TOLERANCES AND TESTING

Due to the characteristics of the material it is impossible to make identical springs. Material hardness, dimensions and physical properties can vary, which influences the consistency of the spring. It is therefore important to set tight tolerances when necessary.

Typical tolerances for spring loads are ± 5, ±7 or 10%. For the initial force (F_o) on extension springs, the tolerance is ±15%. The tolerances are normally controlled by spot checks.

Where a very tight tolerance is required, a tolerance of ±1–2% can be maintained by conducting a 100% load check.

The tolerances apply to springs with a ratio of:

$\frac{D_m}{D_t} = 4–15$

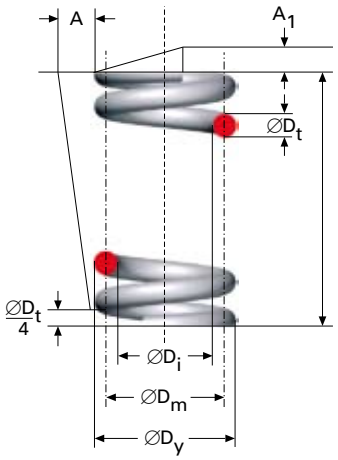
For the end coil of the compression springs, the values of the table should be doubled.

Where two load values are stated, tolerances for free length should not be indicated. The tolerances apply for both compression and extension springs. Normally, the complete tolerance range is not required e.g. most standard springs are produced within tolerance.

$D_m = D_y - D_t = D_i + D_t$

Tolerances for angle deviation SS 2386

The deviation (A) of the generating line from the vertical line must not be greater than 0.05 L_o (2.9°). Parallel misalignment (A_1) must not be greater than 0.03 D_y (1.7°).



Tolerances for spring diameter SS 2384

Base measurement, D_m	Tolerance
– 2,5	±0,15
(2,5) – 4	±0,2
(4,0) – 6,3	±0,25
(6,3) – 10	±0,3
(10) – 16	±0,35
(16) – 25	±0,45
(25) – 32	±0,5
(32) – 40	±0,6
(40) – 50	±0,8
(50) – 63	±1
(63) – 80	±1,2
(80) – 100	±1,5
(100) – 125	±1,9
(125) – 160	±2,3
(160) – 200	±2,9
(200) – 250	±3,1
(250) – 320	±3,5
(320) – 400	±4

Tolerances for other wire and strip steel formations

Base measurements, mm	Length	Radii	Angles
<3	±0,2	±0,2	±4°
3 – 6	±0,3	±0,5	±3°
>6 – 30	±0,5	±1,0	±2,5°
>30 – 60	±0,8	±2,0	±2°
>60 –120	±0,8	±3,0	±1,5°

Tolerances for free length (L_o) SS 2384

Ratio D_m / D_t	Tolerance
4 –12	±5%
(12) –15	±7,5%

Lowest tolerance for L_o = ±0.3 mm

Tolerances for spring force (F) SS 2384

Ratio D_m / D_t	No of active coils 2–3.5	(3.5)–5.5	(5.5)–8.5	(8.5)–12.5	(12.5)+
4 – 5	±15%	±12%	±11%	±10%	±9%
(5) – 11	±13%	±11%	±10%	±9%	±8%