

## DIAMETER TOLERANCE

Outside Diameter:  $D_e$  h12  
 Inside Diameter:  $D_i$  H12

Concentricity:  $D_e \leq 50 \text{ mm}$  2 • IT 11  
 $D_e > 50 \text{ mm}$  2 • IT 12

<b><math>D_e</math> or <math>D_i</math> RANGE mm</b>	<b><math>D_e</math> TOLERANCE MINUS mm</b>	<b><math>D_i</math> TOLERANCE PLUS mm</b>	<b>CONCENTRICITY TOLERANCE <sup>1</sup></b>
3 to 6	0.12	0.12	0.15
Over 6 to 10	0.15	0.15	0.18
Over 10 to 18	0.18	0.18	0.22
Over 18 to 30	0.21	0.21	0.26
Over 30 to 50	0.25	0.25	0.32
Over 50 to 80	0.30	0.30	0.60
Over 80 to 120	0.35	0.35	0.70
Over 120 to 180	0.40	0.40	0.80
Over 180 to 250	0.46	0.46	0.92

1) In reference to Outside Diameter  $D_e$

## THICKNESS TOLERANCE (t)

<b>THICKNESS RANGE mm</b>	<b>TOLERANCE mm</b>	
	<b>PLUS</b>	<b>MINUS</b>
From 0.2 to 0.6	0.02	0.06
Over 0.6 to under 1.25	0.03	0.09
From 1.25 to 3.8	0.04	0.12
Over 3.8 to 6	0.05	0.15

## FREE OVER-ALL HEIGHT ( $l_o$ ) TOLERANCE

<b>THICKNESS RANGE (t) mm</b>	<b>TOLERANCE mm</b>	
	<b>PLUS</b>	<b>MINUS</b>
Less than 1.25	0.10	0.05
From 1.25 to 2	0.15	0.08
Over 2 to 3	0.20	0.10
Over 3 to 6	0.30	0.15

## SPRING FORCE TOLERANCE

The following deviations apply for normal applications:

The static load (F) of a single disc shall be determined for a disc in the loaded state using a suitable lubricant. The pressure plates between which the disc is compressed must be hardened, ground and polished.

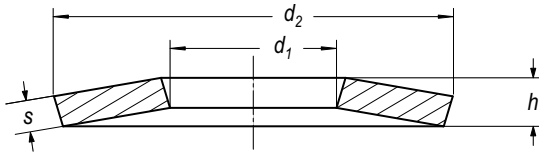
<b>THICKNESS (t) mm</b>	<b>PERMISSIBLE DEVIATION in load F at <math>s = 0.75 h_o</math> as a percentage</b>
Less than 1.25	+ 25 % - 7.5 %
From 1.25 to 3	+ 15 % - 7.5 %
Over 3 to 6	+ 10 % - 5 %



## 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 <sup>1)</sup>	$h$ min <sup>2)</sup>	Force N Test <sup>3)</sup>	Force N <sup>4)</sup>
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  $h_{min} - s$

<b>MATERIAL</b>	<b>B</b>	Spring steel heat treated to HV 420-510 (HRC 43-50)
<b>FINISH</b>	<b>K</b>	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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