



# CB Conical Spring Washers

## Technical Data

### according to DIN 6796



Conical spring washers are spring elements whose role is to counteract the loss of force in screwed or bolted connections due to stress relaxation taking place in the components or to counteract heat expansion. These spring elements are compressed in the assembly.

They are configured in accordance with bolts of the property class 8.8 to 10.9. Particularly when used in conjunction with short bolts, their function is to increase the elasticity of the overall assembly. In the case of relaxation of the connection, these elements maintain a certain minimum clamping force. However, conical spring washers are not able to prevent parts unscrewing as a result of alternating transverse loads.

It should be noted that conical spring washers are extremely high-stressed components and are therefore only recommended for static application.

CB conical springs washers can be supplied in a variety of surface finishes to suit the application.

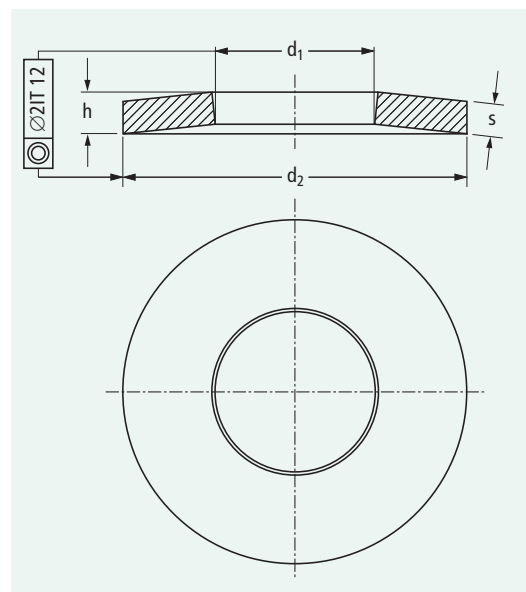
### Materials

Conical spring washers are available in materials according to DIN EN 10 132-4 or in equivalent spring steel qualities as selected by the manufacturer.

### Quality and Testing Requirements for Conical Spring Washers DIN 6796 / DIN 267 part 26

Testing for dimensional stability and configuration comply with DIN 267 part 26.

Both a minimum and a maximum value are specified (see adjacent table) for the overall height  $h$  in unloaded condition. The maximum value may not be exceeded in the as-delivered condition and the minimum value to be attained after testing permanent set, (DIN 267 part 26) must be achieved or exceeded.



**Fig. 1:**  
**Dimensioning.**

Nominal bolt size	Dimensions					Packaging unit	Weight (1000 pc.)	Thread <sup>4)</sup>	Surface			
	d <sub>1</sub>	d <sub>2</sub>	s <sup>3)</sup>	h <sub>max</sub> <sup>1)</sup>	h <sub>min</sub> <sup>2)</sup>				bright	phosphated Fe/Znphr	mech. zinc plated Zn20M with passivation	mech. zinc plated Zn 20 + polyamide*)
M	[mm]	[mm]	[mm]	[mm]	[mm]	[pcs.]	[kg]	[mm]	CB-Part No.	CB-Part No.	CB-Part No.	CB-Part No.
2 <sup>5)</sup>	2,2	5	0,4	0,6	0,5	10 000	0,041	2	105 411	105 412	-	-
2,5 <sup>5)</sup>	2,7	6	0,5	0,72	0,61	10 000	0,072	2,5	105 413	105 414	-	-
3 <sup>5)</sup>	3,2	7	0,6	0,85	0,72	10 000	0,119	3	105 415	105 417	105 416	-
3,5 <sup>5)</sup>	3,7	8	0,8	1,06	0,92	10 000	0,25	3,5	105 419	105 421	105 420	-
4	4,3	9	1,0	1,3	1,12	5 000	0,38	4	105 422	105 424	105 423	-
5	5,3	11	1,2	1,55	1,35	2 500	0,61	5	105 425	105 427	105 426	-
6	6,4	14	1,5	2,0	1,7	2 500	1,29	6	105 428	105 432	105 429	-
7	7,4	17	1,75	2,3	2,0	1 000	2,36	7	105 433	105 437	105 434	-
8	8,4	18	2,0	2,6	2,24	1 000	2,76	8	105 438	105 442	105 439	105 444
10	10,5	23	2,5	3,2	2,8	500	5,85	10	105 449	105 454	105 450	105 456
12	13	29	3,0	3,95	3,43	250	11,7	12	105 460	105 464	105 461	105 466
14	15	35	3,5	4,65	4,04	100	20,1	14	105 472	105 474	105 473	-
16	17	39	4,0	5,25	4,58	100	28,1	16	105 479	105 483	105 480	105 484
18	19	42	4,5	5,8	5,08	100	35,4	18	105 487	105 489	105 488	105 490
20	21	45	5,0	6,4	5,6	100	44,5	20	105 491	105 493	105 492	105 494
22	23	49	5,5	7,05	6,15	100	58,9	22	105 496	105 498	105 497	-
24	25	56	6,0	7,75	6,77	50	86,8	24	105 499	105 501	105 500	-
27	28	60	6,5	8,35	7,3	50	105,2	27	105 503	105 505	105 504	-
30	31	70	7,0	9,2	8,0	50	158,9	30	105 506	105 508	105 507	-

1) Maximum size in as-delivered condition

2) Minimum size after test for permanent set as specified in DIN 267 part 26

3) Tolerances according to DIN EN 10 140

4) For nominal thread diameter

5) Test values for the spring load test as described in DIN 267 part 26 have not as yet been specified for this nominal bolt size.

\*) To allow for coating change the DIN 6796 sizes as follows:  
d<sub>1</sub> by -0,4 mm;  
d<sub>2</sub> by +0,4 mm;  
s and h by +0,4 mm.

**The Christian Bauer  
production program comprises:**

▷ **CB Precision Disc Springs**

for loads ranging from 1 to 4 million N, with outside diameters up to 1000 mm, with thicknesses from 0.1 to 60 mm, made from spring steels and special steels, spring bronze, Nimonic, copper beryllium, Inconel, titanium and other non-ferrous metals, with degressive, progressive and negative characteristic curves, for dynamic, sudden and static applications, for temperature ranges from -260°C to +800°C.

▷ **CB Precision Parts:**

Vanes for vane cell pumps in power steering systems, fuel injection pumps, Common Rail, hydraulic pumps, rolls for roller cell pumps, rotors and stator rings for vane cell pumps, discs hardened and ground.

▷ **CB Disc Springs, slotted type**

for large deflections and with particularly soft characteristic curves for automotive clutches, gearboxes and similar applications.

▷ **CB Disc Springs  
with trapezoidal cross section**

▷ **CB Disc Springs with particular characteristics such as**

corrosion resistance, heat resistance, non-magnetic, surface treatment by chemical or electrolytic methods as well as gun spraying and dipping methods.

▷ **Custom made CB Disc Springs**

Made to your specification or design

▷ **CB Conical spring washers according to DIN 6796 and per customers' requirements**

for bolted connections and in a large number of standard sizes for compensation of loss of force and thermal expansion as well as material and production tolerances.

▷ **Thrust and adjusting washers, supporting rings, etc.**

According to drawings, with high surface finishes, made of case-hardened, nitrided steels and tempering steels. Also available in other special steels.



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