

DIN 2093 Tolerances

Original SCHNORR® disc springs

Today DIN EN 16983 (previously DIN 2093) divides three manufacturing methods depending on the relevant thickness:

- Group 1:** $t < 1.25$, punching, cold forming, rounding-off edges
- Group 2:** $1.25 \leq t \leq 6$ mm, punching, cold forming, turning and rounding off edges or fine-blanking, cold forming and rounding off edge
- Group 3:** $> 6 < t \leq 14$ mm, cold or hot forming, turning all sides, rounding off edges or punching, cold forming, turning and rounding off edges or fine-blanking, cold forming, rounding off edges.

Notes on the disc spring table

The following tables, list the springs according to DIN EN 16983 (previously DIN 2093) as well as those to SCHNORR® Internal standards. Sizes according to DIN EN 16983 (previously DIN 2093) are shown in heavy type. The prefix A, B or C shows the corresponding series. All sizes listed are in production and normally available from stock. The Article number quoted is the normal manufacture from spring steel with phosphate finish.

The load and the corresponding stresses are given for the three points $s = 0.25 h_0$, $s = 0.5 h_0$, $s = 0.75 h_0$. From $s > 0.75 h_0$, the actual characteristic curve increases progressively, contrary to the calculation (the table contains calculated values).

Disc springs according to group 3 are provided with turned bearing surfaces and reduced disc thickness. The disc's force increased by the bearing surfaces which is compensated by means of the reduced disc thickness t' .

Disc thickness t' corresponds to the effective thickness of the spring and must be accounted for with parallel stacking for determining the column length. The elastic force applies to disc springs made of spring steel.

Dimensional series

Dimensional series	h_0/t
A	~ 0.40
B	~ 0.75
C	~ 1.30

The following tolerances apply to springs made of standard materials (C75S and 51CrV4) (Tolerances for springs made of corrosion-resistant materials according to factory standard):

Load tolerances

Nominal spring thickness		Admissible tolerances	
t or t' [mm]		F* [%]	
greater than	up to	max.	min.
0.20	1.25	+25	-7.5
1.25	3.00	+15	-7.5
3.00	6.00	+10	-5.0
6.00	16.00	+5	-5.0

Allowances for the spring load with springs according to DIN EN 16983 (previously DIN 2093)

* F with test length $l_p = l_0 - 0.75 \cdot h_0$

Diameter tolerances

Nominal dimension		Admissible tolerances				
D _e or D _i [mm]		D _e [mm]		D _i [mm]		concentricity [mm]
greater	up to	max.	min.	max.	min.	max.
3	6	0	-0.12	+0.12	0	0.15
6	10	0	-0.15	+0.15	0	0.18
10	18	0	-0.18	+0.18	0	0.22
18	30	0	-0.21	+0.21	0	0.26
30	50	0	-0.25	+0.25	0	0.32
50	80	0	-0.30	+0.30	0	0.60
80	120	0	-0.35	+0.35	0	0.70
120	180	0	-0.40	+0.40	0	0.80
180	250	0	-0.46	+0.46	0	0.92

Allowances for external and internal diameters and concentricity with springs according to DIN EN 16983 (previously DIN 2093)

Thickness tolerances

Nominal spring thickness		Admissible tolerances	
t or t' [mm]		t or t' [mm]	
greater than	up to	greater than	up to
0.20	0.60	+0.02	-0.06
0.60	1.25	+0.03	-0.09
1.25	3.80	+0.04	-0.12
3.80	6.00	+0.05	-0.15
6.00	16.00	+0.10	-0.10

Allowances for spring thickness with springs according to DIN EN 16983 (previously DIN 2093)

Overall height tolerances

Nominal spring thickness		Admissible tolerances	
t or t' [mm]		l ₀ [mm]	
greater than	up to	max.	min.
0.20	1.25	+0.10	-0.05
1.25	2.00	+0.15	-0.08
2.00	3.00	+0.20	-0.10
3.00	6.00	+0.30	-0.15
6.00	16.00	+0.30	-0.30

Allowances for the overall height with springs according to DIN EN 16983 (previously DIN 2093)

MOVE | CUSHION | SECURE

hobson.com.au **QUALITY FASTENERS SINCE 1935**

