



DISC SPRINGS

STANDARD PRODUCT RANGE

DIN 2093 RANGE

SPIROL offers the full range of DIN 2093 Group 1 and 2 Discs in Series A, B, and C.

SPIROL STANDARD RANGE

In addition to the DIN specified sizes, **SPIROL** stocks its own standard size range in outside diameters from 8mm to 200mm in order to meet the diverse needs of its customers. **SPIROL** Standard Disc Springs meet all material, dimensional tolerance, and quality specifications as laid out in DIN 2093 but in diameter and thickness combinations that are not included in the DIN standard.

STANDARD PRODUCT DEFINITIONS

PROPERTY	GROUP 1	GROUP 2
THICKNESS	<1.25mm	1.25mm up to 6mm
MATERIAL	Code B – Carbon Steel C67S (1.1231) / UNS G10700	Code W – Alloy Steel 51CrV4 (1.8159) / UNS G61500
HARDNESS	HV 425-510 (HRC 43-50)	HRC 42-52 (HV 412-544)
FINISH	Code R – Zinc Phosphate and Oil	

Within each Group there are three Series — A, B, and C. These series are differentiated by material thicknesses and the corresponding force/deflection curves they generate. DIN 2093 categorizes the three series by the following approximate ratios:

SERIES A	$D_e/t \approx 18$	$h_o/t \approx 0.4$
SERIES B	$D_e/t \approx 28$	$h_o/t \approx 0.75$
SERIES C	$D_e/t \approx 48$	$h_o/t \approx 1.3$

See pages 9-13 of the design guide for **SPIROL**'s standard offering.

In addition to the standard offerings, **SPIROL** offers a line of austenitic **Stainless Steel Disc Springs**.

MATERIAL	Code D – SAE 301 Stainless Steel Full Hard (X10CrNi18-8 No 1.4310 / UNS 30100)
FINISH	Code K – Plain finish, not oiled.

See page 14 for **SPIROL**'s standard offering.

SPECIALS

SPIROL will work with the customer to develop special disc springs to meet the requirements of the application. Factors to take into consideration are forces, working parameters, environment, duty cycle, and required life. **SPIROL** can provide special dimensions, materials, finishes, and packaging to suit the application.

TO ORDER: Product / D_e x D_i x t / material code / finish code

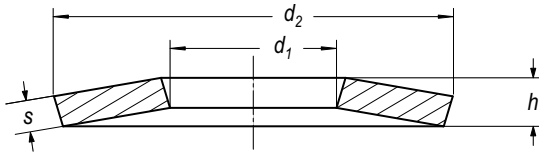
EXAMPLE: DSC 25 x 12.2 x 0.7 BR



CONICAL SPRING WASHERS

Designed in accordance with DIN 6796 for use with high tensile bolts in Classes 8.8 and higher.

Since the spring force exerted is predictable, Spring Washers provide a simple effective means of determining bolt tension required to achieve a properly torqued assembly. In addition, tension, which would otherwise be lost to expansion, wear, or compression set, is maintained.



Nominal Size	d_1 H14	d_2 h14	s	h max ¹⁾	h min ²⁾	Force N Test ³⁾	Force N ⁴⁾
2	2.2	5	0.4	0.6	0.5	920	628
2.5	2.7	6	0.5	0.72	0.61	1540	946
3	3.2	7	0.6	0.85	0.72	2350	1320
3.5	3.7	8	0.8	1.06	0.92	3160	2410
4	4.3	9	1	1.3	1.12	4050	3770
5	5.3	11	1.2	1.55	1.35	6700	5480
6	6.4	14	1.5	2	1.7	9400	8590
7	7.4	17	1.75	2.3	2	13700	11300
8	8.4	18	2	2.6	2.24	17200	14900
10	10.5	23	2.5	3.2	2.8	27500	22100
12	13	29	3	3.95	3.43	40000	34100
14	15	35	3.5	4.65	4.04	55000	46000
16	17	39	4	5.25	4.58	75000	59700
18	19	42	4.5	5.8	5.08	95000	74400
20	21	45	5	6.4	5.6	122000	93200
22	23	49	5.5	7.05	6.15	152000	113700
24	25	56	6	7.75	6.77	175000	131000
27	28	60	6.5	8.35	7.3	230000	154000
30	31	70	7	9.2	8	280000	172000

- 1) Maximum height at delivery
- 2) Minimum height after test for permanent set as specified in DIN 267 Part 26
- 3) Compression test load
- 4) Calculated spring force at deflection equals $h_{min} - s$

MATERIAL	B	Spring steel heat treated to HV 420-510 (HRC 43-50)
FINISH	K	Plain (natural), oiled

TO ORDER: Product / $d_2 \times d_1 \times t$ / material code / finish code
 EXAMPLE: LWR 9 x 4.3 x 1 B K

Produced to order only.

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