618)	19.2	20					
SL 35 - 045			45	9.17	14.4		16.2		18.0		21.6	20					
SL 35 - 050			50	8.25	16.0		18.0		20.0		24.0	20					
SL 35 - 055			55	7.50	17.6		19.8		22.0		26.4	10					
SL 35 - 060			60	6.87	19.2		21.6		24.0		28.8	10					
SL 35 - 065			65	6.35	20.8		23.4		26.0		31.2	10					
SL 35 - 070			70	5.89	22.4		25.2		28.0		33.6	10					
SL 35 - 075			75	5.50	24.0		27.0		30.0		36.0	10					
SL 35 - 080			80	5.15	25.6		28.8		32.0		38.4	10					
SL 35 - 090			90	4.58	28.8		32.4		36.0		43.2	10					
SL 35 - 100			100	4.12	32.0		36.0		40.0		48.0	10					
SL 35 - 125			125	3.30	40.0		45.0		50.0		60.0	5					
SL 35 - 150			150	2.75	48.0		54.0		60.0		72.0	5					
SL 35 - 175			175	2.35	56.0		63.0		70.0		84.0	5					
SL 35 - 200			200	2.06	64.0		72.0		80.0		96.0	5					
SLR 35 - 040			35	20.5	40		9.15		12.8		114.6 (1,123.1)	14.4	128.9 (1,263.2)	16.0	143.2 (1,403.4)	19.2	20
SLR 35 - 045					45		8.42		14.4			16.2		18.0		21.6	20
SLR 35 - 050	50	7.85			16.0	18.0	20.0	24.0	20								
SLR 35 - 055	55	7.42			17.6	19.8	22.0	26.4	10								
SLR 35 - 060	60	6.70			19.2	21.6	24.0	28.8	10								
SLR 35 - 065	65	6.25			20.8	23.4	26.0	31.2	10								
SLR 35 - 070	70	5.45			22.4	25.2	28.0	33.6	10								
SLR 35 - 075	75	5.28			24.0	27.0	30.0	36.0	10								
SLR 35 - 080	80	4.90			25.6	28.8	32.0	38.4	10								
SLR 35 - 090	90	4.20			28.8	32.4	36.0	43.2	10								
SLR 35 - 100	100	3.75			32.0	36.0	40.0	48.0	10								
SLR 35 - 125	125	3.00			40.0	45.0	50.0	60.0	5								
SLR 35 - 150	150	2.40			48.0	54.0	60.0	72.0	5								
SLR 35 - 175	175	2.20			56.0	63.0	70.0	84.0	5								
SLR 35 - 200	200	1.80			64.0	72.0	80.0	96.0	5								
SL 40 - 040	40	20			40	13.50	12.8	173 (1,697)	14.4	194 (1,903)		16.0		216 (2,120)		19.2	20
SL 40 - 045					45	12.00	14.4		16.2			18.0				21.6	20
SL 40 - 050			50	10.80	16.0	18.0	20.0		24.0		20						
SL 40 - 055			55	9.80	17.6	19.8	22.0		26.4		20						
SL 40 - 060			60	9.00	19.2	21.6	24.0		28.8		10						
SL 40 - 065			65	8.29	20.8	23.4	26.0		31.2		10						
SL 40 - 070			70	7.71	22.4	25.2	28.0		33.6		10						
SL 40 - 075			75	7.19	24.0	27.0	30.0		36.0		10						
SL 40 - 080			80	6.75	25.6	28.8	32.0		38.4		10						
SL 40 - 090			90	6.00	28.8	32.4	36.0		43.2		10						
SL 40 - 100			100	5.40	32.0	36.0	40.0		48.0		10						
SL 40 - 125			125	4.32	40.0	45.0	50.0		60.0		5						
SL 40 - 150			150	3.60	48.0	54.0	60.0		72.0		5						
SL 40 - 175			175	3.08	56.0	63.0	70.0		84.0		5						
SL 40 - 200			200	2.70	64.0	72.0	80.0		96.0		5						
SL 40 - 250			250	2.16	80.0	90.0	100.0		120.0		2						

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SL 40 - 80 (Series D<sub>0</sub> - L<sub>0</sub>)

JIS B 5012 - 1986

SERIES SL

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant ± 10%	A 32% L <sub>0</sub> 1.000.000 cycles		B 36% L <sub>0</sub> 500.000 cycles		C 40% L <sub>0</sub> 300.000 cycles		E approx. do not use	Pcs
					mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)		
SLR 40 - 040	40	25.5	40	9.30	12.8	14.4	16.0	19.2	20			
SLR 40 - 050			50	7.75	16.0	18.0	20.0	24.0	20			
SLR 40 - 060			60	6.20	19.2	21.6	24.0	28.8	10			
SLR 40 - 070			70	5.00	22.4	25.2	28.0	33.6	10			
SLR 40 - 080			80	4.35	25.6	28.8	32.0	38.4	10			
SLR 40 - 090			90	3.85	28.8	32.4	36.0	43.2	10			
SLR 40 - 100			100	3.50	32.0	36.0	40.0	48.0	10			
SLR 40 - 125			125	2.80	40.0	45.0	50.0	60.0	5			
SLR 40 - 150			150	2.25	48.0	54.0	60.0	72.0	5			
SLR 40 - 175			175	1.95	56.0	63.0	70.0	84.0	5			
SLR 40 - 200			200	1.65	64.0	72.0	80.0	96.0	5			
SLR 40 - 250			250	1.50	80.0	90.0	100.0	120.0	2			
SL 50 - 050	50	25	50	16.89	16.0	18.0	20.0	24.0	5			
SL 50 - 055			55	15.35	17.6	19.8	22.0	26.4	5			
SL 50 - 060			60	14.08	19.2	21.6	24.0	28.8	5			
SL 50 - 065			65	12.99	20.8	23.4	26.0	31.2	5			
SL 50 - 070			70	12.07	22.4	25.2	28.0	33.6	5			
SL 50 - 075			75	11.25	24.0	27.0	30.0	36.0	5			
SL 50 - 080			80	10.56	25.6	28.8	32.0	38.4	5			
SL 50 - 090			90	9.38	28.8	32.4	36.0	43.2	5			
SL 50 - 100			100	8.45	32.0	36.0	40.0	48.0	5			
SL 50 - 125			125	6.76	40.0	45.0	50.0	60.0	5			
SL 50 - 150			150	5.63	48.0	54.0	60.0	72.0	2			
SL 50 - 175			175	4.82	56.0	63.0	70.0	84.0	2			
SL 50 - 200			200	4.22	64.0	72.0	80.0	96.0	2			
SL 50 - 250			250	3.38	80.0	90.0	100.0	120.0	2			
SL 50 - 300	300	2.81	96.0	108.0	120.0	144.0	2					
SLR 50 - 050	50	30.5	50	11.90	16.0	18.0	20.0	24.0	5			
SLR 50 - 060			60	10.60	19.2	21.6	24.0	28.8	5			
SLR 50 - 070			70	9.00	22.4	25.2	28.0	33.6	5			
SLR 50 - 080			80	7.65	25.6	28.8	32.0	38.4	5			
SLR 50 - 090			90	6.75	28.8	32.4	36.0	43.2	5			
SLR 50 - 100			100	5.85	32.0	36.0	40.0	48.0	5			
SLR 50 - 125			125	4.90	40.0	45.0	50.0	60.0	5			
SLR 50 - 150			150	3.55	48.0	54.0	60.0	72.0	2			
SLR 50 - 175			175	3.00	56.0	63.0	70.0	84.0	2			
SLR 50 - 200			200	2.65	64.0	72.0	80.0	96.0	2			
SLR 50 - 250			250	2.40	80.0	90.0	100.0	120.0	2			
SLR 50 - 300			300	2.20	96.0	108.0	120.0	144.0	2			
SL 60 - 060			60	30	60	20.25	19.2	21.6	24.0	28.8	5	
SL 60 - 070					70	17.35	22.4	25.2	28.0	33.6	5	
SL 60 - 080	80	15.18			25.6	28.8	32.0	38.4	5			
SL 60 - 090	90	13.50			28.8	32.4	36.0	43.2	5			
SL 60 - 100	100	12.15			32.0	36.0	40.0	48.0	5			
SL 60 - 125	125	9.72			40.0	45.0	50.0	60.0	2			
SL 60 - 150	150	8.10			48.0	54.0	60.0	72.0	2			
SL 60 - 175	175	6.94			56.0	63.0	70.0	84.0	2			
SL 60 - 200	200	6.07			64.0	72.0	80.0	96.0	2			
SL 60 - 250	250	4.86			80.0	90.0	100.0	120.0	2			
SL 60 - 300	300	4.05			96.0	108.0	120.0	144.0	2			
SLR 60 - 060	60	35.5	60	16.80	19.2	21.6	24.0	28.8	5			
SLR 60 - 070			70	14.40	22.4	25.2	28.0	33.6	5			
SLR 60 - 080			80	12.10	25.6	28.8	32.0	38.4	5			
SLR 60 - 090			90	10.65	28.8	32.4	36.0	43.2	5			
SLR 60 - 100			100	9.80	32.0	36.0	40.0	48.0	5			
SLR 60 - 125			125	8.50	40.0	45.0	50.0	60.0	2			
SLR 60 - 150			150	6.80	48.0	54.0	60.0	72.0	2			
SLR 60 - 175			175	6.00	56.0	63.0	70.0	84.0	2			
SLR 60 - 200			200	5.20	64.0	72.0	80.0	96.0	2			
SLR 60 - 250			250	3.90	80.0	90.0	100.0	120.0	2			
SLR 60 - 300			300	3.10	96.0	108.0	120.0	144.0	2			

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

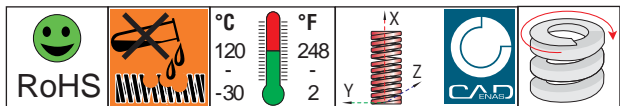
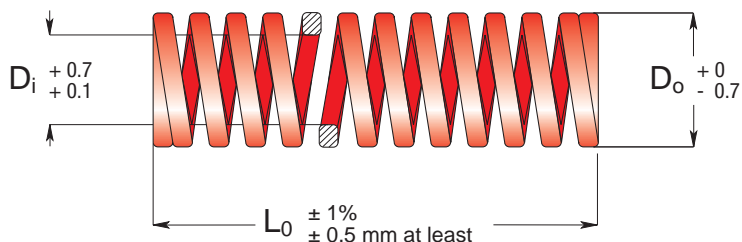


SL 40 - 80 (Series D<sub>0</sub> - L<sub>0</sub>)

SM SERIES

JIS B 5012 - 1986

EN Medium load springs



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 25.6% L <sub>0</sub>		B 28.8% L <sub>0</sub>		C 32% L <sub>0</sub>		E approx. do not use	Pcs
					± 10% 1.000.000 cycles	Kgf (N)	500.000 cycles	Kgf (N)	300.000 cycles	Kgf (N)		
	mm	mm	mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm	
SM 10 - 020	10	5	20	3.13	5.1	16 (156.9)	5.8	18 (176.5)	6.4	20 (196.1)	7.6	50
SM 10 - 025			25	2.50	6.4		7.2		8.0		9.5	50
SM 10 - 030			30	2.08	7.7		8.6		9.6		11.4	50
SM 10 - 035			35	1.78	9.0		10.1		11.2		13.3	50
SM 10 - 040			40	1.56	10.2		11.5		12.8		15.2	50
SM 10 - 045			45	1.38	11.5		13.0		14.4		17.1	50
SM 10 - 050			50	1.25	12.8		14.4		16.0		19.0	25
SM 10 - 055			55	1.13	14.1		15.8		17.6		20.9	25
SM 10 - 060			60	1.04	15.4		17.3		19.2		22.8	25
SM 10 - 065			65	0.96	16.6		18.7		20.8		24.7	25
SM 10 - 070			70	0.89	17.9		20.2		22.4		26.6	25
SM 10 - 075			75	0.83	19.2		21.6		24.0		28.5	25
SM 10 - 080			80	0.78	20.5		23.0		25.6		30.4	25
SM 12 - 020	12	6	20	4.53	5.1	23 (226)	5.8	26 (255)	6.4	29 (284)	7.6	50
SM 12 - 025			25	3.62	6.4		7.2		8.0		9.5	50
SM 12 - 030			30	3.02	7.7		8.6		9.6		11.4	50
SM 12 - 035			35	2.58	9.0		10.1		11.2		13.3	50
SM 12 - 040			40	2.27	10.2		11.5		12.8		15.2	50
SM 12 - 045			45	2.01	11.5		13.0		14.4		17.1	50
SM 12 - 050			50	1.81	12.8		14.4		16.0		19.0	25
SM 12 - 055			55	1.64	14.1		15.8		17.6		20.9	25
SM 12 - 060			60	1.51	15.4		17.3		19.2		22.8	25
SM 12 - 065			65	1.39	16.6		18.7		20.8		24.7	25
SM 12 - 070			70	1.29	17.9		20.2		22.4		26.6	25
SM 12 - 075			75	1.20	19.2		21.6		24.0		28.5	25
SM 12 - 080			80	1.13	20.5		23.0		25.6		30.4	25
SM 14 - 025	14	7	25	4.87	6.4	31 (304)	7.2	35 (343)	8.0	39 (383)	9.5	50
SM 14 - 030			30	4.06	7.7		8.6		9.6		11.4	50
SM 14 - 035			35	3.48	9.0		10.1		11.2		13.3	50
SM 14 - 040			40	3.04	10.2		11.5		12.8		15.2	50
SM 14 - 045			45	2.70	11.5		13.0		14.4		17.1	25
SM 14 - 050			50	2.43	12.8		14.4		16.0		19.0	25
SM 14 - 055			55	2.21	14.1		15.8		17.6		20.9	25
SM 14 - 060			60	2.03	15.4		17.3		19.2		22.8	25
SM 14 - 065			65	1.87	16.6		18.7		20.8		24.7	25
SM 14 - 070			70	1.74	17.9		20.2		22.4		26.6	25
SM 14 - 075			75	1.62	19.2		21.6		24.0		28.5	25
SM 14 - 080			80	1.52	20.5		23.0		25.6		30.4	20
SM 14 - 090			90	1.35	23.0		25.9		28.8		34.2	20

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



SM 22 - 40 (Series D<sub>0</sub> - L<sub>0</sub>)



JIS B 5012 - 1986

SERIES SM

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant ± 10%	A 25.6% L <sub>0</sub> 1.000.000 cycles		B 28.8% L <sub>0</sub> 500.000 cycles		C 32% L <sub>0</sub> 300.000 cycles		E do not use approx.		Pcs
					mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	
SM 16 - 025	16	8	25	6.39	6.4		7.2		8.0		9.5	50	
SM 16 - 030			30	5.32	7.7		8.6		9.6		11.4	50	
SM 16 - 035			35	4.55	9.0		10.1		11.2		13.3	50	
SM 16 - 040			40	3.98	10.2		11.5		12.8		15.2	25	
SM 16 - 045			45	3.54	11.5		13.0		14.4		17.1	25	
SM 16 - 050			50	3.18	12.8		14.4		16.0		19.0	25	
SM 16 - 055			55	2.89	14.1	41	15.8	46	17.6	51	20.9	25	
SM 16 - 060			60	2.65	15.4	(402)	17.3	(451)	19.2	(500)	22.8	25	
SM 16 - 065			65	2.45	16.6		18.7		20.8		24.7	25	
SM 16 - 070			70	2.27	17.9		20.2		22.4		26.6	20	
SM 16 - 075			75	2.11	19.2		21.6		24.0		28.5	20	
SM 16 - 080			80	1.99	20.5		23.0		25.6		30.4	20	
SM 16 - 090			90	1.77	23.0		25.9		28.8		34.2	20	
SM 16 - 100	100	1.59	25.6		28.8		32.0		38.0	20			
SM 18 - 025	18	9	25	8.12	6.4		7.2		8.0		9.5	50	
SM 18 - 030			30	6.77	7.7		8.6		9.6		11.4	50	
SM 18 - 035			35	5.80	9.0		10.1		11.2		13.3	25	
SM 18 - 040			40	5.07	10.2		11.5		12.8		15.2	25	
SM 18 - 045			45	4.51	11.5		13.0		14.4		17.1	25	
SM 18 - 050			50	4.06	12.8		14.4		16.0		19.0	25	
SM 18 - 055			55	3.69	14.1	52	15.8	58	17.6	65	20.9	25	
SM 18 - 060			60	3.38	15.4	(510)	17.3	(569)	19.2	(637)	22.8	25	
SM 18 - 065			65	3.12	16.6		18.7		20.8		24.7	25	
SM 18 - 070			70	2.90	17.9		20.2		22.4		26.6	25	
SM 18 - 075			75	2.70	19.2		21.6		24.0		28.5	25	
SM 18 - 080			80	2.53	20.5		23.0		25.6		30.4	20	
SM 18 - 090			90	2.25	23.0		25.9		28.8		34.2	20	
SM 18 - 100	100	2.02	25.6		28.8		32.0		38.0	20			
SM 20 - 025	20	10	25	10.00	6.4		7.2		8.0		9.5	50	
SM 20 - 030			30	8.33	7.7		8.6		9.6		11.4	50	
SM 20 - 035			35	7.14	9.0		10.1		11.2		13.3	25	
SM 20 - 040			40	6.25	10.2		11.5		12.8		15.2	25	
SM 20 - 045			45	5.55	11.5		13.0		14.4		17.1	25	
SM 20 - 050			50	5.00	12.8		14.4		16.0		19.0	25	
SM 20 - 055			55	4.54	14.1		15.8		17.6		20.9	25	
SM 20 - 060			60	4.16	15.4	64	17.3	72	19.2	80	22.8	25	
SM 20 - 065			65	3.84	16.6	(628)	18.7	(706)	20.8	(785)	24.7	25	
SM 20 - 070			70	3.57	17.9		20.2		22.4		26.6	25	
SM 20 - 075			75	3.33	19.2		21.6		24.0		28.5	25	
SM 20 - 080			80	3.12	20.5		23.0		25.6		30.4	20	
SM 20 - 090			90	2.77	23.0		25.9		28.8		34.2	20	
SM 20 - 100	100	2.50	25.6		28.8		32.0		38.0	20			
SM 20 - 125	125	2.00	32.0		36.0		40.0		47.5	10			
SM 20 - 150	150	1.67	38.4		43.2		48.0		57.0	10			
SM 22 - 025	22	11	25	12.13	6.4		7.2		8.0		9.5	50	
SM 22 - 030			30	10.10	7.7		8.6		9.6		11.4	25	
SM 22 - 035			35	8.65	9.0		10.1		11.2		13.3	25	
SM 22 - 040			40	7.57	10.2		11.5		12.8		15.2	25	
SM 22 - 045			45	6.74	11.5		13.0		14.4		17.1	25	
SM 22 - 050			50	6.06	12.8		14.4		16.0		19.0	25	
SM 22 - 055			55	5.50	14.1		15.8		17.6		20.9	25	
SM 22 - 060			60	5.05	15.4	78	17.3	87	19.2	97	22.8	25	
SM 22 - 065			65	4.66	16.6	(765)	18.7	(853)	20.8	(951)	24.7	25	
SM 22 - 070			70	4.33	17.9		20.2		22.4		26.6	20	
SM 22 - 075			75	4.04	19.2		21.6		24.0		28.5	20	
SM 22 - 080			80	3.78	20.5		23.0		25.6		30.4	20	
SM 22 - 090			90	3.36	23.0		25.9		28.8		34.2	20	
SM 22 - 100	100	3.03	25.6		28.8		32.0		38.0	20			
SM 22 - 125	125	2.42	32.0		36.0		40.0		47.5	10			
SM 22 - 150	150	2.01	38.4		43.2		48.0		57.0	10			

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SM 22 - 40 (Series D<sub>0</sub> - L<sub>0</sub>)



## SM SERIES

JIS B 5012 - 1986

Code	D <sub>o</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A		B		C		E	Pcs
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	25.6% L <sub>0</sub>	1.000.000 cycles	28.8% L <sub>0</sub>	500.000 cycles	32% L <sub>0</sub>	300.000 cycles	do not use approx.	
	mm	mm	mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm	
SM 25 - 025	25	12.5	25	15.63	6.4	100 (981)	7.2	112 (1,098)	8.0	125 (1,226)	9.5	50
SM 25 - 030			30	13.02	7.7		8.6		9.6		11.4	25
SM 25 - 035			35	11.20	9.0		10.0		11.2		13.3	25
SM 25 - 040			40	9.76	10.2		11.5		12.8		15.2	25
SM 25 - 045			45	8.68	11.5		13.0		14.4		17.1	25
SM 25 - 050			50	7.81	12.8		14.4		16.0		19.0	25
SM 25 - 055			55	7.10	14.1		15.8		17.6		20.9	25
SM 25 - 060			60	6.51	15.4		17.3		19.2		22.8	25
SM 25 - 065			65	6.00	16.6		18.7		20.8		24.7	25
SM 25 - 070			70	5.58	17.9		20.2		22.4		26.6	20
SM 25 - 075			75	5.21	19.2		21.6		24.0		28.5	20
SM 25 - 080			80	4.88	20.5		23.0		25.6		30.4	20
SM 25 - 090			90	4.34	23.0		25.9		28.8		34.2	20
SM 25 - 100			100	3.90	25.6		28.8		32.0		38.0	20
SM 25 - 125			125	3.12	32.0		36.0		40.0		47.5	10
SM 25 - 150			150	2.60	38.4		43.2		48.0		57.0	10
SM 25 - 175	175	2.23	44.8	50.4	56.0	66.5	10					
SM 27 - 025	27	13.5	25	18.25	6.4	117 (1,147)	7.2	131 (1,285)	8.0	146 (1,432)	9.5	20
SM 27 - 030			30	15.20	7.7		8.6		9.6		11.4	20
SM 27 - 035			35	13.04	9.0		10.0		11.2		13.3	20
SM 27 - 040			40	11.40	10.2		11.5		12.8		15.2	20
SM 27 - 045			45	10.14	11.5		13.0		14.4		17.1	20
SM 27 - 050			50	9.12	12.8		14.4		16.0		19.0	20
SM 27 - 055			55	8.30	14.1		15.8		17.6		20.9	20
SM 27 - 060			60	7.60	15.4		17.3		19.2		22.8	20
SM 27 - 065			65	7.00	16.6		18.7		20.8		24.7	20
SM 27 - 070			70	6.51	17.9		20.2		22.4		26.6	20
SM 27 - 075			75	6.08	19.2		21.6		24.0		28.5	20
SM 27 - 080			80	5.70	20.5		23.0		25.6		30.4	10
SM 27 - 090			90	5.06	23.0		25.9		28.8		34.2	10
SM 27 - 100			100	4.56	25.6		28.8		32.0		38.0	10
SM 27 - 125			125	3.65	32.0		36.0		40.0		47.5	10
SM 27 - 150			150	3.04	38.4		43.2		48.0		57.0	10
SM 27 - 175	175	2.61	44.8	50.4	56.0	66.5	5					
SM 30 - 025	30	15	25	22.50	6.4	144 (1,412)	7.2	161 (1,579)	8.0	180 (1,785)	9.5	20
SM 30 - 030			30	18.75	7.7		8.6		9.6		11.4	20
SM 30 - 035			35	16.10	9.0		10.0		11.2		13.3	20
SM 30 - 040			40	14.06	10.2		11.5		12.8		15.2	20
SM 30 - 045			45	12.50	11.5		13.0		14.4		17.1	20
SM 30 - 050			50	11.25	12.8		14.4		16.0		19.0	20
SM 30 - 055			55	10.23	14.1		15.8		17.6		20.9	20
SM 30 - 060			60	9.37	15.4		17.3		19.2		22.8	20
SM 30 - 065			65	8.65	16.6		18.7		20.8		24.7	20
SM 30 - 070			70	8.03	17.9		20.2		22.4		26.6	20
SM 30 - 075			75	7.50	19.2		21.6		24.0		28.5	20
SM 30 - 080			80	7.03	20.5		23.0		25.6		30.4	10
SM 30 - 090			90	6.25	23.0		25.9		28.8		34.2	10
SM 30 - 100			100	5.62	25.6		28.8		32.0		38.0	10
SM 30 - 125			125	4.50	32.0		36.0		40.0		47.5	10
SM 30 - 150			150	3.75	38.4		43.2		48.0		57.0	10
SM 30 - 175	175	3.21	44.8	50.4	56.0	66.5	5					
SM 30 - 200	200	2.81	51.2	57.6	64.0	76.0	5					

1 N = 0.1 daN = 0.102 kgf






Load (N) = R (N/mm) x Deflection (mm)



SM 40 - 80 (Series D<sub>0</sub> - L<sub>0</sub>)

JIS B 5012 - 1986

SERIES SM

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant  ± 10%	A 25.6% L <sub>0</sub>  1.000.000 cycles		B 28.8% L <sub>0</sub>  500.000 cycles		C 32% L <sub>0</sub>  300.000 cycles		E  do not use approx. 	Pcs
					mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)		
SM 35 - 040	35	17.5	40	19.14	10.2	195 (1,912)	11.5	220 (2,160)	12.8	245 (2,400)	15.2	20
SM 35 - 045			45	17.01	11.5		13.0		14.4		17.1	20
SM 35 - 050			50	15.31	12.8		14.4		16.0		19.0	20
SM 35 - 055			55	13.92	14.0		15.8		17.6		20.9	10
SM 35 - 060			60	12.76	15.4		17.3		19.2		22.8	10
SM 35 - 065			65	11.77	16.6		18.7		20.8		24.7	10
SM 35 - 070			70	10.93	17.9		20.2		22.4		26.6	10
SM 35 - 075			75	10.20	19.2		21.6		24.0		28.5	10
SM 35 - 080			80	9.57	20.5		23.0		25.6		30.4	10
SM 35 - 090			90	8.50	23.0		25.9		28.8		34.2	10
SM 35 - 100			100	7.65	25.6		28.8		32.0		38.0	10
SM 35 - 125			125	6.12	32.0		36.0		40.0		47.5	5
SM 35 - 150			150	5.10	38.4		43.2		48.0		57.0	5
SM 35 - 175			175	4.37	44.8		50.4		56.0		66.5	5
SM 35 - 200			200	3.82	51.2		57.6		64.0		76.0	5
SM 40 - 040			40	20	40		25.02		10.2		256 (2,510)	11.5
SM 40 - 045	45	22.19			11.5	13.0	14.4	17.1	20			
SM 40 - 050	50	20.00			12.8	14.4	16.0	19.0	20			
SM 40 - 055	55	18.15			14.1	15.8	17.6	20.9	20			
SM 40 - 060	60	16.60			15.4	17.3	19.2	22.8	10			
SM 40 - 065	65	15.36			16.6	18.7	20.8	24.7	10			
SM 40 - 070	70	14.28			17.9	20.2	22.4	26.6	10			
SM 40 - 075	75	13.31			19.2	21.6	24.0	28.5	10			
SM 40 - 080	80	12.50			20.5	23.0	25.6	30.4	10			
SM 40 - 090	90	11.11			23.0	25.9	28.8	34.2	10			
SM 40 - 100	100	10.00			25.6	28.8	32.0	38.0	10			
SM 40 - 125	125	8.00			32.0	36.0	40.0	47.5	5			
SM 40 - 150	150	6.66			38.4	43.2	48.0	57.0	5			
SM 40 - 175	175	5.71			44.8	50.4	56.0	66.5	5			
SM 40 - 200	200	5.00			51.2	57.6	64.0	76.0	5			
SM 40 - 250	250	4.00			64.0	72.0	80.0	95.0	2			
SM 50 - 050	50	25	50	31.25	12.8	400 (3,920)	14.4	450 (4,410)	16.0	500 (4,900)	19.0	5
SM 50 - 055			55	28.39	14.1		15.8		17.6		20.9	5
SM 50 - 060			60	26.04	15.4		17.3		19.2		22.8	5
SM 50 - 065			65	24.02	16.6		18.7		20.8		24.7	5
SM 50 - 070			70	22.32	17.9		20.2		22.4		26.6	5
SM 50 - 075			75	20.82	19.2		21.6		24.0		28.5	5
SM 50 - 080			80	19.53	20.5		23.0		25.6		30.4	5
SM 50 - 090			90	17.36	23.0		25.9		28.8		34.2	5
SM 50 - 100			100	15.62	25.6		28.8		32.0		38.0	5
SM 50 - 125			125	12.50	32.0		36.0		40.0		47.5	5
SM 50 - 150			150	10.41	38.4		43.2		48.0		57.0	2
SM 50 - 175			175	8.92	44.8		50.4		56.0		66.5	2
SM 50 - 200			200	7.81	51.2		57.6		64.0		76.0	2
SM 50 - 250			250	6.25	64.0		72.0		80.0		95.0	2
SM 50 - 300			300	5.20	76.8		86.4		96.0		114.0	2
SM 60 - 060			60	30	60		37.40		15.4		575 (5,640)	17.3
SM 60 - 070	70	32.10			17.9	20.2	22.4	26.6	5			
SM 60 - 080	80	28.12			20.5	23.0	25.6	30.4	5			
SM 60 - 090	90	25.00			23.0	25.9	28.8	34.2	5			
SM 60 - 100	100	22.50			25.6	28.8	32.0	38.0	5			
SM 60 - 125	125	18.00			32.0	36.0	40.0	47.5	2			
SM 60 - 150	150	15.00			38.4	43.2	48.0	57.0	2			
SM 60 - 175	175	12.85			44.8	50.4	56.0	66.5	2			
SM 60 - 200	200	11.25			51.2	57.6	64.0	76.0	2			
SM 60 - 250	250	9.00			64.0	72.0	80.0	95.0	2			
SM 60 - 300	300	7.50			76.8	86.4	96.0	114.0	2			

1 N = 0.1 daN = 0.102 kgf

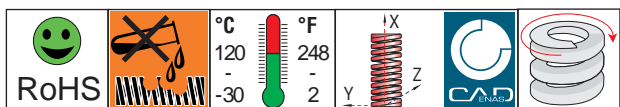
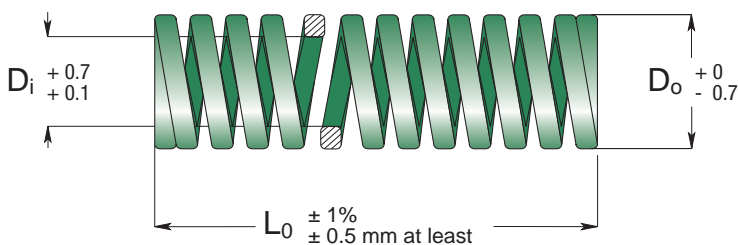
Load (N) = R (N/mm) x Deflection (mm)

SM 40 - 80 (Series D<sub>0</sub> - L<sub>0</sub>)

SH SERIES

JIS B 5012 - 1986

**EN** Heavy load springs



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 19.2% L <sub>0</sub> 1.000.000 cycles		B 21.6% L <sub>0</sub> 500.000 cycles		C 24% L <sub>0</sub> 300.000 cycles		E do not use approx.	Pcs
					± 10% Kgf/mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)		
SH 10 - 020	10	5	20	6.25	3.8	4.3	4.8	5.6	50			
SH 10 - 025			25	5.00	4.8	5.4	6.0	7.0	50			
SH 10 - 030			30	4.16	5.8	6.5	7.2	8.4	50			
SH 10 - 035			35	3.57	6.7	7.5	8.4	9.8	50			
SH 10 - 040			40	3.15	7.7	8.6	9.6	11.2	50			
SH 10 - 045			45	2.77	8.6	9.7	10.8	12.6	50			
SH 10 - 050			50	2.50	9.6	10.8	12.0	14.0	25			
SH 10 - 055			55	2.27	10.6	11.8	13.2	15.4	25			
SH 10 - 060			60	2.08	11.5	13.0	14.4	16.8	25			
SH 10 - 065			65	1.92	12.5	14.0	15.6	18.2	25			
SH 10 - 070	70	1.79	13.4	15.1	16.8	19.6	25					
SH 10 - 075	75	1.67	14.4	16.2	18.0	21.0	25					
SH 10 - 080	80	1.56	15.4	17.3	19.2	22.4	25					
SH 12 - 020	12	6	20	8.90	3.8	4.3	4.8	5.6	50			
SH 12 - 025			25	7.10	4.8	5.4	6.0	7.0	50			
SH 12 - 030			30	5.97	5.8	6.5	7.2	8.4	50			
SH 12 - 035			35	5.11	6.7	7.5	8.4	9.8	50			
SH 12 - 040			40	4.47	7.7	8.6	9.6	11.2	50			
SH 12 - 045			45	3.98	8.6	9.7	10.8	12.6	50			
SH 12 - 050			50	3.58	9.6	10.8	12.0	14.0	25			
SH 12 - 055			55	3.25	10.6	11.8	13.2	15.4	25			
SH 12 - 060			60	2.98	11.5	13.0	14.4	16.8	25			
SH 12 - 065			65	2.74	12.5	14.0	15.6	18.2	25			
SH 12 - 070	70	2.54	13.4	15.1	16.8	19.6	25					
SH 12 - 075	75	2.37	14.4	16.2	18.0	21.0	25					
SH 12 - 080	80	2.21	15.4	17.3	19.2	22.4	25					
SH 14 - 025	14	7	25	9.83	4.8	5.4	6.0	7.0	50			
SH 14 - 030			30	8.19	5.8	6.5	7.2	8.4	50			
SH 14 - 035			35	7.02	6.7	7.5	8.4	9.8	50			
SH 14 - 040			40	6.14	7.7	8.6	9.6	11.2	50			
SH 14 - 045			45	5.46	8.6	9.7	10.8	12.6	25			
SH 14 - 050			50	4.91	9.6	10.8	12.0	14.0	25			
SH 14 - 055			55	4.46	10.6	11.8	13.2	15.4	25			
SH 14 - 060			60	4.09	11.5	13.0	14.4	16.8	25			
SH 14 - 065			65	3.78	12.5	14.0	15.6	18.2	25			
SH 14 - 070			70	3.51	13.4	15.1	16.8	19.6	25			
SH 14 - 075	75	3.27	14.4	16.2	18.0	21.0	25					
SH 14 - 080	80	3.07	15.4	17.3	19.2	22.4	20					
SH 14 - 090	90	2.72	15.4	19.4	21.6	25.2	20					
SH 16 - 025	16	8	25	12.83	17.3	5.4	6.0	7.0	50			
SH 16 - 030			30	10.69	4.8	6.5	7.2	8.4	50			
SH 16 - 035			35	9.16	5.8	7.5	8.4	9.8	50			
SH 16 - 040			40	8.02	6.7	8.6	9.6	11.2	25			
SH 16 - 045			45	7.12	7.7	9.7	10.8	12.6	25			
SH 16 - 050			50	6.41	8.6	10.8	12.0	14.0	25			
SH 16 - 055	55	5.83	9.6	11.8	13.2	15.4	25					

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SH 22 - 40 (Series D<sub>0</sub> - L<sub>0</sub>)

JIS B 5012 - 1986

SERIES SH

Code	D <sub>o</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A		B		C		E	Pcs
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	19.2% L <sub>0</sub>	1.000.000 cycles	21.6% L <sub>0</sub>	500.000 cycles	24% L <sub>0</sub>	300.000 cycles	do not use approx.	
	mm	mm	mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm	
SH 16 - 060	16	8	60	5.34	10.6	62 (608)	13.0	69 (677)	14.4	77 (755)	16.8	25
SH 16 - 065			65	4.93	11.5		14.0		15.6		18.2	25
SH 16 - 070			70	4.58	12.5		15.1		16.8		19.6	20
SH 16 - 075			75	4.28	13.4		16.2		18.0		21.0	20
SH 16 - 080			80	4.01	14.4		17.3		19.2		22.4	20
SH 16 - 090			90	3.57	15.4		19.4		21.6		25.2	20
SH 16 - 100			100	3.21	17.3		21.6		24.0		28.0	20
SH 18 - 025	18	9	25	16.16	4.8	78 (765)	5.4	87 (853)	6.0	97 (951)	7.0	50
SH 18 - 030			30	13.47	5.8		6.5		7.2		8.4	50
SH 18 - 035			35	11.54	6.7		7.5		8.4		9.8	25
SH 18 - 040			40	10.10	7.7		8.6		9.6		11.2	25
SH 18 - 045			45	8.98	8.6		9.7		10.8		12.6	25
SH 18 - 050			50	8.08	9.6		10.8		12.0		14.0	25
SH 18 - 055			55	7.34	10.6		11.8		13.2		15.4	25
SH 18 - 060			60	6.73	11.5		13.0		14.4		16.8	25
SH 18 - 065			65	6.21	12.5		14.0		15.6		18.2	25
SH 18 - 070			70	5.77	13.4		15.1		16.8		19.6	25
SH 18 - 075			75	5.39	14.4		16.2		18.0		21.0	25
SH 18 - 080			80	5.05	15.4		17.3		19.2		22.4	20
SH 18 - 090			90	4.50	17.3		19.4		21.6		25.2	20
SH 18 - 100	100	4.04	19.2	21.6	24.0	28.0	20					
SH 20 - 025	20	10	25	20.00	4.8	96 (941)	5.4	108 (1.059)	6.0	120 (1.177)	7.0	50
SH 20 - 030			30	16.66	5.8		6.5		7.2		8.4	50
SH 20 - 035			35	14.28	6.7		7.5		8.4		9.8	25
SH 20 - 040			40	12.50	7.7		8.6		9.6		11.2	25
SH 20 - 045			45	11.11	8.6		9.7		10.8		12.6	25
SH 20 - 050			50	10.00	9.6		10.8		12.0		14.0	25
SH 20 - 055			55	9.09	10.6		11.8		13.2		15.4	25
SH 20 - 060			60	8.33	11.5		13.0		14.4		16.8	25
SH 20 - 065			65	7.69	12.5		14.0		15.6		18.2	25
SH 20 - 070			70	7.14	13.4		15.1		16.8		19.6	25
SH 20 - 075			75	6.67	14.4		16.2		18.0		21.0	25
SH 20 - 080			80	6.25	15.4		17.3		19.2		22.4	20
SH 20 - 090			90	5.55	17.3		19.4		21.6		25.2	20
SH 20 - 100			100	5.00	19.2		21.6		24.0		28.0	20
SH 20 - 125			125	4.00	24.0		27.0		30.0		35.0	10
SH 20 - 150	150	3.33	28.8	32.4	36.0	42.0	10					
SH 22 - 025	22	11	25	24.16	4.8	116 (1.138)	5.4	130 (1.275)	6.0	145 (1.422)	7.0	50
SH 22 - 030			30	20.13	5.8		6.5		7.2		8.4	25
SH 22 - 035			35	17.30	6.7		7.5		8.4		9.8	25
SH 22 - 040			40	15.10	7.7		8.6		9.6		11.2	25
SH 22 - 045			45	13.40	8.6		9.7		10.8		12.6	25
SH 22 - 050			50	12.08	9.6		10.8		12.0		14.0	25
SH 22 - 055			55	10.94	10.6		11.8		13.2		15.4	25
SH 22 - 060			60	10.06	11.5		13.0		14.4		16.8	25
SH 22 - 065			65	9.28	12.5		14.0		15.6		18.2	25
SH 22 - 070			70	8.63	13.4		15.1		16.8		19.6	20
SH 22 - 075			75	8.04	14.4		16.2		18.0		21.0	20
SH 22 - 080			80	7.55	15.4		17.3		19.2		22.4	20
SH 22 - 090			90	6.71	17.3		19.4		21.6		25.2	20
SH 22 - 100			100	6.04	19.2		21.6		24.0		28.0	20
SH 22 - 125			125	4.83	24.0		27.0		30.0		35.0	10
SH 22 - 150	150	4.02	28.8	32.4	36.0	42.0	10					

1 N = 0.1 daN = 0.102 kgf





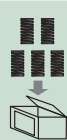
Load (N) = R (N/mm) x Deflection (mm)



SH 22 - 40 (Series D<sub>0</sub> - L<sub>0</sub>)

## SH SERIES

JIS B 5012 - 1986

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant  ± 10%	A 19.2% L <sub>0</sub>  1.000.000 cycles		B 21.6% L <sub>0</sub>  500.000 cycles		C 24% L <sub>0</sub>  300.000 cycles		E  approx. do not use	 Pcs
					mm	mm	mm	Kgf/mm	mm	Kgf (N)	mm	
SH 25 - 025	25	12.5	25	31.20	4.8	150 (1,471)	169 (1,657)	187 (1,834)	7.0	50		
SH 25 - 030			30	25.97	5.8				8.4	25		
SH 25 - 035			35	22.38	6.7				9.8	25		
SH 25 - 040			40	19.47	7.7				11.2	25		
SH 25 - 045			45	17.40	8.6				12.6	25		
SH 25 - 050			50	15.58	9.6				14.0	25		
SH 25 - 055			55	14.20	10.6				15.4	25		
SH 25 - 060			60	12.98	11.5				16.8	25		
SH 25 - 065			65	12.00	12.5				18.2	25		
SH 25 - 070			70	11.13	13.4				19.6	20		
SH 25 - 075			75	10.40	14.4				21.0	20		
SH 25 - 080			80	9.73	15.4				22.4	20		
SH 25 - 090			90	8.65	17.3				25.2	20		
SH 25 - 100			100	7.79	19.2				28.0	20		
SH 25 - 125			125	6.23	24.0				35.0	10		
SH 25 - 150			150	5.20	28.8				42.0	10		
SH 25 - 175			175	4.46	33.6				49.0	10		
SH 27 - 025	27	13.5	25	36.40	4.8	175 (1,716)	197 (1,932)	219 (2,150)	7.0	20		
SH 27 - 030			30	30.41	5.8				8.4	20		
SH 27 - 035			35	26.20	6.7				9.8	20		
SH 27 - 040			40	22.81	7.7				11.2	20		
SH 27 - 045			45	20.30	8.6				12.6	20		
SH 27 - 050			50	18.25	9.6				14.0	20		
SH 27 - 055			55	16.50	10.6				15.4	20		
SH 27 - 060			60	15.20	11.5				16.8	20		
SH 27 - 065			65	14.00	12.5				18.2	20		
SH 27 - 070			70	13.03	13.4				19.6	20		
SH 27 - 075			75	12.10	14.4				21.0	20		
SH 27 - 080			80	11.40	15.4				22.4	10		
SH 27 - 090			90	10.13	17.3				25.2	10		
SH 27 - 100			100	9.12	19.2				28.0	10		
SH 27 - 125			125	7.30	24.0				35.0	10		
SH 27 - 150			150	6.08	28.8				42.0	10		
SH 27 - 175			175	5.21	33.6				49.0	5		
SH 30 - 025	30	15	25	45.00	4.8	216 (2,120)	243 (2,380)	270 (2,550)	7.0	20		
SH 30 - 030			30	37.50	5.8				8.4	20		
SH 30 - 035			35	32.26	6.7				9.8	20		
SH 30 - 040			40	28.12	7.7				11.2	20		
SH 30 - 045			45	25.00	8.6				12.6	20		
SH 30 - 050			50	22.50	9.6				14.0	20		
SH 30 - 055			55	20.40	10.6				15.4	20		
SH 30 - 060			60	18.75	11.5				16.8	20		
SH 30 - 065			65	17.30	12.5				18.2	20		
SH 30 - 070			70	16.07	13.4				19.6	20		
SH 30 - 075			75	15.00	14.4				21.0	20		
SH 30 - 080			80	14.06	15.4				22.4	10		
SH 30 - 090			90	12.50	17.3				25.2	10		
SH 30 - 100			100	11.25	19.2				28.0	10		
SH 30 - 125			125	9.00	24.0				35.0	10		
SH 30 - 150			150	7.50	28.8				42.0	10		
SH 30 - 175			175	6.42	33.6				49.0	5		
SH 30 - 200	200	5.62	38.4	56.0	5							

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SH 50 - 80 (Series D<sub>H</sub> - L<sub>0</sub>)



JIS B 5012 - 1986

SERIES SH

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant ± 10%	A 19.2% L <sub>0</sub> 1.000.000 cycles		B 21.6% L <sub>0</sub> 500.000 cycles		C 24% L <sub>0</sub> 300.000 cycles		E do not use approx. Pcs			
					mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)		mm	Kgf (N)	mm
SH 35 - 040	35	17.5	40	38.22	7.7	293 (2,870)	8.6	330 (3,240)	9.6	367 (3,600)	11.2	20		
SH 35 - 045			45	33.98	8.6						9.7	10.8	12.6	20
SH 35 - 050			50	30.58	9.6						10.8	12.0	14.0	20
SH 35 - 055			55	27.80	10.5						11.9	13.2	15.4	10
SH 35 - 060			60	25.48	11.5						13.0	14.4	16.8	10
SH 35 - 065			65	23.53	12.5						14.0	15.6	18.2	10
SH 35 - 070			70	21.84	13.4						15.1	16.8	19.6	10
SH 35 - 075			75	20.39	14.4						16.2	18.0	21.0	10
SH 35 - 080			80	19.11	15.4						17.3	19.2	22.4	10
SH 35 - 090			90	16.99	17.3						19.4	21.6	25.2	10
SH 35 - 100			100	15.29	19.2						21.6	24.0	28.0	10
SH 35 - 125			125	12.23	24.0						27.0	30.0	35.0	5
SH 35 - 150			150	10.19	28.8						32.4	36.0	42.0	5
SH 35 - 175			175	8.73	33.6						37.8	42.0	49.0	5
SH 35 - 200			200	7.64	38.4						43.2	48.0	56.0	5
SH 40 - 040	40	20	40	50.00	7.7	384 (3,770)	8.6	432 (4,240)	9.6	480 (4,710)	11.2	20		
SH 40 - 045			45	44.48	8.6						9.7	10.8	12.6	20
SH 40 - 050			50	40.00	9.6						10.8	12.0	14.0	20
SH 40 - 055			55	36.39	10.6						11.9	13.2	15.4	20
SH 40 - 060			60	33.33	11.5						13.0	14.4	16.8	10
SH 40 - 065			65	30.39	12.5						14.0	15.6	18.2	10
SH 40 - 070			70	28.57	13.4						15.1	16.8	19.6	10
SH 40 - 075			75	26.69	14.4						16.2	18.0	21.0	10
SH 40 - 080			80	25.00	15.4						17.3	19.2	22.4	10
SH 40 - 090			90	22.22	17.3						19.4	21.6	25.2	10
SH 40 - 100			100	20.00	19.2						21.6	24.0	28.0	10
SH 40 - 125			125	16.00	24.0						27.0	30.0	35.0	5
SH 40 - 150			150	13.33	28.8						32.4	36.0	42.0	5
SH 40 - 175			175	11.42	33.6						37.8	42.0	49.0	5
SH 40 - 200			200	10.00	38.4						43.2	48.0	56.0	5
SH 40 - 250	250	8.00	48.0	54.0	60.0	70.0	2							
SH 50 - 050	50	25	50	62.50	9.6	600 (5,880)	10.8	675 (6,620)	12.0	750 (7,360)	14.0	5		
SH 50 - 055			55		10.6						11.9	13.2		
SH 50 - 060			60	52.08	11.5						13.0	14.4	16.8	5
SH 50 - 065			65		12.5						14.0	15.6		
SH 50 - 070			70	44.64	13.4						15.1	16.8	19.6	5
SH 50 - 075			75		14.4						16.2	18.0		
SH 50 - 080			80	39.06	15.4						17.3	19.2	22.4	5
SH 50 - 090			90	34.72	17.3						19.4	21.6	25.2	5
SH 50 - 100			100	31.25	19.2						21.6	24.0	28.0	5
SH 50 - 125			125	25.00	24.0						27.0	30.0	35.0	5
SH 50 - 150			150	20.83	28.8						32.4	36.0	42.0	2
SH 50 - 175			175	17.85	33.6						37.8	42.0	49.0	2
SH 50 - 200			200	15.62	38.4						43.2	48.0	56.0	2
SH 50 - 250			250	12.50	48.0						54.0	60.0	70.0	2
SH 50 - 300			300	10.41	57.6						64.8	72.0	84.0	2
SH 60 - 060	60	30	60	75.00	11.5	864 (8,470)	13.0	973 (9,540)	14.4	1,080 (10,590)	16.8	5		
SH 60 - 070			70	64.28	13.4						15.1	16.8	19.6	5
SH 60 - 080			80	56.25	15.4						17.3	19.2	22.4	5
SH 60 - 090			90	50.00	17.3						19.4	21.6	25.2	5
SH 60 - 100			100	45.00	19.2						21.6	24.0	28.0	5
SH 60 - 125			125	36.00	24.0						27.0	30.0	35.0	2
SH 60 - 150			150	30.00	28.8						32.4	36.0	42.0	2
SH 60 - 175			175	25.71	33.6						37.8	42.0	49.0	2
SH 60 - 200			200	22.50	38.4						43.2	48.0	56.0	2
SH 60 - 250			250	18.00	48.0						54.0	60.0	70.0	2
SH 60 - 300	300	15.00	57.6	64.8	72.0	84.0	2							

1 N = 0.1 daN = 0.102 kgf

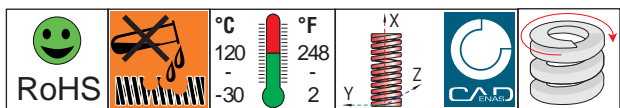
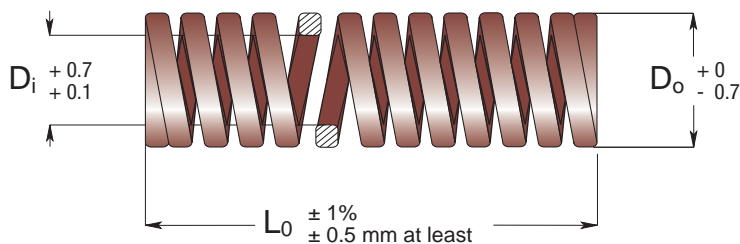
Load (N) = R (N/mm) x Deflection (mm)

SH 50 - 80 ([Series][D<sub>0</sub>] - [L<sub>0</sub>])

SB SERIES

JIS B 5012 - 1986

**EN** Super load springs



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 16% L <sub>0</sub>		B 18% L <sub>0</sub>		C 24% L <sub>0</sub>		E do not use approx.	Pcs
					1.000.000 cycles	500.000 cycles	300.000 cycles	mm	Kgf (N)	mm		
	mm	mm	mm	Kgf/mm	± 10%						mm	
SB 10 - 020	10	5	20	11.25	3.2		3.6	4.0	4.8	50		
SB 10 - 025			25	9.00	4.0		4.5	5.0	6.0	50		
SB 10 - 030			30	7.50	4.8		5.4	6.0	7.2	50		
SB 10 - 035			35	6.43	5.6		6.3	7.0	8.4	50		
SB 10 - 040			40	5.63	6.4		7.2	8.0	9.6	50		
SB 10 - 045			45	5.00	7.2		8.1	9.0	10.8	50		
SB 10 - 050			50	4.50	8.0	36 (353)	9.0	10.0	12.0	25		
SB 10 - 055			55	4.09	8.8		9.9	11.0	13.2	25		
SB 10 - 060			60	3.75	9.6		10.8	12.0	14.4	25		
SB 10 - 065			65	3.47	10.4		11.7	13.0	15.6	25		
SB 10 - 070			70	3.21	11.2		12.6	14.0	16.8	25		
SB 10 - 075			75	3.00	12.0		13.5	15.0	18.0	25		
SB 10 - 080	80	2.82	12.8		14.4	16.0	19.2	25				
SB 12 - 020	12	6	20	14.50	3.2		3.6	4.0	4.8	50		
SB 12 - 025			25	11.60	4.0		4.5	5.0	6.0	50		
SB 12 - 030			30	9.67	4.8		5.4	6.0	7.2	50		
SB 12 - 035			35	8.29	5.6		6.3	7.0	8.4	50		
SB 12 - 040			40	7.25	6.4		7.2	8.0	9.6	50		
SB 12 - 045			45	6.44	7.2		8.1	9.0	10.8	50		
SB 12 - 050			50	5.80	8.0	46 (451)	9.0	10.0	12.0	25		
SB 12 - 055			55	5.27	8.8		9.9	11.0	13.2	25		
SB 12 - 060			60	4.83	9.6		10.8	12.0	14.4	25		
SB 12 - 065			65	4.44	10.4		11.7	13.0	15.6	25		
SB 12 - 070			70	4.13	11.2		12.6	14.0	16.8	25		
SB 12 - 075			75	3.85	12.0		13.5	15.0	18.0	25		
SB 12 - 080	80	3.61	12.8		14.4	16.0	19.2	25				
SB 14 - 025	14	7	25	15.00	4.0		4.5	5.0	6.0	50		
SB 14 - 030			30	12.50	4.8		5.4	6.0	7.2	50		
SB 14 - 035			35	10.72	5.6		6.3	7.0	8.4	50		
SB 14 - 040			40	9.38	6.4		7.2	8.0	9.6	50		
SB 14 - 045			45	8.34	7.2		8.1	9.0	10.8	25		
SB 14 - 050			50	7.50	8.0	60 (588)	9.0	10.0	12.0	25		
SB 14 - 055			55	6.82	8.8		9.9	11.0	13.2	25		
SB 14 - 060			60	6.25	9.6		10.8	12.0	14.4	25		
SB 14 - 065			65	5.77	10.4		11.7	13.0	15.6	25		
SB 14 - 070			70	5.36	11.2		12.6	14.0	16.8	25		
SB 14 - 075			75	5.00	12.0		13.5	15.0	18.0	25		
SB 14 - 080			80	4.69	12.8		14.4	16.0	19.2	20		
SB 14 - 090	90	4.17	14.4		16.2	18.0	21.6	20				
SB 16 - 025	16	8	25	20.00	4.0		4.5	5.0	6.0	50		
SB 16 - 030			30	16.67	4.8		5.4	6.0	7.2	50		
SB 16 - 035			35	14.29	5.6		6.3	7.0	8.4	50		
SB 16 - 040			40	12.50	6.4	80 (785)	7.2	8.0	9.6	25		
SB 16 - 045			45	11.11	7.2		8.1	9.0	10.8	25		
SB 16 - 050			50	10.00	8.0		9.0	10.0	12.0	25		
SB 16 - 055			55	9.09	8.8		9.9	11.0	13.2	25		






1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SB 22 - 40 (Series D<sub>0</sub> - L<sub>0</sub>)

JIS B 5012 - 1986

SERIES SB

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant  ± 10%	A 16% L <sub>0</sub>  1.000.000 cycles		B 18% L <sub>0</sub>  500.000 cycles		C 24% L <sub>0</sub>  300.000 cycles		E  do not use approx.	 Pcs
					mm	mm	mm	Kgf/mm	mm	Kgf (N)		
SB 16 - 060	16	8	60	8.34	9.6	80 (785)	10.8	90 (883)	12.0	100 (981)	14.4	25
SB 16 - 065			65	7.69	10.4		11.7		13.0		15.6	25
SB 16 - 070			70	7.14	11.2		12.6		14.0		16.8	20
SB 16 - 075			75	6.67	12.0		13.5		15.0		18.0	20
SB 16 - 080			80	6.25	12.8		14.4		16.0		19.2	20
SB 16 - 090			90	5.56	14.4		16.2		18.0		21.6	20
SB 16 - 100			100	5.00	16.0		18.0		20.0		24.0	20
SB 18 - 025	18	9	25	25.00	4.0	100 (981)	4.5	113 (1,108)	5.0	125 (1,226)	6.0	50
SB 18 - 030			30	20.84	4.8		5.4		6.0		7.2	50
SB 18 - 035			35	17.86	5.6		6.3		7.0		8.4	25
SB 18 - 040			40	15.63	6.4		7.2		8.0		9.6	25
SB 18 - 045			45	13.89	7.2		8.1		9.0		10.8	25
SB 18 - 050			50	12.50	8.0		9.0		10.0		12.0	25
SB 18 - 055			55	11.37	8.8		9.9		11.0		13.2	25
SB 18 - 060			60	10.42	9.6		10.8		12.0		14.4	25
SB 18 - 065			65	9.62	10.4		11.7		13.0		15.6	25
SB 18 - 070			70	8.93	11.2		12.6		14.0		16.8	25
SB 18 - 075			75	8.34	12.0		13.5		15.0		18.0	25
SB 18 - 080			80	7.82	12.8		14.4		16.0		19.2	20
SB 18 - 090			90	6.95	14.4		16.2		18.0		21.6	20
SB 18 - 100	100	6.26	16.0	18.0	20.0	24.0	20					
SB 20 - 025	20	10	25	32.00	4.0	128 (1,255)	4.5	144 (1,412)	5.0	160 (1,569)	6.0	50
SB 20 - 030			30	26.67	4.8		5.4		6.0		7.2	50
SB 20 - 035			35	22.86	5.6		6.3		7.0		8.4	25
SB 20 - 040			40	20.00	6.4		7.2		8.0		9.6	25
SB 20 - 045			45	17.78	7.2		8.1		9.0		10.8	25
SB 20 - 050			50	16.00	8.0		9.0		10.0		12.0	25
SB 20 - 055			55	14.55	8.8		9.9		11.0		13.2	25
SB 20 - 060			60	13.33	9.6		10.8		12.0		14.4	25
SB 20 - 065			65	12.31	10.4		11.7		13.0		15.6	25
SB 20 - 070			70	11.43	11.2		12.6		14.0		16.8	25
SB 20 - 075			75	10.67	12.0		13.5		15.0		18.0	25
SB 20 - 080			80	10.00	12.8		14.4		16.0		19.2	20
SB 20 - 090			90	8.89	14.4		16.2		18.0		21.6	20
SB 20 - 100	100	8.00	16.0	18.0	20.0	24.0	20					
SB 20 - 125	125	6.40	20.0	22.5	25.0	30.0	10					
SB 20 - 150	150	5.33	24.0	27.0	30.0	36.0	10					
SB 22 - 025	22	11	25	39.00	4.0	156 (1,530)	4.5	176 (1,726)	5.0	195 (1,912)	6.0	50
SB 22 - 030			30	32.50	4.8		5.4		6.0		7.2	25
SB 22 - 035			35	27.86	5.6		6.3		7.0		8.4	25
SB 22 - 040			40	24.38	6.4		7.2		8.0		9.6	25
SB 22 - 045			45	21.67	7.2		8.1		9.0		10.8	25
SB 22 - 050			50	19.50	8.0		9.0		10.0		12.0	25
SB 22 - 055			55	17.73	8.8		9.9		11.0		13.2	25
SB 22 - 060			60	16.25	9.6		10.8		12.0		14.4	25
SB 22 - 065			65	15.00	10.4		11.7		13.0		15.6	25
SB 22 - 070			70	13.93	11.2		12.6		14.0		16.8	20
SB 22 - 075			75	13.00	12.0		13.5		15.0		18.0	20
SB 22 - 080			80	12.19	12.8		14.4		16.0		19.2	20
SB 22 - 090			90	10.83	14.4		16.2		18.0		21.6	20
SB 22 - 100	100	9.75	16.0	18.0	20.0	24.0	20					
SB 22 - 125	125	7.80	20.0	22.5	25.0	30.0	10					
SB 22 - 150	150	6.50	24.0	27.0	30.0	36.0	10					





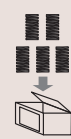
1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

SB 22 - 40 (Series D<sub>0</sub> - L<sub>0</sub>)

SB SERIES

JIS B 5012 - 1986

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A 16% L <sub>0</sub>  1.000.000 cycles		B 18% L <sub>0</sub>  500.000 cycles		C 24% L <sub>0</sub>  300.000 cycles		E  approx. do not use	 Pcs
					mm	Kgf/mm	mm	Kgf (N)	mm	Kgf (N)		
SB 25 - 025	25	12.5	25	49.00	4.0	196 (1,922)	4.5	221 (2,170)	5.0	245 (2,400)	6.0	50
SB 25 - 030			30	40.80	4.8		5.4		6.0		7.2	25
SB 25 - 035			35	35.00	5.6		6.3		7.0		8.4	25
SB 25 - 040			40	30.60	6.4		7.2		8.0		9.6	25
SB 25 - 045			45	27.20	7.2		8.1		9.0		10.8	25
SB 25 - 050			50	24.50	8.0		9.0		10.0		12.0	25
SB 25 - 055			55	22.30	8.8		9.9		11.0		13.2	25
SB 25 - 060			60	20.40	9.6		10.8		12.0		14.4	25
SB 25 - 065			65	18.80	10.4		11.7		13.0		15.6	25
SB 25 - 070			70	17.50	11.2		12.6		14.0		16.8	20
SB 25 - 075			75	16.30	12.0		13.5		15.0		18.0	20
SB 25 - 080			80	15.30	12.8		14.4		16.0		19.2	20
SB 25 - 090			90	13.60	14.4		16.2		18.0		21.6	20
SB 25 - 100			100	12.30	16.0		18.0		20.0		24.0	20
SB 25 - 125			125	9.80	20.0		22.5		25.0		30.0	10
SB 25 - 150			150	8.17	24.0		27.0		30.0		36.0	10
SB 25 - 175	175	7.00	28.0	31.5	35.0	42.0	10					
SB 27 - 025	27	13.5	25	58.00	4.0	232 (2,280)	4.5	261 (2,560)	5.0	290 (2,840)	6.0	20
SB 27 - 030			30	48.33	4.8		5.4		6.0		7.2	20
SB 27 - 035			35	41.43	5.6		6.3		7.0		8.4	20
SB 27 - 040			40	36.25	6.4		7.2		8.0		9.6	20
SB 27 - 045			45	32.22	7.2		8.1		9.0		10.8	20
SB 27 - 050			50	29.00	8.0		9.0		10.0		12.0	20
SB 27 - 055			55	26.36	8.8		9.9		11.0		13.2	20
SB 27 - 060			60	24.17	9.6		10.8		12.0		14.4	20
SB 27 - 065			65	22.31	10.4		11.7		13.0		15.6	20
SB 27 - 070			70	20.71	11.2		12.6		14.0		16.8	20
SB 27 - 075			75	19.33	12.0		13.5		15.0		18.0	20
SB 27 - 080			80	18.13	12.8		14.4		16.0		19.2	10
SB 27 - 090			90	16.11	14.4		16.2		18.0		21.6	10
SB 27 - 100			100	14.50	16.0		18.0		20.0		24.0	10
SB 27 - 125			125	11.60	20.0		22.5		25.0		30.0	10
SB 27 - 150			150	9.67	24.0		27.0		30.0		36.0	10
SB 27 - 175	175	8.28	28.0	31.5	35.0	42.0	5					
SB 30 - 025	30	15	25	72.00	4.0	288 (2,820)	4.5	324 (3,180)	5.0	360 (3,530)	6.0	20
SB 30 - 030			30	60.00	4.8		5.4		6.0		7.2	20
SB 30 - 035			35	51.43	5.6		6.3		7.0		8.4	20
SB 30 - 040			40	45.00	6.4		7.2		8.0		9.6	20
SB 30 - 045			45	40.00	7.2		8.1		9.0		10.8	20
SB 30 - 050			50	36.00	8.0		9.0		10.0		12.0	20
SB 30 - 055			55	32.72	8.8		9.9		11.0		13.2	20
SB 30 - 060			60	30.00	9.6		10.8		12.0		14.4	20
SB 30 - 065			65	27.69	10.4		11.7		13.0		15.6	20
SB 30 - 070			70	25.71	11.2		12.6		14.0		16.8	20
SB 30 - 075			75	24.00	12.0		13.5		15.0		18.0	20
SB 30 - 080			80	22.50	12.8		14.4		16.0		19.2	10
SB 30 - 090			90	20.00	14.4		16.2		18.0		21.6	10
SB 30 - 100			100	18.00	16.0		18.0		20.0		24.0	10
SB 30 - 125			125	14.40	20.0		22.5		25.0		30.0	10
SB 30 - 150			150	12.00	24.0		27.0		30.0		36.0	10
SB 30 - 175	175	10.28	28.0	31.5	35.0	42.0	5					
SB 30 - 200	200	9.00	32.0	36.0	40.0	48.0	5					
SB 35 - 040	35	17.5	40	61.25	6.4	392 (3,840)	7.2	441 (4,320)	8.0	490 (4,810)	9.6	20
SB 35 - 045			45	54.44	7.2		8.1		9.0		10.8	20
SB 35 - 050			50	49.00	8.0		9.0		10.0		12.0	20
SB 35 - 055			55	44.54	8.8		9.9		11.0		13.2	10
SB 35 - 060			60	40.83	9.6		10.8		12.0		14.4	10
SB 35 - 065			65	37.69	10.4		11.7		13.0		15.6	10
SB 35 - 070			70	35.00	11.2		12.6		14.0		16.8	10
SB 35 - 075			75	32.67	12.0		13.5		15.0		18.0	10
SB 35 - 080			80	30.62	12.8		14.4		16.0		19.2	10
SB 35 - 090			90	27.22	14.4		16.2		18.0		21.6	10
SB 35 - 100			100	24.50	16.0		18.0		20.0		24.0	10
SB 35 - 125			125	19.60	20.0		22.5		25.0		30.0	5
SB 35 - 150			150	16.33	24.0		27.0		30.0		36.0	5
SB 35 - 175			175	14.00	28.0		31.5		35.0		42.0	5
SB 35 - 200			200	12.25	32.0		36.0		40.0		48.0	5

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



SB 40 - 80 (Series D<sub>0</sub> - L<sub>0</sub>)

JIS B 5012 - 1986

SERIES SB

Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant ± 10%	A 16% L <sub>0</sub> 1.000.000 cycles		B 18% L <sub>0</sub> 500.000 cycles		C 24% L <sub>0</sub> 300.000 cycles		E do not use approx.	Pcs				
					mm	Kgf (N)	mm	Kgf (N)	mm	Kgf (N)	mm					
SB 40 - 040	40	20	40	80.00	6.4	512 (5,020)	7.2	576 (5,650)	8.0	640 (6,280)	9.6	20				
SB 40 - 045			45	71.13	7.2		8.1		9.0		10.8	10.8	10.8	10.8	10.8	20
SB 40 - 050			50	64.00	8.0		9.0		10.0		12.0	12.0	12.0	12.0	12.0	20
SB 40 - 055			55	58.20	8.8		9.9		11.0		13.2	13.2	13.2	13.2	13.2	20
SB 40 - 060			60	53.33	9.6		10.8		12.0		14.4	14.4	14.4	14.4	14.4	10
SB 40 - 065			65	49.24	10.4		11.7		13.0		15.6	15.6	15.6	15.6	15.6	10
SB 40 - 070			70	45.71	11.2		12.6		14.0		16.8	16.8	16.8	16.8	16.8	10
SB 40 - 075			75	42.68	12.0		13.5		15.0		18.0	18.0	18.0	18.0	18.0	10
SB 40 - 080			80	40.00	12.8		14.4		16.0		19.2	19.2	19.2	19.2	19.2	10
SB 40 - 090			90	35.55	14.4		16.2		18.0		21.6	21.6	21.6	21.6	21.6	10
SB 40 - 100			100	32.00	16.0		18.0		20.0		24.0	24.0	24.0	24.0	24.0	10
SB 40 - 125			125	25.60	20.0		22.5		25.0		30.0	30.0	30.0	30.0	30.0	5
SB 40 - 150			150	21.33	24.0		27.0		30.0		36.0	36.0	36.0	36.0	36.0	5
SB 40 - 175			175	18.28	28.0		31.5		35.0		42.0	42.0	42.0	42.0	42.0	5
SB 40 - 200			200	16.00	32.0		36.0		40.0		48.0	48.0	48.0	48.0	48.0	5
SB 40 - 250			250	12.80	40.0		45.0		50.0		60.0	60.0	60.0	60.0	60.0	2
SB 50 - 050	50	25	50	100.00	8.0	800 (7,850)	9.0	900 (8,830)	10.0	1,000 (9,810)	12.0	5				
SB 50 - 055			55	90.95	8.8		9.9		11.0		13.2	13.2	13.2	13.2	13.2	5
SB 50 - 060			60	83.33	9.6		10.8		12.0		14.4	14.4	14.4	14.4	14.4	5
SB 50 - 065			65	76.96	10.4		11.7		13.0		15.6	15.6	15.6	15.6	15.6	5
SB 50 - 070			70	71.42	11.2		12.6		14.0		16.8	16.8	16.8	16.8	16.8	5
SB 50 - 075			75	66.70	12.0		13.5		15.0		18.0	18.0	18.0	18.0	18.0	5
SB 50 - 080			80	62.50	12.8		14.4		16.0		19.2	19.2	19.2	19.2	19.2	5
SB 50 - 090			90	55.55	14.4		16.2		18.0		21.6	21.6	21.6	21.6	21.6	5
SB 50 - 100			100	50.00	16.0		18.0		20.0		24.0	24.0	24.0	24.0	24.0	5
SB 50 - 125			125	40.00	20.0		22.5		25.0		30.0	30.0	30.0	30.0	30.0	5
SB 50 - 150			150	33.33	24.0		27.0		30.0		36.0	36.0	36.0	36.0	36.0	2
SB 50 - 175			175	28.57	28.0		31.5		35.0		42.0	42.0	42.0	42.0	42.0	2
SB 50 - 200			200	25.00	32.0		36.0		40.0		48.0	48.0	48.0	48.0	48.0	2
SB 50 - 250			250	20.00	40.0		45.0		50.0		60.0	60.0	60.0	60.0	60.0	2
SB 50 - 300	300	16.66	48.0	54.0	60.0	72.0	72.0	72.0	72.0	72.0	2					
SB 60 - 060	60	30	60	120.00	9.6	1,152 (11,300)	10.8	1,296 (12,710)	12.0	1,440 (14,120)	14.4	5				
SB 60 - 070			70	102.86	11.2		12.6		14.0		16.8	16.8	16.8	16.8	16.8	5
SB 60 - 080			80	90.00	12.8		14.4		16.0		19.2	19.2	19.2	19.2	19.2	5
SB 60 - 090			90	80.00	14.4		16.2		18.0		21.6	21.6	21.6	21.6	21.6	5
SB 60 - 100			100	72.00	16.0		18.0		20.0		24.0	24.0	24.0	24.0	24.0	5
SB 60 - 125			125	57.60	20.0		22.5		25.0		30.0	30.0	30.0	30.0	30.0	2
SB 60 - 150			150	48.00	24.0		27.0		30.0		36.0	36.0	36.0	36.0	36.0	2
SB 60 - 175			175	41.14	28.0		31.5		35.0		42.0	42.0	42.0	42.0	42.0	2
SB 60 - 200			200	36.00	32.0		36.0		40.0		48.0	48.0	48.0	48.0	48.0	2
SB 60 - 250			250	28.80	40.0		45.0		50.0		60.0	60.0	60.0	60.0	60.0	2
SB 60 - 300	300	24.00	48.0	54.0	60.0	72.0	72.0	72.0	72.0	72.0	2					

1 N = 0.1 daN = 0.102 kgf

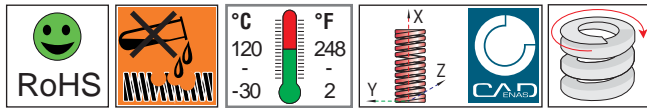
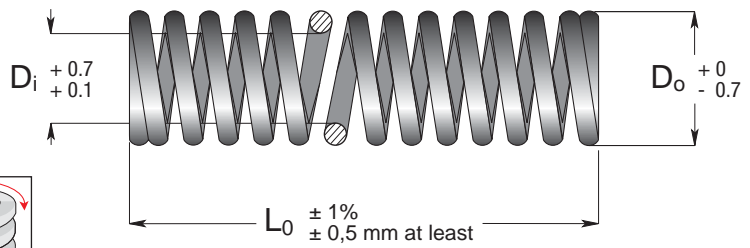
Load (N) = R (N/mm) x Deflection (mm)

SB 40 - 80 (Series D<sub>0</sub> - L<sub>0</sub>)



L SERIES

**EN** Not painted with added rust preventative coating



Code	D <sub>o</sub> D <sub>i</sub>		L <sub>0</sub>	R	A		B		C	
	Outside Diameter	Inside Diameter			16% L <sub>0</sub>		24% L <sub>0</sub>		32% L <sub>0</sub>	
	d				Free Length	Spring Constant	Long Life		Medium Life	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N
L 3 - 010			10	2.94	1.6	4.4	2.4	6.62	3.2	8.8
L 3 - 015	3	2	15	1.96	2.4	4.4	3.6	6.62	4.8	8.8
L 3 - 020			20	0.98	3.2	4.4	4.8	6.62	6.4	8.8
L 3 - 025		0.4	25	0.98	4.0	4.4	6.0	6.62	8.0	8.8
L 4 - 010			10	4.9	1.6	7.8	2.4	11.6	3.2	15.7
L 4 - 015	4	2.6	15	2.94	2.4	7.8	3.6	11.6	4.8	15.7
L 4 - 020			20	2.94	3.2	7.8	4.8	11.6	6.4	15.7
L 4 - 025			25	1.96	4.0	7.8	6.0	11.6	8.0	15.7
L 4 - 030		0.6	30	1.96	4.8	7.8	7.2	11.6	9.6	15.7
L 6 - 015			15	7.85	2.4	17.7	3.6	26.5	4.8	35.5
L 6 - 020	6	4	20	5.88	3.2	17.7	4.8	26.5	6.4	35.5
L 6 - 025			25	4.90	4.0	17.7	6.0	26.5	8.0	35.5
L 6 - 030			30	3.92	4.8	17.7	7.2	26.5	9.6	35.5
L 6 - 035		0.9	35	2.94	5.6	17.7	8.4	26.5	11.2	35.5
L 8 - 015			15	12.75	2.4	31.4	3.6	47.1	4.8	62.8
L 8 - 020	8	5.4	20	9.81	3.2	31.4	4.8	47.1	6.4	62.8
L 8 - 025			25	7.85	4.0	31.4	6.0	47.1	8.0	62.8
L 8 - 030			30	6.86	4.8	31.4	7.2	47.1	9.6	62.8
L 8 - 035			35	5.88	5.6	31.4	8.4	47.1	11.2	62.8
L 8 - 040		1.2	40	4.90	6.4	31.4	9.6	47.1	12.8	62.8
L 10 - 025			25	12.75	4.0	49.0	6.0	73.6	8.0	98
L 10 - 030			30	9.81	4.8	49.0	7.2	73.6	9.6	98
L 10 - 035	10	6.5	35	8.83	5.6	49.0	8.4	73.6	11.2	98
L 10 - 040			40	7.85	6.4	49.0	9.6	73.6	12.8	98
L 10 - 045			45	6.86	7.2	49.0	10.8	73.6	14.4	98
L 10 - 050		1.5	50	5.88	8.0	49.0	12.0	73.6	16.0	98
L 12 - 025			25	17.65	4.0	70.6	6.0	106.9	8.0	141.2
L 12 - 030			30	14.71	4.8	70.6	7.2	106.9	9.6	141.2
L 12 - 035			35	12.75	5.6	70.6	8.4	106.9	11.2	141.2
L 12 - 040	12	8	40	10.79	6.4	70.6	9.6	106.9	12.8	141.2
L 12 - 045			45	9.81	7.2	70.6	10.8	106.9	14.4	141.2
L 12 - 050			50	8.83	8.0	70.6	12.0	106.9	16.0	141.2
L 12 - 055			55	7.85	8.8	70.6	13.2	106.9	17.6	141.2
L 12 - 060		1.8	60	7.85	9.6	70.6	14.4	106.9	19.2	141.2
L 14 - 025			25	24.52	4.0	96.1	6.0	144.2	8.0	192.2
L 14 - 030			30	19.61	4.8	96.1	7.2	144.2	9.4	192.2
L 14 - 035			35	17.65	5.6	96.1	8.4	144.2	11.2	192.2
L 14 - 040			40	14.71	6.4	96.1	9.6	144.2	12.8	192.2
L 14 - 045	14	9.3	45	13.73	7.2	96.1	10.8	144.2	14.4	192.2
L 14 - 050			50	11.77	8.0	96.1	12.0	144.2	16.0	192.2
L 14 - 055			55	10.79	8.8	96.1	13.2	144.2	17.6	192.2
L 14 - 060			60	9.81	9.6	96.1	14.4	144.2	19.2	192.2
L 14 - 065			65	8.83	10.4	96.1	15.6	144.2	20.8	192.2
L 14 - 070		2.2	70	8.83	11.2	96.1	16.8	144.2	22.4	192.2
L 16 - 025			25	31.38	4.0	125.5	6.0	188.3	8.0	251.1
L 16 - 030			30	26.48	4.8	125.5	7.2	188.3	9.4	251.1
L 16 - 035			35	22.56	5.6	125.5	8.4	188.3	11.2	251.1
L 16 - 040	16	10.7	40	19.61	6.4	125.5	9.6	188.3	12.8	251.1
L 16 - 045			45	17.65	7.2	125.5	10.8	188.3	14.4	251.1
L 16 - 050			50	15.69	8.0	125.5	12.0	188.3	16.0	251.1

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

L 30 - 80 (Series) [D<sub>o</sub>] - [L<sub>0</sub>]

Code	D <sub>o</sub> D <sub>i</sub>		L <sub>0</sub>	R	A		B		C			
	Outside Diameter	Inside Diameter			Free Length	Spring Constant	16% L <sub>0</sub>	24% L <sub>0</sub>	32% L <sub>0</sub>	Long Life	Medium Life	Max Deflection
	d											
L 16 - 055	16	10.7	55	14.71	8.8	125.5	13.2	188.3	17.6	251.1		
L 16 - 060			60	12.75	9.6	125.5	14.4	188.3	19.2	251.1		
L 16 - 065			65	11.77	10.4	125.5	15.6	188.3	20.8	251.1		
L 16 - 070			70	10.79	11.2	125.5	16.8	188.3	22.4	251.1		
L 16 - 075			75	10.79	12.0	125.5	18.0	188.3	24.0	251.1		
L 16 - 080			2.4	80	9.81	12.8	125.5	19.2	188.3	25.6	251.1	
L 18 - 025	18	12	25	40.21	4.0	158.9	6.0	238.3	8.0	317.7		
L 18 - 030			30	33.34	4.8	158.9	7.2	238.3	9.4	317.7		
L 18 - 035			35	28.44	5.6	158.9	8.4	238.3	11.2	317.7		
L 18 - 040			40	24.52	6.4	158.9	9.6	238.3	12.8	317.7		
L 18 - 045			45	22.56	7.2	158.9	10.8	238.3	14.4	317.7		
L 18 - 050			50	19.61	8.0	158.9	12.0	238.3	16.0	317.7		
L 18 - 055			55	17.65	8.8	158.9	13.2	238.3	17.6	317.7		
L 18 - 060			60	16.67	9.6	158.9	14.4	238.3	19.2	317.7		
L 18 - 065			65	15.69	10.4	158.9	15.6	238.3	20.8	317.7		
L 18 - 070			70	14.71	11.2	158.9	16.8	238.3	22.4	317.7		
L 18 - 075			75	13.73	12.0	158.9	18.0	238.3	24.0	317.7		
L 18 - 080			80	12.75	12.8	158.9	19.2	238.3	25.6	317.7		
L 18 - 090			2.8	90	10.79	14.4	158.9	21.6	238.3	28.8	317.7	
L 20 - 025			20	13.5	25	49.03	4.0	196.1	6.0	294.2	8.0	392.3
L 20 - 030	30	41.19			4.8	196.1	7.2	294.2	9.4	392.3		
L 20 - 035	35	35.30			5.6	196.1	8.4	294.2	11.2	392.3		
L 20 - 040	40	30.40			6.4	196.1	9.6	294.2	12.8	392.3		
L 20 - 045	45	27.46			7.2	196.1	10.8	294.2	14.4	392.3		
L 20 - 050	50	24.52			8.0	196.1	12.0	294.2	16.0	392.3		
L 20 - 055	55	22.56			8.8	196.1	13.2	294.2	17.6	392.3		
L 20 - 060	60	20.59			9.6	196.1	14.4	294.2	19.2	392.3		
L 20 - 065	65	18.63			10.4	196.1	15.6	294.2	20.8	392.3		
L 20 - 070	70	17.65			11.2	196.1	16.8	294.2	22.4	392.3		
L 20 - 075	75	16.67			12.0	196.1	18.0	294.2	24.0	392.3		
L 20 - 080	80	15.69			12.8	196.1	19.2	294.2	25.6	392.3		
L 20 - 090	90	13.73			14.4	196.1	21.6	294.2	28.8	392.3		
L 20 - 100	3	100			12.75	16.0	196.1	24.0	294.2	32.0	392.3	
L 22 - 025	22	14.7	25	59.82	4.0	237.3	6.0	356	8.0	474.6		
L 22 - 030			30	49.03	4.8	237.3	7.2	356	9.4	474.6		
L 22 - 035			35	42.17	5.6	237.3	8.4	356	11.2	474.6		
L 22 - 040			40	37.27	6.4	237.3	9.6	356	12.8	474.6		
L 22 - 045			45	33.34	7.2	237.3	10.8	356	14.4	474.6		
L 22 - 050			50	29.42	8.0	237.3	12.0	356	16.0	474.6		
L 22 - 055			55	27.46	8.8	237.3	13.2	356	17.6	474.6		
L 22 - 060			60	24.52	9.6	237.3	14.4	356	19.2	474.6		
L 22 - 065			65	22.56	10.4	237.3	15.6	356	20.8	474.6		
L 22 - 070			70	21.57	11.2	237.3	16.8	356	22.4	474.6		
L 22 - 075			75	19.61	12.0	237.3	18.0	356	24.0	474.6		
L 22 - 080			80	18.63	12.8	237.3	19.2	356	25.6	474.6		
L 22 - 090			90	16.67	14.4	237.3	21.6	356	28.8	474.6		
L 22 - 100			3.4	100	14.71	16.0	237.3	24.0	356	32.0	474.6	
L 25 - 025	25	17	25	76.49	4.0	307	6.0	459.9	8.0	613.9		
L 25 - 030			30	63.74	4.8	307	7.2	459.9	9.6	613.9		
L 25 - 035			35	54.92	5.6	307	8.4	459.9	11.2	613.9		
L 25 - 040			40	48.05	6.4	307	9.6	459.9	12.8	613.9		
L 25 - 045			45	42.17	7.2	307	10.8	459.9	14.4	613.9		
L 25 - 050			50	38.25	8.0	307	12.0	459.9	16.0	613.9		
L 25 - 055			55	35.30	8.8	307	13.2	459.9	17.6	613.9		
L 25 - 060			60	32.36	9.6	307	14.4	459.9	19.2	613.9		
L 25 - 065			65	29.42	10.4	307	15.6	459.9	20.8	613.9		
L 25 - 070			70	27.46	11.2	307	16.8	459.9	22.4	613.9		
L 25 - 075			75	25.50	12.0	307	18.0	459.9	24.0	613.9		
L 25 - 080			80	23.54	12.8	307	19.2	459.9	25.6	613.9		
L 25 - 090			90	21.57	14.4	307	21.6	459.9	28.8	613.9		
L 25 - 100			3.8	100	19.61	16.0	307	24.0	459.9	32.0	613.9	
L 30 - 050	30	20	50	51.94	8.0	414	12.0	621	16.0	828		
L 30 - 060			60	44.10	9.6	414	14.4	621	19.2	828		
L 30 - 070			70	37.24	11.2	414	16.8	621	22.4	828		
L 30 - 080			80	32.34	12.8	414	19.2	621	25.6	828		
L 30 - 090			90	28.42	14.4	414	21.6	621	28.8	828		
L 30 - 100			100	25.48	16.0	414	24.0	621	32.0	828		
L 30 - 125			4.5	125	20.58	20.0	414	30.0	621	40.0	828	

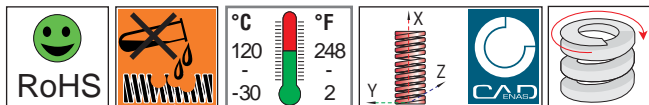
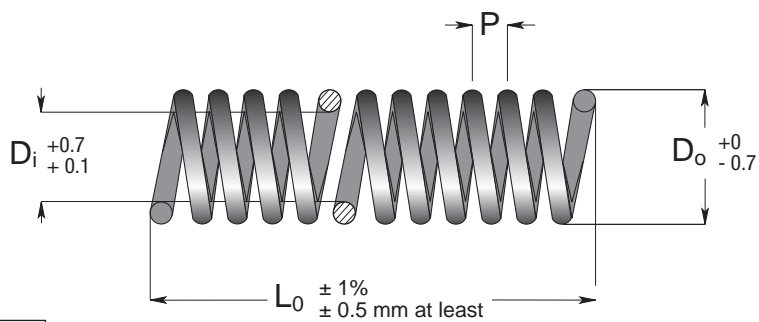
1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)



L 12 - 300 (Series D<sub>o</sub> - L<sub>0</sub>)


## L SERIES

**EN** Long size open ends

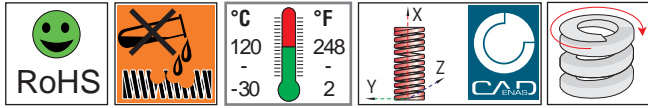
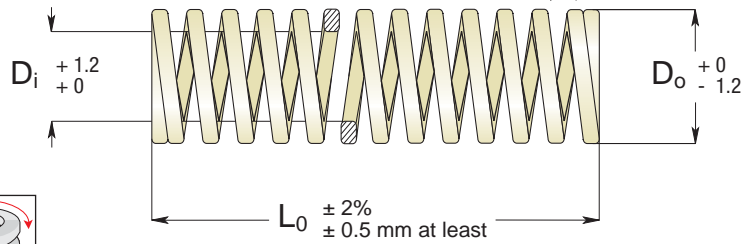
Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	d Wire Diameter	L <sub>0</sub> Free Length	P Pitch
	mm	mm	mm	mm	mm
L 03 - 300	3	2.0	0.4	300	1.04
L 04 - 300	4	2.6	0.6	300	1.50
L 06 - 300	6	4.0	0.9	300	2.00
L 08 - 300	8	5.4	1.2	300	2.80
L 10 - 300	10	6.5	1.5	300	3.50
L 12 - 300	12	8.0	1.8	300	4.30
L 14 - 300	14	9.3	2.2	300	4.80
L 16 - 300	16	10.7	2.4	300	5.50
L 18 - 300	18	12.0	2.8	300	5.30
L 20 - 300	20	13.5	3.0	300	6.80
L 22 - 300	22	14.7	3.4	300	6.70
L 25 - 300	25	17.0	3.8	300	8.20

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

 L 30 - 80 (Series  - )

**EN** High deflection springs for mould return pin



Code	D <sub>o</sub> Outside Diameter	D <sub>i</sub> Inside Diameter	L <sub>0</sub> Free Length	R Spring Constant	A		Solid Length
					50% L <sub>0</sub>	1.000.000 cycles	
	mm	mm	mm	mm	mm	mm	mm
SR 14 - 020	14.5	8.5	20	1.30	10.0	13 (127.5)	8
SR 14 - 025			25	1.04	12.5		10
SR 14 - 030			30	0.87	15.0		12
SR 14 - 035			35	0.74	17.5		14
SR 14 - 040			40	0.65	20.0		16
SR 14 - 045			45	0.58	22.5		18
SR 14 - 050			50	0.52	25.0		20
SR 14 - 055			55	0.47	27.5		22
SR 14 - 060			60	0.43	30.0		24
SR 14 - 065			65	0.40	32.5		26
SR 14 - 070			70	0.37	35.0		28
SR 14 - 075			75	0.35	37.5		30
SR 14 - 080			80	0.33	40.0		32
SR 14 - 090			90	0.29	45.0		36
SR 14 - 100	100	0.26	50.0	40			
SR 14 - 125	125	0.21	62.5	50			
SR 17 - 025	17	10.5	25	1.60	12.5	20 (196.1)	10
SR 17 - 030			30	1.33	15.0		12
SR 17 - 035			35	1.14	17.5		14
SR 17 - 040			40	1.00	20.0		16
SR 17 - 045			45	0.89	22.5		18
SR 17 - 050			50	0.80	25.0		20
SR 17 - 055			55	0.73	27.5		22
SR 17 - 060			60	0.67	30.0		24
SR 17 - 065			65	0.62	32.5		26
SR 17 - 070			70	0.57	35.0		28
SR 17 - 075			75	0.53	37.5		30
SR 17 - 080			80	0.50	40.0		32
SR 17 - 090			90	0.44	45.0		36
SR 17 - 100			100	0.40	50.0		40
SR 17 - 125	125	0.32	62.5	50			
SR 17 - 150	150	0.27	75.0	60			
SR 21 - 030	21	13.5	30	2.00	15.0	30 (294.1)	12
SR 21 - 035			35	1.71	17.5		14
SR 21 - 040			40	1.50	20.0		16
SR 21 - 045			45	1.33	22.5		18
SR 21 - 050			50	1.20	25.0		20
SR 21 - 055			55	1.09	27.5		22
SR 21 - 060			60	1.00	30.0		24
SR 21 - 065			65	0.92	32.5		26
SR 21 - 070			70	0.86	35.0		28
SR 21 - 075			75	0.80	37.5		30
SR 21 - 080			80	0.75	40.0		32
SR 21 - 090			90	0.67	45.0		36
SR 21 - 100			100	0.60	50.0		40
SR 21 - 110			110	0.55	55.0		44
SR 21 - 120			120	0.50	60.0		48
SR 21 - 125			125	0.48	62.5		50
SR 21 - 130	130	0.46	65.0	52			
SR 21 - 140	140	0.43	70.0	56			
SR 21 - 150	150	0.40	75.0	60			



L 12 - 300 (Series D<sub>o</sub> - L<sub>0</sub>)

Load (N) = R(N/rm) x Deflection (mm)

1 N = 0.1 daN = 0.102 kgf

## SB SERIES

Code	D <sub>o</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A	Solid Length
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	50% L <sub>0</sub>	
	mm	mm	mm	mm	mm	mm
SR 26 - 030	26	16.5	30	2.67	15.0	40 (392.3)
SR 26 - 035			35	2.29	17.5	
SR 26 - 040			40	2.00	20.0	
SR 26 - 045			45	1.78	22.5	
SR 26 - 050			50	1.60	25.0	
SR 26 - 055			55	1.45	27.5	
SR 26 - 060			60	1.33	30.0	
SR 26 - 065			65	1.23	32.5	
SR 26 - 070			70	1.14	35.0	
SR 26 - 075			75	1.07	37.5	
SR 26 - 080			80	1.00	40.0	
SR 26 - 090			90	0.89	45.0	
SR 26 - 100			100	0.80	50.0	
SR 26 - 110			110	0.73	55.0	
SR 26 - 120			120	0.67	60.0	
SR 26 - 125			125	0.64	62.5	
SR 26 - 130			130	0.62	65.0	
SR 26 - 140			140	0.57	70.0	
SR 26 - 150			150	0.53	75.0	
SR 26 - 175			175	0.46	87.5	
SR 26 - 200	200	0.40	100.0			
SR 31 - 040	31	21	40	2.50	2.50	50 (490.3)
SR 31 - 045			45	2.22	2.22	
SR 31 - 050			50	2.00	2.00	
SR 31 - 060			60	1.67	1.67	
SR 31 - 070			70	1.43	1.43	
SR 31 - 080			80	1.25	1.25	
SR 31 - 090			90	1.11	1.11	
SR 31 - 100			100	1.00	1.00	
SR 31 - 110			110	0.91	0.91	
SR 31 - 120			120	0.83	0.83	
SR 31 - 125			125	0.80	0.80	
SR 31 - 130			130	0.77	0.77	
SR 31 - 140			140	0.71	0.71	
SR 31 - 150			150	0.67	0.67	
SR 31 - 160			160	0.63	0.63	
SR 31 - 170			170	0.59	0.59	
SR 31 - 175			175	0.57	0.57	
SR 31 - 180			180	0.56	0.56	
SR 31 - 190			190	0.53	0.53	
SR 31 - 200			200	0.50	0.50	
SR 31 - 250	250	0.40	0.40			
SR 31 - 300	300	0.33	0.33			

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

L 17 - 50 (Series | D<sub>0</sub> - L<sub>0</sub>)



Code	D <sub>o</sub>	D <sub>i</sub>	L <sub>0</sub>	R	A	Solid Length			
	Outside Diameter	Inside Diameter	Free Length	Spring Constant	50% L <sub>0</sub>				
	mm	mm	mm	mm	mm	mm			
SR 46 - 050	46	33	50	4.40	25.0	110 (1,078.7)			
SR 46 - 060			60	3.67	30.0				
SR 46 - 070			70	3.14	35.0				
SR 46 - 080			80	2.75	40.0				
SR 46 - 090			90	2.44	45.0				
SR 46 - 100			100	2.20	50.0				
SR 46 - 110			110	2.00	55.0				
SR 46 - 120			120	1.83	60.0				
SR 46 - 125			125	1.76	62.5				
SR 46 - 130			130	1.69	65.0				
SR 46 - 140			140	1.57	70.0				
SR 46 - 150			150	1.47	75.0				
SR 46 - 175			175	1.26	87.5				
SR 46 - 200			200	1.10	100.0				
SR 46 - 225			225	0.98	112.5				
SR 46 - 250			250	0.88	125.0				
SR 46 - 275			275	0.80	137.5				
SR 46 - 300			300	0.73	150.0				
SR 37 - 040			37	26	40		3.00	3.00	60 (588.4)
SR 37 - 045					45		2.67	2.67	
SR 37 - 050	50	2.40			2.40				
SR 37 - 060	60	2.00			2.00				
SR 37 - 070	70	1.71			1.71				
SR 37 - 080	80	1.50			1.50				
SR 37 - 090	90	1.33			1.33				
SR 37 - 100	100	1.20			1.20				
SR 37 - 110	110	1.09			1.09				
SR 37 - 120	120	1.00			1.00				
SR 37 - 125	125	0.96			0.96				
SR 37 - 130	130	0.92			0.92				
SR 37 - 140	140	0.86			0.86				
SR 37 - 150	150	0.80			0.80				
SR 37 - 160	160	0.75			0.75				
SR 37 - 170	170	0.71			0.71				
SR 37 - 175	175	0.69			0.69				
SR 37 - 180	180	0.67			0.67				
SR 37 - 190	190	0.63			0.63				
SR 37 - 200	200	0.60			0.60				
SR 37 - 250	250	0.48	0.48						
SR 37 - 300	300	0.40	0.40						

L 12 - 300 (Series | D<sub>o</sub> - L<sub>0</sub>)

Load (N) = R (N/mm) x Deflection (mm)

1 N = 0.1 daN = 0.102 kgf