

# Technical Data



- cb disc springs
- cb disc springs corrosion-resistant
- cb ball-bearing disc springs
- cb conical spring washers

# The art of flexibility

## **About cb**

With decades of familiarity with the market and solid know-how, cb successfully designs flexibility creatively. Wherever disc springs and precision components are involved, we stand for the tightest of production tolerances while being consistently solution-driven. In addition to the DIN disc springs depicted in this brochure, we also support you with tailored and customised developments.

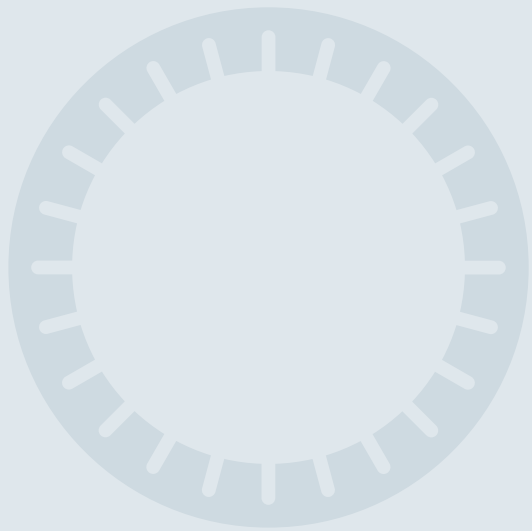
## **Specific information – also digital**

This brochure gives you an overview of all cb spring types. Furthermore you also have access to a flexible and comfortable calculation programme for all cb spring types at [www.christianbauer.com](http://www.christianbauer.com). We wish you lots of success with our products!



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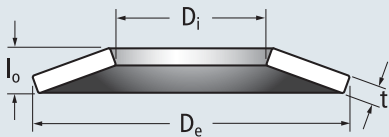
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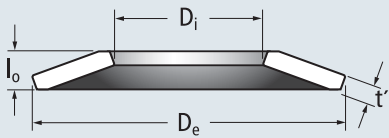
cb disc springs deliver reliable performance in automobiles, aircraft or power stations – and in numerous other applications too. Just contact us to find out more!

# Disc spring designs

## cb disc springs



Disc springs of group 1 and 2.



Disc springs of group 3 with contact surfaces.

### Subdivision of disc springs into groups

In accordance with DIN 2093, disc springs are subdivided into three groups.

Group	Disc thickness t [mm]	Contact surfaces and reduced disc thickness
1	< 1.25	no
2	1.25 bis 6.0	no
3	> 6.0 bis 14.0	yes

Disc springs with dimensions deviating from the standard can be logically allocated to one of these groups. Disc springs of groups 1 and 2 are rectangular in cross-section with rounded edges. This leads to minimal shortening of the lever arm and thus to higher spring forces. With the disc springs in group 3, some of the relevant contact surfaces ensure a defined transmission of force. The corresponding lever-arm shortening leads to higher spring force, compensated for by a reduction in the material thickness of the disc spring. The reduced material thickness results from the requirement for the same force value at  $s = 0.75 h_0$  and the same overall height  $l_0$ .

### Subdivision of disc springs into series A, B and C in accordance with DIN 2093

For every diameter combination listed in the standard, there are three different disc-spring series, with the following features:

Series	A	B	C
$D_e/t$	$\approx 18$	$\approx 28$	$\approx 40$
$h_0/t$ and $K_4 \cdot h_0'/t'$	$\approx 0.4$	$\approx 0.75$	$\approx 1.3$
Characteristic curve form	nearly linear	slightly regressive	strongly regressive
Spring force	high	medium	low

Disc springs that go with series A, B and C are marked as such in the tables.

Series	Dimensions (size ordered)					$l_0$ [mm]	$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	$F(0.75h_0)$ [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]								
	6.00	3.20	0.30		0.45	0.50		119.2	0.34	0.043	104298	
	8.00	3.20	0.20		0.40	1.00		25.8	0.25	0.061	104299	
	8.00	3.20	0.30		0.55	0.83		104.4	0.36	0.092	104301	
	8.00	3.20	0.40		0.60	0.50		185.5	0.45	0.123	104302	
	8.00	3.20	0.50		0.70	0.40		357.4	0.55	0.154	104306	
<b>C</b>	8.00	4.20	0.20		0.45	1.25		39.2	0.26	0.052	104308	
<b>B</b>	8.00	4.20	0.30		0.55	0.83		117.9	0.36	0.078	104310	
<b>A</b>	8.00	4.20	0.40		0.60	0.50		209.6	0.45	0.105	104313	
	10.00	3.20	0.30		0.65	1.17		98.3	0.39	0.156	104317	
	10.00	3.20	0.40		0.70	0.75		179.2	0.47	0.209	104318	
	10.00	3.20	0.50		0.75	0.50		278.5	0.56	0.262	104319	
	10.00	4.20	0.40		0.70	0.75		189.2	0.47	0.191	104321	
	10.00	4.20	0.50		0.75	0.50		294.1	0.56	0.239	104323	
	10.00	4.20	0.60		0.85	0.42		502.3	0.66	0.287	104326	
<b>C</b>	10.00	5.20	0.25		0.55	1.20		57.5	0.32	0.104	104329	
<b>B</b>	10.00	5.20	0.40		0.70	0.75		209.3	0.47	0.167	104330	
<b>A</b>	10.00	5.20	0.50		0.75	0.50		325.4	0.56	0.210	104332	
	12.00	4.20	0.40		0.80	1.00		178.4	0.50	0.295	104336	
	12.00	4.20	0.50		0.85	0.70		283.8	0.59	0.369	104338	
	12.00	4.20	0.60		1.00	0.67		556.8	0.70	0.444	104339	
	12.00	5.20	0.50		0.90	0.80		349.6	0.60	0.340	104342	
	12.00	5.20	0.60		0.95	0.58		506.1	0.69	0.408	104345	
	12.00	6.20	0.50		0.85	0.70		326.4	0.59	0.303	104347	
	12.00	6.20	0.60		0.95	0.58		551.8	0.69	0.364	104351	
	12.50	5.20	0.50		0.85	0.70		272.2	0.59	0.377	104353	
<b>C</b>	12.50	6.20	0.35		0.80	1.29		151.3	0.46	0.237	104354	
<b>B</b>	12.50	6.20	0.50		0.85	0.70		293.5	0.59	0.340	104358	
<b>A</b>	12.50	6.20	0.70		1.00	0.43		659.6	0.77	0.474	104361	
<b>C</b>	14.00	7.20	0.35		0.80	1.29		123.2	0.46	0.291	104369	
<b>B</b>	14.00	7.20	0.50		0.90	0.80		279.2	0.60	0.418	104372	
<b>A</b>	14.00	7.20	0.80		1.10	0.38		796.9	0.87	0.667	104374	
	15.00	5.20	0.40		0.95	1.38		175.4	0.54	0.466	104379	
	15.00	5.20	0.50		1.00	1.00		278.3	0.62	0.584	104381	
	15.00	5.20	0.60		1.05	0.75		407.2	0.71	0.702	104382	

<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$l_0$ [mm]	$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	F(0.75 $h_0$ ) [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]								
	15.00	5.20	0.70		1.10	0.57		555.3	0.80	0.814	104383	
	15.00	6.20	0.50		1.00	1.00		289.4	0.62	0.547	104384	
	15.00	6.20	0.60		1.05	0.75		423.5	0.71	0.657	104386	
	15.00	6.20	0.70		1.10	0.57		577.5	0.80	0.762	104389	
	15.00	8.20	0.70		1.10	0.57		665.6	0.80	0.637	104390	
	15.00	8.20	0.80		1.20	0.50		982.3	0.90	0.730	104395	
<b>C</b>	16.00	8.20	0.40		0.90	1.25		154.4	0.52	0.439	104397	
<b>B</b>	16.00	8.20	0.60		1.05	0.75		410.1	0.71	0.662	104404	
	16.00	8.20	0.70		1.15	0.64		637.2	0.81	0.768	104407	
	16.00	8.20	0.80		1.20	0.50		825.3	0.90	0.879	104408	
<b>A</b>	16.00	8.20	0.90		1.25	0.39		1013.0	0.99	0.990	104410	
	18.00	6.20	0.40		1.00	1.50		138.7	0.55	0.675	104417	
	18.00	6.20	0.50		1.10	1.20		245.5	0.65	0.846	104420	
	18.00	6.20	0.60		1.20	1.00		400.4	0.75	1.020	104422	
	18.00	6.20	0.70		1.25	0.79		552.6	0.84	1.180	104424	
	18.00	6.20	0.80		1.30	0.63		725.7	0.92	1.350	104426	
	18.00	8.20	0.50		1.10	1.20		264.7	0.65	0.756	104428	
	18.00	8.20	0.70		1.25	0.79		596.0	0.84	1.050	104431	
	18.00	8.20	0.80		1.30	0.63		782.7	0.92	1.210	104436	
	18.00	8.20	1.00		1.40	0.40		1181.0	1.10	1.540	104499	
<b>C</b>	18.00	9.20	0.45		1.05	1.33		213.7	0.60	0.631	104437	
<b>B</b>	18.00	9.20	0.70		1.20	0.71		566.4	0.82	0.979	104439	
<b>A</b>	18.00	9.20	1.00		1.40	0.40		1254.0	1.10	1.400	104504	
	20.00	8.20	0.50		1.15	1.30		231.1	0.66	0.982	104441	
	20.00	8.20	0.60		1.30	1.17		412.1	0.77	1.180	104444	
	20.00	8.20	0.70		1.35	0.93		570.2	0.86	1.370	104445	
	20.00	8.20	0.80		1.40	0.75		751.1	0.95	1.570	104447	
	20.00	8.20	0.90		1.45	0.61		953.6	1.04	1.770	104450	
	20.00	8.20	1.00		1.55	0.55		1295.0	1.14	1.960	104506	
	20.00	10.20	0.40		0.90	1.25		98.5	0.52	0.691	104451	
<b>C</b>	20.00	10.20	0.50		1.15	1.30		254.1	0.66	0.866	104456	
<b>B</b>	20.00	10.20	0.80		1.35	0.69		744.8	0.94	1.380	104459	
	20.00	10.20	0.90		1.45	0.61		1050.0	1.04	1.560	104463	
	20.00	10.20	1.00		1.55	0.55		1425.0	1.14	1.730	104513	

<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$l_0$ [mm]	$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	$F(0.75h_0)$ [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]								
A	20.00	10.20	1.10		1.55	0.41		1521.0	1.21	1.910	104518	
	20.00	10.20	1.20		1.55	0.29		1516.0	1.29	2.080	104520	
	20.00	10.20	1.50		1.80	0.20		2576.0	1.57	2.520	104544	
C	22.50	11.20	0.60		1.40	1.33		425.5	0.80	1.350	104464	
B	22.50	11.20	0.80		1.45	0.81		707.5	0.96	1.790	104466	
A	22.50	11.20	1.25		1.75	0.40		1929.0	1.37	2.810	104546	
	23.00	8.20	0.70		1.50	1.14		543.6	0.90	1.910	104468	
	23.00	8.20	0.80		1.55	0.94		718.6	0.99	2.190	104470	
	23.00	8.20	0.90		1.60	0.78		919.0	1.07	2.470	104474	
	23.00	8.20	1.00		1.70	0.70		1240.0	1.17	2.740	104521	
	23.00	10.20	0.90		1.65	0.83		1058.0	1.09	2.260	104477	
	23.00	10.20	1.00		1.70	0.70		1315.0	1.17	2.510	104522	
	23.00	10.20	1.25		1.90	0.52		2310.0	1.41	3.150	104550	
	23.00	12.20	1.00		1.60	0.60		1217.0	1.15	2.230	104524	
	23.00	12.20	1.25		1.85	0.48		2331.0	1.40	2.800	104554	
	23.00	12.20	1.50		2.10	0.40		3986.0	1.65	3.360	104558	
	25.00	10.20	1.00		1.75	0.75		1172.0	1.19	3.090	104525	
C	25.00	12.20	0.70		1.60	1.29		599.7	0.92	1.960	104478	
B	25.00	12.20	0.90		1.60	0.78		862.3	1.07	2.530	104480	
	25.00	12.20	1.00		1.80	0.80		1359.0	1.20	2.810	104526	
	25.00	12.20	1.25		1.95	0.56		2214.0	1.42	3.520	104563	
A	25.00	12.20	1.50		2.05	0.37		2926.0	1.64	4.120	104565	
	28.00	10.20	0.80		1.75	1.19		661.5	1.04	3.240	104484	
	28.00	10.20	1.00		1.90	0.90		1130.0	1.22	4.050	104528	
	28.00	10.20	1.25		2.05	0.64		1853.0	1.45	5.080	104575	
	28.00	10.20	1.50		2.20	0.47		2723.0	1.67	6.100	104579	
	28.00	12.20	1.00		1.95	0.95		1266.0	1.24	3.780	104529	
	28.00	12.20	1.25		2.10	0.68		2083.0	1.46	4.730	104582	
	28.00	12.20	1.50		2.25	0.50		3077.0	1.69	5.680	104586	
C	28.00	14.20	0.80		1.80	1.25		801.4	1.05	2.750	104486	
B	28.00	14.20	1.00		1.80	0.80		1107.0	1.20	3.450	104530	
	28.00	14.20	1.25		2.10	0.68		2240.0	1.46	4.320	104590	
A	28.00	14.20	1.50		2.15	0.43		2841.0	1.66	5.190	104592	
	31.50	12.20	1.00		2.10	1.10		1167.0	1.27	5.020	104532	

<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$l_0$ [mm]	$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	F(0.75 $h_0$ ) [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]								
	31.50	12.20	1.25		2.20	0.76		1805.0	1.49	6.29	104598	
	31.50	12.20	1.50		2.35	0.57		2688.0	1.71	7.56	104599	
C	31.50	16.30	0.80		1.85	1.31		686.9	1.06	3.43	104488	
B	31.50	16.30	1.25		2.15	0.72		1913.0	1.47	5.39	104602	
	31.50	16.30	1.50		2.40	0.60		3230.0	1.72	6.47	104611	
A	31.50	16.30	1.75		2.45	0.40		3871.0	1.92	7.56	104616	
	31.50	16.30	2.00		2.75	0.38		6173.0	2.19	8.64	104627	
	34.00	12.20	1.00		2.25	1.25		1172.0	1.31	6.01	104533	
	34.00	12.20	1.25		2.35	0.88		1815.0	1.52	7.41	104638	
	34.00	12.20	1.50		2.50	0.67		2721.0	1.75	9.10	104639	
	34.00	14.30	1.25		2.40	0.92		1993.0	1.54	7.10	104643	
	34.00	14.30	1.50		2.55	0.70		2990.0	1.76	8.42	104646	
	34.00	16.30	1.50		2.55	0.70		3155.0	1.76	7.86	104651	
	34.00	16.30	2.00		2.85	0.43		5782.0	2.21	10.30	104658	
C	35.50	18.30	0.90		2.05	1.28		832.0	1.19	4.94	104498	
B	35.50	18.30	1.25		2.25	0.80		1699.0	1.50	6.88	104663	
A	35.50	18.30	2.00		2.80	0.40		5187.0	2.20	11.00	104669	
	40.00	14.20	1.25		2.65	1.12		1778.0	1.60	9.80	104677	
	40.00	14.20	1.50		2.75	0.83		2542.0	1.81	12.35	104680	
	40.00	14.20	2.00		3.05	0.53		4763.0	2.26	16.30	104681	
	40.00	16.30	1.50		2.80	0.87		2749.0	1.82	12.00	104682	
	40.00	16.30	2.00		3.10	0.55		5169.0	2.27	16.00	104684	
	40.00	18.30	2.00		3.15	0.58		5656.0	2.29	15.20	104692	
C	40.00	20.40	1.00		2.30	1.30		1017.0	1.32	7.00	104535	
B	40.00	20.40	1.50		2.65	0.77		2622.0	1.79	10.60	104694	
	40.00	20.40	2.00		3.10	0.55		5701.0	2.27	14.20	104699	
A	40.00	20.40	2.25		3.15	0.40		6500.0	2.47	16.00	104705	
	40.00	20.40	2.50		3.45	0.38		9390.0	2.74	17.70	104714	
C	45.00	22.40	1.25		2.85	1.28		1891.0	1.65	11.40	104726	
B	45.00	22.40	1.75		3.05	0.74		3646.0	2.07	16.00	104731	
A	45.00	22.40	2.50		3.50	0.40		7716.0	2.75	22.90	104737	
	50.00	18.30	1.25		2.85	1.28		1373.0	1.65	16.30	104741	
	50.00	18.30	1.50		3.30	1.20		2603.0	1.95	19.18	104742	
	50.00	18.30	2.00		3.50	0.75		4567.0	2.37	25.31	104746	

<sup>1)</sup> 1,000 items



Series	Dimensions (size ordered)					$l_0$ [mm]	$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	$F(0.75h_0)$ [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]								
	50.00	18.30	2.50		3.85	0.54		7715	2.84	31.80	104748	
	50.00	18.30	3.00		4.00	0.33		9609	3.25	39.30	104750	
	50.00	20.40	2.00		3.50	0.75		4687	2.37	24.30	104752	
	50.00	20.40	2.50		3.85	0.54		7919	2.84	30.60	104754	
	50.00	22.40	2.00		3.60	0.80		5222	2.40	23.40	104759	
	50.00	22.40	2.50		3.90	0.56		8510	2.85	29.30	104760	
<b>C</b>	50.00	25.40	1.25		2.85	1.28		1550	1.65	13.90	104766	
	50.00	25.40	1.50		3.10	1.07		2512	1.90	16.70	104769	
<b>B</b>	50.00	25.40	2.00		3.40	0.70		4762	2.35	22.30	104774	
	50.00	25.40	2.25		3.75	0.67		7217	2.62	25.10	104778	
	50.00	25.40	2.50		3.90	0.56		9063	2.85	27.90	104780	
<b>A</b>	50.00	25.40	3.00		4.10	0.37		11977	3.27	33.50	104790	
<b>C</b>	56.00	28.50	1.50		3.45	1.30		2622	1.99	20.90	104807	
<b>B</b>	56.00	28.50	2.00		3.60	0.80		4438	2.40	27.90	104812	
	56.00	28.50	2.50		4.20	0.68		8978	2.92	35.00	104816	
<b>A</b>	56.00	28.50	3.00		4.30	0.43		11388	3.32	42.14	104818	
	60.00	20.40	2.00		4.10	1.05		4727	2.52	38.50	104825	
	60.00	20.40	2.50		4.30	0.72		7297	2.95	48.20	104827	
	60.00	20.40	3.00		4.70	0.57		11569	3.42	57.80	104830	
	60.00	25.50	2.50		4.40	0.76		8175	2.97	44.50	104833	
	60.00	25.50	3.00		4.65	0.55		11784	3.41	53.50	104836	
	60.00	30.50	2.50		4.50	0.80		9432	3.00	40.20	104841	
	60.00	30.50	2.75		4.75	0.73		12356	3.25	44.20	104849	
	60.00	30.50	3.00		4.70	0.57		13226	3.42	48.20	104853	
	60.00	30.50	3.50		5.00	0.43		18153	3.87	56.30	104860	
<b>C</b>	63.00	31.00	1.80		4.15	1.31		4238	2.39	31.70	104868	
<b>B</b>	63.00	31.00	2.50		4.25	0.70		7189	2.94	45.30	104870	
	63.00	31.00	3.00		4.80	0.60		12536	3.45	52.90	104876	
<b>A</b>	63.00	31.00	3.50		4.90	0.40		15025	3.85	62.00	104878	
	70.00	25.50	2.00		4.50	1.25		4437	2.62	51.50	104882	
	70.00	30.50	2.50		4.90	0.96		8031	3.10	60.00	104886	
	70.00	30.50	3.00		5.10	0.70		11426	3.52	72.10	104889	
	70.00	35.50	3.00		5.10	0.70		12288	3.52	64.50	104890	
	70.00	35.50	3.50		5.30	0.51		16177	3.95	75.50	104896	

<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	F(0.75 $h_0$ ) [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]	$l_0$ [mm]						
	70.00	35.50	4.00		5.80	0.45		23923	4.45	88.00	104983
	70.00	35.50	4.00	3.75	5.80		0.59	23923	4.45	82.50	105006
	70.00	40.50	4.00		5.60	0.40		23351	4.40	78.61	104984
	70.00	40.50	4.00	3.75	5.60		0.53	23351	4.40	73.70	105014
	70.00	40.50	5.00		6.20	0.24		33672	5.30	98.26	104985
	70.00	40.50	5.00	4.60	6.20		0.39	33672	5.30	90.40	105017
<b>C</b>	71.00	36.00	2.00		4.60	1.30		5144	2.65	45.20	104899
<b>B</b>	71.00	36.00	2.50		4.50	0.80		6725	3.00	56.50	104903
<b>A</b>	71.00	36.00	4.00		5.60	0.40		20535	4.40	90.70	104912
	71.00	36.00	4.00	3.75	5.60		0.53	20535	4.40	85.00	105025
	80.00	31.00	2.50		5.30	1.12		7239	3.20	81.20	104913
	80.00	31.00	3.00		5.50	0.83		10352	3.62	97.00	104917
	80.00	31.00	4.00		6.10	0.53		19394	4.52	126.10	104986
	80.00	31.00	4.00	3.75	6.10		0.67	19394	4.52	124.00	105029
	80.00	36.00	3.00		5.70	0.90		11919	3.67	91.00	104918
	80.00	36.00	4.00		6.20	0.55		21400	4.55	123.70	104987
	80.00	36.00	4.00	3.75	6.20		0.70	21400	4.55	116.00	105031
<b>C</b>	80.00	41.00	2.25		5.20	1.31		6613	2.99	64.70	104921
<b>B</b>	80.00	41.00	3.00		5.30	0.77		10518	3.57	84.00	104923
	80.00	41.00	4.00		6.20	0.55		22874	4.55	114.10	104988
	80.00	41.00	4.00	3.75	6.20		0.70	22874	4.55	107.00	105032
<b>A</b>	80.00	41.00	5.00		6.70	0.34		33559	5.42	143.00	104928
	80.00	41.00	5.00	4.70	6.70		0.46	33559	5.42	131.00	105036
<b>C</b>	90.00	46.00	2.50		5.70	1.28		7684	3.30	90.50	104931
<b>B</b>	90.00	46.00	3.50		6.00	0.71		14161	4.12	124.50	104942
<b>A</b>	90.00	46.00	5.00		7.00	0.40		31354	5.50	181.00	104946
	90.00	46.00	5.00	4.70	7.00		0.53	31354	5.50	170.00	105048
	100.00	41.00	4.00		7.20	0.80		20521	4.80	202.70	104989
	100.00	41.00	4.00	3.75	7.20		0.97	20521	4.80	190.00	105055
	100.00	41.00	5.00		7.75	0.55		32361	5.69	252.60	104990
	100.00	41.00	5.00	4.75	7.75		0.67	32361	5.69	240.00	105056
<b>C</b>	100.00	51.00	2.70		6.20	1.30		8609	3.57	121.00	104947
<b>B</b>	100.00	51.00	3.50		6.30	0.80		13070	4.20	157.00	104951
	100.00	51.00	4.00		7.00	0.75		20674	4.75	179.20	104991

<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	$F(0.75h_0)$ [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]	$l_0$ [mm]						
	100.00	51.00	4.00	3.75	7.00		0.92	20674	4.75	168.0	105058
	100.00	51.00	5.00		7.80	0.56		36339	5.70	224.2	104993
	100.00	51.00	5.00	4.75	7.80		0.68	36339	5.70	213.0	105061
A	100.00	51.00	6.00		8.20	0.37		48022	6.55	265.7	104954
	100.00	51.00	6.00	5.60	8.20		0.50	48022	6.55	251.0	105066
C	112.00	57.00	3.00		6.90	1.30		10484	3.97	169.0	104956
B	112.00	57.00	4.00		7.20	0.80		17752	4.80	226.0	104962
	112.00	57.00	4.00	3.75	7.20		0.97	17752	4.80	212.0	105071
A	112.00	57.00	6.00		8.50	0.42		43707	6.62	339.0	104964
	112.00	57.00	6.00	5.60	8.50		0.56	43707	6.62	316.0	105073
	125.00	41.00	4.00		8.20	1.05		17346	5.05	339.2	104995
	125.00	41.00	4.00	3.75	8.20		1.24	17346	5.05	318.0	105078
	125.00	51.00	4.00		8.50	1.13		19817	5.12	316.8	104996
	125.00	51.00	4.00	3.75	8.50		1.33	19817	5.12	297.0	105080
	125.00	51.00	5.00		8.90	0.78		30669	5.97	396.8	104997
	125.00	51.00	5.00	4.70	8.90		0.95	30669	5.97	373.0	105085
	125.00	51.00	6.00		9.40	0.57		44307	6.85	475.7	104998
	125.00	51.00	6.00	5.60	9.40		0.73	44307	6.85	444.0	105087
	125.00	61.00	5.00		9.00	0.80		33966	6.00	361.7	104999
	125.00	61.00	5.00	4.70	9.00		0.97	33966	6.00	340.0	105091
	125.00	61.00	6.00		9.60	0.60		50722	6.90	433.9	105000
	125.00	61.00	6.00	5.60	9.60		0.77	50722	6.90	405.0	105092
	125.00	61.00	8.00	7.60	10.90		0.46	93577	8.72	550.0	105098
C	125.00	64.00	3.50		8.00	1.29		15416	4.62	245.0	104965
B	125.00	64.00	5.00		8.50	0.70		29908	5.87	350.0	104973
	125.00	64.00	5.00	4.70	8.50		0.86	29908	5.87	329.0	105102
	125.00	64.00	6.00		9.60	0.60		52155	6.90	420.0	105001
	125.00	64.00	6.00	5.60	9.60		0.77	52155	6.90	392.0	105106
	125.00	64.00	7.00	6.55	10.00		0.57	67216	7.75	458.0	105107
A	125.00	64.00	8.00	7.50	10.60		0.45	85930	8.65	525.0	105109
	125.00	71.00	6.00		9.30	0.55		51217	6.82	385.7	105002
	125.00	71.00	6.00	5.60	9.30		0.71	51217	6.82	360.0	105116
	125.00	71.00	8.00	7.40	10.40		0.45	85490	8.60	475.0	113218
	125.00	71.00	10.00	9.20	11.80		0.32	124120	10.45	591.0	105122

<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$h_0/t$ [-]	$K_4 \cdot (h_0'/t')$ [-]	F(0.75 $h_0$ ) [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]	$l_0$ [mm]						
C	140.00	72.00	3.80		8.70	1.29		17195	5.02	333.0	104974
	140.00	72.00	3.80	3.80	8.70		1.37	19774	5.02	333.0	105125
B	140.00	72.00	5.00		9.00	0.80		27920	6.00	438.3	104976
	140.00	72.00	5.00	4.70	9.00		0.97	27920	6.00	412.0	105132
A	140.00	72.00	8.00	7.50	11.20		0.53	85250	8.80	657.0	105137
	150.00	61.00	5.00		10.30	1.06		31041	6.32	572.9	105003
	150.00	61.00	5.00	4.80	10.30		1.18	31041	6.32	550.0	105140
	150.00	61.00	6.00		10.80	0.80		45456	7.20	686.9	105004
	150.00	61.00	6.00	5.80	10.80		0.89	45456	7.20	664.0	105144
	150.00	71.00	6.00		10.80	0.80		48155	7.20	638.2	105005
	150.00	71.00	6.00	5.65	10.80		0.96	48155	7.20	601.0	105147
	150.00	71.00	8.00	7.50	12.00		0.64	89850	9.00	797.0	105154
	150.00	81.00	8.00	7.50	11.70		0.60	89630	8.92	727.0	105158
	150.00	81.00	10.00	9.30	13.00		0.44	139100	10.75	901.0	105161
C	160.00	82.00	4.30		9.90	1.30		21843	5.70	494.0	104977
	160.00	82.00	4.30	4.30	9.90		1.38	25119	5.70	494.0	105164
B	160.00	82.00	6.00		10.50	0.75		41008	7.12	681.0	104978
	160.00	82.00	6.00	5.60	10.50		0.93	41008	7.12	644.0	105169
A	160.00	82.00	10.00	9.40	13.50		0.47	138330	10.87	1080.0	105172
C	180.00	92.00	4.80		11.00	1.29		26442	6.35	700.0	104979
	180.00	92.00	4.80	4.80	11.00		1.37	30409	6.35	700.0	105174
B	180.00	92.00	6.00		11.10	0.85		37502	7.27	864.0	104980
	180.00	92.00	6.00	5.60	11.10		1.04	37502	7.27	817.0	105177
A	180.00	92.00	10.00	9.40	14.00		0.53	125420	11.00	1370.0	105179
	180.00	92.00	13.00	12.10	16.50		0.40	237880	13.87	1770.0	105185
	200.00	82.00	8.00	7.60	14.20		0.91	78034	9.55	1540.0	105186
	200.00	82.00	10.00	9.45	15.50		0.68	129450	11.37	1920.0	105188
	200.00	82.00	12.00	11.35	16.60		0.49	182740	13.15	2310.0	105191
	200.00	92.00	10.00	9.50	15.60		0.68	137690	11.40	1830.0	105192
	200.00	92.00	12.00	11.40	16.80		0.50	199270	13.20	2190.0	105195
	200.00	92.00	14.00	13.20	18.10		0.40	267230	15.02	2540.0	105197
C	200.00	102.00	5.50		12.50	1.27		36111	7.25	993.0	104982
	200.00	102.00	5.50	5.50	12.50		1.35	41528	7.25	993.0	105199
B	200.00	102.00	8.00	7.50	13.60		0.87	76378	9.40	1350.0	105203

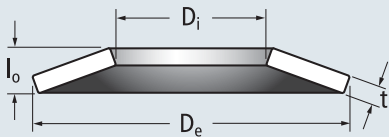
<sup>1)</sup> 1,000 items

Series	Dimensions (size ordered)					$h_0/t$ [-]	$K_4(h_0'/t')$ [-]	$F(0.75h_0)$ [N]	$l_t$ [mm]	Weight <sup>1)</sup> [kg]	cb part number
	$D_e$ [mm]	$D_i$ [mm]	$t$ [mm]	$t'$ [mm]	$l_0$ [mm]						
	200.00	102.00	10.00	9.40	15.60		0.70	145360	11.40	1700	105207
A	200.00	102.00	12.00	11.25	16.20		0.48	183020	13.05	2030	105209
	200.00	102.00	14.00	13.10	18.20		0.42	289180	15.05	2360	105211
	200.00	112.00	12.00	11.10	16.20		0.50	195830	13.05	1860	105214
	200.00	112.00	14.00	12.90	17.50		0.40	256760	14.87	2130	105215
	200.00	112.00	16.00	14.70	18.80		0.31	305100	16.70	2410	105217
	225.00	112.00	6.00	6.00	13.60		1.34	45501	7.90	1390	105219
C	225.00	112.00	6.50	6.20	13.60		1.24	44580	8.27	1436	105220
B	225.00	112.00	8.00	7.50	14.50		0.99	70749	9.62	1700	105221
A	225.00	112.00	12.00	11.25	17.00		0.55	171020	13.25	2620	105223
	225.00	112.00	16.00	15.00	20.50		0.40	359590	17.12	3490	105227
	250.00	102.00	10.00	9.70	18.00		0.88	126390	12.00	3030	105228
	250.00	102.00	12.00	11.25	19.00		0.74	182960	13.75	3580	105229
	250.00	127.00	6.50	6.50	14.80		1.35	51962	8.57	1840	105231
C	250.00	127.00	7.00	6.70	14.80		1.25	50466	8.95	1897	105232
B	250.00	127.00	10.00	9.40	17.00		0.86	119050	11.75	2610	105233
	250.00	127.00	12.00	11.30	19.30		0.75	210810	13.82	3150	105235
A	250.00	127.00	14.00	13.10	19.60		0.54	248830	15.40	3660	105239
	250.00	127.00	16.00	15.10	21.80		0.48	383020	17.45	4280	105240
	265.00	136.00	14.70	14.70	20.50		0.42	307084	16.15	4673	112600 <sup>2)</sup>
	280.00	141.00	15.50	15.50	21.70		0.43	340946	17.05	5576	112601 <sup>2)</sup>
	300.00	151.00	16.70	16.70	23.30		0.42	395086	18.35	6900	112602 <sup>2)</sup>
	315.00	161.00	17.50	17.50	24.40		0.42	435093	19.23	7888	112603 <sup>2)</sup>
	335.00	171.00	18.60	18.60	25.90		0.42	488165	20.43	9487	112604 <sup>2)</sup>
	355.00	181.20	19.70	19.70	27.50		0.42	552076	21.65	11280	112605 <sup>2)</sup>
	375.00	191.20	20.80	20.80	29.00		0.42	611676	22.85	13310	112606 <sup>2)</sup>
	400.00	201.20	22.20	22.20	31.00		0.43	695912	24.40	16320	112607 <sup>2)</sup>
	425.00	216.20	23.60	23.60	32.90		0.42	787330	25.93	19440	112608 <sup>2)</sup>
	450.00	231.20	25.00	25.00	34.80		0.42	885446	27.45	22920	112609 <sup>2)</sup>
	475.00	241.20	26.40	26.40	36.80		0.42	986130	29.00	27200	112610 <sup>2)</sup>
	500.00	251.40	27.80	27.80	38.80		0.42	1092899	30.55	31950	112611 <sup>2)</sup>
	530.00	271.40	29.50	29.50	41.10		0.42	1238991	32.40	37620	112612 <sup>2)</sup>
	560.00	281.40	31.10	31.10	43.50		0.43	1375075	34.20	44850	112613 <sup>2)</sup>
	600.00	301.40	33.30	33.30	46.60		0.43	1577004	36.63	55150	112614 <sup>2)</sup>

<sup>1)</sup> 1,000 items

<sup>2)</sup> no warehouse storage

## cb disc springs corrosion-resistant made from X10CrNi18-8 (1.4310)



**X10CrNi18-8** (1.4310) is, in accordance with the DIN EN 10 151 standard, corrosion-resistant spring steel that is distinctive for its resistance to certain chemically aggressive substances. It derives its spring behaviour via strain hardening.

**X10CrNi18-8** (1.4310) only gains its resistance from strain hardening. This is why it is generally only used up to a thickness of 2 to 2.5 mm. From roughly 100°C onwards, depending on the degree of hardness increase, a clear reduction in strain hardening begins. This is why this material should not be used in higher temperatures.

In its soft state, the material **X10CrNi18-8** (1.4310) is scarcely magnetizable. Through strain hardening, **X10CrNi18-8** (1.4310) becomes more or less powerfully magnetizable.

Dimensions (size ordered)								
D <sub>e</sub> [mm]	D <sub>i</sub> [mm]	t [mm]	l <sub>0</sub> [mm]	h <sub>0</sub> /t [-]	F(0.75h <sub>0</sub> ) [N]	l <sub>t</sub> [mm]	Weight <sup>1)</sup> [kg]	cb part number
6.0	3.2	0.3	0.45	0.50	109.9	0.34	0.047	112650
8.0	3.2	0.5	0.70	0.40	329.6	0.55	0.166	105578
8.0	4.2	0.3	0.50	0.67	83.9	0.35	0.087	105579
8.0	4.2	0.4	0.60	0.50	193.3	0.45	0.115	105580
10.0	5.2	0.4	0.65	0.63	156.9	0.46	0.180	105581
10.0	5.2	0.5	0.70	0.40	236.8	0.55	0.210	105582
12.0	4.2	0.4	0.80	1.00	164.5	0.50	0.300	105583
12.0	4.2	0.5	0.80	0.60	220.1	0.57	0.390	105584
12.0	6.2	0.5	0.85	0.70	301.0	0.59	0.330	105585
12.5	6.2	0.5	0.85	0.70	270.7	0.59	0.360	105586
12.5	6.2	0.7	0.95	0.36	502.6	0.76	0.474	105587
14.0	7.2	0.8	1.10	0.38	735.0	0.87	0.667	105589
15.0	8.2	0.8	1.25	0.56	1029.4	0.91	0.730	105590
16.0	8.2	0.6	1.05	0.75	378.2	0.71	0.700	105591
16.0	8.2	0.9	1.25	0.39	934.2	0.99	1.050	105592
18.0	9.2	0.7	1.20	0.71	522.4	0.82	1.090	105593
18.0	9.2	1.0	1.40	0.40	1156.8	1.10	1.480	105594
20.0	8.2	0.5	1.15	1.30	212.9	0.66	1.050	105595
20.0	10.2	0.6	1.20	1.00	342.0	0.75	1.110	105596
20.0	10.2	0.8	1.35	0.69	690.1	0.94	1.400	105597
20.0	10.2	0.9	1.40	0.56	872.0	1.02	1.650	105598
20.0	10.2	1.0	1.55	0.55	1314.6	1.14	1.730	105599
20.0	10.2	1.1	1.55	0.41	1402.7	1.21	2.000	105600
25.0	12.2	0.9	1.60	0.78	795.3	1.07	2.640	105601
25.0	12.2	1.5	1.90	0.27	1943.7	1.60	4.430	105602
28.0	14.2	1.0	1.80	0.80	1021.1	1.20	3.600	105603
28.0	14.2	1.5	2.15	0.43	2620.3	1.66	5.380	105604

<sup>1)</sup> 1,000 items

## cb disc springs corrosion-resistant made from X7CrNiAl17-7 (1.4568)

**X7CrNiAl17-7** (1.4568) is, in accordance with the DIN EN 10 151 standard, a spring steel characterised by its resistance to certain chemically aggressive substances. It derives its spring behaviour via strain hardening and/or heat treatment.

Up to a thickness of 2.5 mm (and up to 3.0 mm with larger amounts), a simple hardening process (artificial ageing at 480 °C) is also carried out alongside the strain hardening, which gives the material heat resistance up to 350 °C. The increase in resistance achieved through artificial ageing has the advantage that when the final resistance is the same, a lower strain hardening than with X10CrNi18-8 (1.4310) is required. This has a positive effect on corrosion behaviour.

The material **X7CrNiAl17-7** (1.4568) is processed in thicknesses >2.5 mm (3.0 mm), in a soft, solution-annealed state. The necessary resistance is then achieved via two sessions of artificial ageing. Since the first artificial ageing process has to take place at a temperature of 760 °C, chromium carbide excretions occur here – primarily on grain boundaries. This considerably reduces the corrosion resistance of the material. Springs in structurally annealed condition should only be used if there are requirements placed on heat resistance. These springs must never be de-greased in an acidic medium.

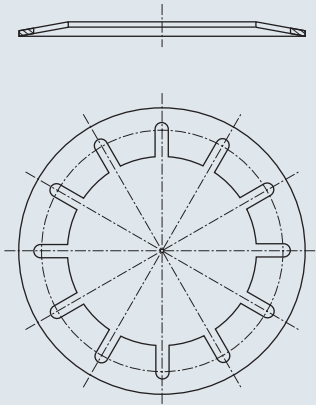
In its soft state, the material **X7CrNiAl17-7** (1.4568) is clearly magnetizable. The magnetizability is increased still further by strain hardening.



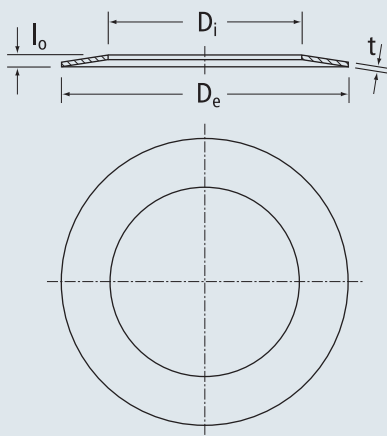
Dimensions (size ordered)								
D <sub>e</sub> [mm]	D <sub>i</sub> [mm]	t [mm]	l <sub>0</sub> [mm]	h <sub>0</sub> /t [-]	F(0.75h <sub>0</sub> ) [N]	l <sub>t</sub> [mm]	Weight <sup>1)</sup> [kg]	cb part number
31.5	16.3	1.25	2.00	0.60	1512.3	1.44	5.4	105531
31.5	16.3	1.75	2.30	0.31	2925.5	1.89	7.6	105534
35.5	18.3	1.25	2.15	0.72	1458.7	1.47	6.9	105535
35.5	18.3	2.00	2.65	0.33	4057.7	2.16	11.0	105536
40.0	20.4	1.50	2.45	0.63	2046.3	1.74	10.4	105537
40.0	20.4	2.00	2.80	0.40	3939.8	2.20	14.2	105539
40.0	20.4	2.25	2.95	0.31	4861.2	2.42	16.0	105540
45.0	22.4	1.75	2.80	0.60	2780.2	2.01	16.0	105542
45.0	22.4	2.50	3.30	0.32	5940.3	2.70	22.9	105543
50.0	25.4	1.50	3.10	1.07	2438.7	1.90	16.7	105559
50.0	25.4	2.00	3.15	0.58	3710.0	2.29	22.3	105544
50.0	25.4	2.50	3.50	0.40	6141.1	2.75	27.9	105545
56.0	28.5	2.00	3.40	0.70	3689.9	2.35	27.9	105546
56.0	28.5	3.00	4.05	0.35	8842.0	3.26	42.0	105548
63.0	31.0	2.50	3.95	0.58	5654.2	2.86	45.3	105551
80.0	41.0	3.00	4.90	0.63	8210.0	3.47	85.7	105556

<sup>1)</sup> 1,000 items

## cb ball-bearing disc springs



Slotted version.



Plain version.

These special disc springs were developed in close cooperation with leading ball-bearing manufacturers. They are used for the axial pre-loading of deep-groove ball-bearings (clearance compensation), where they bridge tolerance deviations in the bearing bed. The cb ball-bearing disc springs have a noise reduction effect and prolong the life of the ball-bearing. Up to an external spring diameter of 94.5 mm, there are two variants available. Variant 1 has a slotted internal diameter and has especially long spring travel combined with low spring force. Variant 2 is plain and delivers high spring force with short spring travel. For external diameters larger than 94.5 mm a series of plain cb ball-bearing disc springs has been continued.

In the interests of large compensation travel, a form of spring characteristic curve has been selected that is sharply degressive, or even displays a clear maximum power. For this reason, stacking of cb ball-bearing disc springs in series is not recommended. Parallel stacking to multiply spring force is however quite possible. When stacking springs in parallel, friction will be inherent and result in mechanical hysteresis. cb ball-bearing disc springs are made from spring steels in accordance with the DIN EN 10 132-4 standard, but for special requirements all materials can be used. In this case we recommend that you contact our technical experts.

The mechanical stresses that arise inside the ball-bearing disc springs are relatively low. This ensures that no major setting behaviour occurs when the parts are pressed flat. This makes it possible to dispense with the setting process, so that the component can be produced more cost effectively.



Installation site of a cb ball-bearing disc spring.



Ball-bearing disc spring for ball-bearing type			Dimensions (size ordered)				F(0.50 h <sub>0</sub> )		F(0.75 h <sub>0</sub> )		Weight <sup>1)</sup> [kg]	cb part number
			D <sub>e</sub> <sup>3)</sup> [mm]	D <sub>i</sub> <sup>3)</sup> [mm]	t [mm]	l <sub>0</sub> [mm]	s [mm]	F [N]	s [mm]	F [N]		
	623		9.8	6.2	0.15	0.60	0.23	9	0.35	13	0.050	105245
			9.8	6.2	0.20	0.40	0.10	19	0.15	24	0.072	105248
	624		12.8	7.2	0.20	0.65	0.23	16	0.35	18	0.130	105249
			12.8	7.2	0.25	0.50	0.12	24	0.19	29	0.173	105251
	625	634	15.8	8.2	0.25	0.75	0.25	17	0.40	20	0.280	105253
			15.8	8.2	0.25	0.55	0.15	20	0.22	23	0.281	105256
	626	635	18.8	9.2	0.25	1.00	0.38	17	0.55	20	0.340	105259
			18.8	9.2	0.30	0.65	0.17	26	0.26	31	0.500	105260
	607		18.8	10.2	0.25	1.05	0.40	19	0.60	24	0.350	105261
			18.8	10.2	0.35	0.70	0.17	40	0.26	51	0.540	105263
	608	627	21.8	12.3	0.25	1.25	0.50	19	0.75	24	0.420	105265
			21.8	12.3	0.35	0.75	0.20	38	0.30	46	0.700	105267
	609		23.7	14.3	0.30	1.30	0.50	21	0.75	25	0.660	105273
			23.7	14.3	0.40	0.90	0.25	69	0.37	80	0.880	105276
6000		629	25.7	14.3	0.30	1.40	0.55	24	0.80	28	0.700	105277
			25.7	14.3	0.40	0.90	0.25	54	0.37	64	1.130	105278
6001			27.7	17.3	0.35	1.45	0.55	25	0.80	31	0.790	105281
			27.7	17.3	0.40	1.00	0.30	73	0.45	80	1.170	105283
	6200		29.7	17.3	0.35	1.55	0.60	26	0.90	32	1.200	105285
			29.7	17.3	0.40	1.10	0.35	80	0.52	82	1.430	105287
6002	6201		31.7	20.4	0.35	1.55	0.60	27	0.90	33	1.020	105289
			31.7	20.4	0.40	1.10	0.35	79	0.52	81	1.470	105292
		6300	34.6	20.4	0.40	1.65	0.65	27	1.00	32	1.650	105293
			34.6	20.4	0.40	1.10	0.35	60	0.52	61	1.930	105294
6003	6202		34.6	22.4	0.35	1.55	0.60	27	0.90	32	1.200	105295
			34.6	22.4	0.50	1.20	0.35	106	0.52	119	2.140	105296
		6301	36.6	20.4	0.40	1.90	0.75	31	1.10	35	2.280	105299
			36.6	20.4	0.50	1.30	0.40	103	0.60	111	2.850	105300
	6203		39.6	25.5	0.40	1.90	0.75	33	1.10	37	1.920	105302
			39.6	25.5	0.50	1.30	0.40	103	0.60	111	2.820	105303
6004		6302	41.6	25.5	0.45	2.05	0.80	34	1.20	39	2.500	105304
			41.6	25.5	0.50	1.40	0.45	113	0.67	114	3.340	105305
6005	6204	6303	46.5	30.5	0.45	2.05	0.80	39	1.20	44	2.840	105307
			46.5	30.5	0.60	1.50	0.45	140	0.67	155	4.540	105309

<sup>1)</sup> 1,000 items

**Bold type = slotted version**

<sup>3)</sup> Values when pressed flat

Ball-bearing disc spring for ball-bearing type			Dimensions (size ordered)				F(0.50 h <sub>0</sub> )		F(0.75 h <sub>0</sub> )		Weight <sup>1)</sup> [kg]	cb part number
			D <sub>e</sub> <sup>3)</sup> [mm]	D <sub>i</sub> <sup>3)</sup> [mm]	t [mm]	l <sub>0</sub> [mm]	s [mm]	F [N]	s [mm]	F [N]		
	6205	6304	<b>51.5</b>	<b>35.5</b>	<b>0.45</b>	<b>2.10</b>	<b>0.85</b>	<b>42</b>	<b>1.25</b>	<b>47</b>	3.070	105314
			51.5	35.5	0.60	1.50	0.45	124	0.67	135	5.150	105316
6006			<b>54.5</b>	<b>40.5</b>	<b>0.45</b>	<b>2.15</b>	<b>0.85</b>	<b>48</b>	<b>1.30</b>	<b>53</b>	3.200	105321
			54.5	40.5	0.60	1.50	0.45	127	0.67	140	4.920	105324
6007	6206	6305	<b>61.5</b>	<b>40.5</b>	<b>0.55</b>	<b>2.55</b>	<b>1.00</b>	<b>49</b>	<b>1.50</b>	<b>54</b>	5.840	105325
			61.5	40.5	0.70	1.80	0.55	164	0.82	186	9.250	105326
6008			<b>67.5</b>	<b>50.5</b>	<b>0.50</b>	<b>2.60</b>	<b>1.05</b>	<b>76</b>	<b>1.60</b>	<b>78</b>	5.500	105330
			67.5	50.5	0.70	1.70	0.50	143	0.75	160	8.650	105331
		6306	<b>71.5</b>	<b>45.5</b>	<b>0.60</b>	<b>2.90</b>	<b>1.15</b>	<b>71</b>	<b>1.70</b>	<b>74</b>	9.600	105332
			71.5	45.5	0.70	2.10	0.70	190	1.05	185	13.120	105333
	6207		<b>71.5</b>	<b>50.5</b>	<b>0.60</b>	<b>2.90</b>	<b>1.15</b>	<b>127</b>	<b>1.70</b>	<b>127</b>	8.200	105336
			71.5	50.5	0.70	2.10	0.70	223	1.05	217	11.050	105339
6009			<b>74.5</b>	<b>55.5</b>	<b>0.60</b>	<b>2.90</b>	<b>1.15</b>	<b>88</b>	<b>1.70</b>	<b>91</b>	7.580	105345
			74.5	55.5	0.80	1.90	0.55	186	0.82	212	12.170	105347
		6307	<b>79.5</b>	<b>50.5</b>	<b>0.70</b>	<b>3.10</b>	<b>1.20</b>	<b>78</b>	<b>1.80</b>	<b>83</b>	13.500	105349
			79.5	50.5	0.80	2.30	0.75	228	1.12	228	18.580	105350
6010	6208		<b>79.5</b>	<b>55.5</b>	<b>0.70</b>	<b>2.90</b>	<b>1.10</b>	<b>127</b>	<b>1.65</b>	<b>127</b>	14.500	105351
			79.5	55.5	0.80	2.30	0.75	264	1.12	264	15.970	105352
	6209		<b>84.5</b>	<b>60.5</b>	<b>0.75</b>	<b>3.15</b>	<b>1.20</b>	<b>66</b>	<b>1.80</b>	<b>78</b>	13.000	105353
			84.5	60.5	0.90	2.50	0.80	352	1.20	357	19.200	105356
		6308	<b>89.5</b>	<b>60.5</b>	<b>0.80</b>	<b>3.30</b>	<b>1.25</b>	<b>90</b>	<b>1.90</b>	<b>104</b>	18.100	105357
			89.5	60.5	0.90	2.50	0.80	284	1.20	288	24.200	105358
6011	6210		<b>89.5</b>	<b>65.5</b>	<b>0.80</b>	<b>3.40</b>	<b>1.30</b>	<b>180</b>	<b>1.95</b>	<b>189</b>	16.000	105360
			89.5	65.5	0.90	2.50	0.80	330	1.20	333	20.700	105361
6012			<b>94.5</b>	<b>75.5</b>	<b>0.80</b>	<b>3.45</b>	<b>1.35</b>	<b>191</b>	<b>2.00</b>	<b>206</b>	13.300	105362
			94.5	75.5	1.00	2.20	0.60	272	0.90	325	19.900	105364
		6309	99.0	65.5	1.00	2.60	0.80	274	1.20	293	34.000	105365
6013	6211		99.0	70.5	1.00	2.60	0.80	312	1.20	333	29.800	105366
		6310	109.0	70.5	1.25	2.70	0.73	294	1.09	356	53.200	105367
6014	6212		109.0	75.5	1.25	2.70	0.73	327	1.09	394	47.600	105368
6015			114.0	90.5	1.25	2.45	0.60	311	0.90	396	37.000	105369
		6311	119.0	75.5	1.25	2.80	0.78	270	1.16	319	65.200	105370
	6213		119.0	85.5	1.25	2.80	0.78	331	1.16	391	52.800	105371
6016	6214		124.0	90.5	1.25	3.00	0.88	392	1.31	441	55.300	105373

<sup>1)</sup> 1,000 items

**Bold type = slotted version**

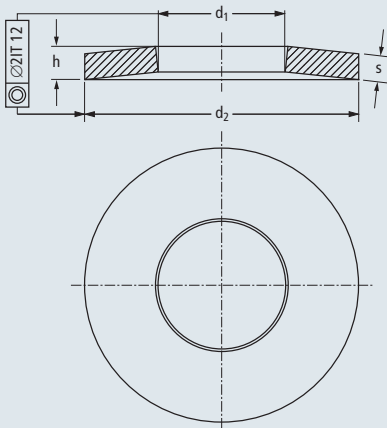
<sup>3)</sup> Values when pressed flat

Ball-bearing disc spring for ball-bearing type			Dimensions (size ordered)				F(0.50 h <sub>0</sub> )		F(0.75 h <sub>0</sub> )		Weight <sup>1)</sup> [kg]	cb part number
			D <sub>e</sub> <sup>3)</sup> [mm]	D <sub>i</sub> <sup>3)</sup> [mm]	t [mm]	l <sub>0</sub> [mm]	s [mm]	F [N]	s [mm]	F [N]		
		6312	129	85.5	1.25	3.20	0.98	375	1.46	402	71.900	105374
6017	6215		129	95.5	1.25	3.20	0.98	462	1.46	500	58.000	105375
		6313	139	90.5	1.25	3.25	1.00	329	1.50	353	85.700	105377
6018	6216		139	101.0	1.25	3.25	1.00	398	1.50	427	70.200	105378
		6314	149	95.5	1.50	3.20	0.85	312	1.28	380	120.900	105381
6020	6217		149	106.0	1.50	3.20	0.85	368	1.28	448	101.300	105382
		6315	159	101.0	1.50	3.50	1.00	356	1.50	409	139.400	105383
6021	6218		159	111.0	1.50	3.50	1.00	415	1.50	477	119.800	105384
		6316	169	111.0	1.50	3.80	1.15	432	1.73	472	150.100	105385
6022	6219		169	121.0	1.50	3.80	1.15	497	1.73	542	128.700	105386
		6317	179	121.0	2.00	4.20	1.10	702	1.65	861	214.400	105389
6024	6220		179	126.0	2.00	4.20	1.10	761	1.65	934	199.200	105391
		6318	189	121.0	2.00	4.30	1.15	628	1.73	760	259.800	105392
	6221		189	131.0	2.00	4.30	1.15	702	1.73	849	228.700	105393
		6319	198	131.0	2.00	4.50	1.25	691	1.88	813	271.700	105394
6026	6222		198	141.0	2.00	4.50	1.25	779	1.88	917	238.100	105395
	6224	6320	213	151.0	2.25	4.50	1.12	746	1.69	941	313.000	105396
6030		6321	223	161.0	2.25	4.60	1.17	747	1.76	933	330.000	105398
	6226		228	161.0	2.25	4.95	1.35	864	2.02	1030	362.000	105399
6032		6322	238	161.0	2.25	5.25	1.50	886	2.25	1020	426.000	105400
	6228		248	171.0	2.50	5.00	1.25	795	1.88	1000	497.000	105401
6034		6324	258	171.0	2.50	5.50	1.50	928	2.25	1108	575.000	105402
	6230		268	181.0	2.50	5.70	1.60	990	2.40	1160	602.000	105403
6036		6326	278	181.0	2.50	6.00	1.75	1020	2.63	1160	686.000	105404
6038	6232		288	191.0	2.75	5.75	1.50	931	2.25	1150	788.000	105405
		6328	298	191.0	2.75	6.35	1.80	1130	2.70	1310	887.000	105406
6040	6234		308	202.0	3.00	6.10	1.55	1050	2.33	1300	1000.000	105407
	6236	6330	318	212.0	3.00	6.20	1.60	1060	2.40	1300	1040.000	105408
6044	6238	6332	338	232.0	3.00	6.60	1.80	1180	2.70	1410	1120.000	105409
6048	6240	6334	358	242.0	3.00	7.00	2.10	1350	3.15	1530	1290.000	105410

<sup>1)</sup> 1,000 items

<sup>3)</sup> Values when pressed flat

## cb conical spring washers (DIN 6796) for screw connections.



Dimensioning.

Conical spring washers are spring elements designed to counter loosening of screw connections caused by e.g. setting of the components. The discs are clamped inside the connections.

They are designed for use with screws of strength class 8.8 to 10.9. Especially in combination with short screws, they help to increase the elasticity of the whole system. In case of possible setting of the screw connection, this enables a certain minimum clamping force to be retained. An unscrewing of the screw caused by alternating lateral forces cannot, however, be prevented by conical spring washers.

Generally speaking, conical spring washers are components exposed to extremely high stress, and should only be used in static application.

Depending on the application, cb conical spring washers can be supplied with different surface finishes.

### Materials

Materials according to DIN EN 10 132-4 can be used, or spring steel of equal quality as selected by the manufacturer.

### Testing of conical spring washers in accordance with DIN 6796 and DIN 267-26

The testing of dimensional accuracy and design corresponds to DIN 267-26.

For the unloaded overall height  $h$  a maximum as well as a minimum value are indicated. The maximum value may not be exceeded in as-received condition, and going below the minimum value after the setting test is not permitted (DIN 267-26).

Nominal dimension	Dimensions (size ordered)					Packaging unit	Weight <sup>1)</sup>	Thread <sup>7)</sup>	Surface			
	d <sub>1</sub>	d <sub>2</sub>	s <sup>4)</sup>	h <sub>max</sub> <sup>5)</sup>	h <sub>min</sub> <sup>6)</sup>				blank	phosphated Fe/Znphr	mech. zinc plated Zn20M with passivation	mech. zinc plated Zn20M + polyamide <sup>9)</sup>
	[mm]	[mm]	[mm]	[mm]	[mm]				cb-Part No.	cb-Part No.	cb-Part No.	cb-Part No.
2.0 <sup>8)</sup>	2.2	5	0.40	0.60	0.50	10000	0.041	2.0	105411	105412	–	–
2.5 <sup>8)</sup>	2.7	6	0.50	0.72	0.61	10000	0.072	2.5	105413	105414	–	–
3.0 <sup>8)</sup>	3.2	7	0.60	0.85	0.72	10000	0.119	3.0	105415	105417	105416	–
3.5 <sup>8)</sup>	3.7	8	0.80	1.06	0.92	10000	0.250	3.5	105419	105421	105420	–
4.0	4.3	9	1.00	1.30	1.12	5000	0.380	4.0	105422	105424	105423	–
5.0	5.3	11	1.20	1.55	1.35	2500	0.610	5.0	105425	105427	105426	–
6.0	6.4	14	1.50	2.00	1.70	2500	1.290	6.0	105428	105432	105429	–
7.0	7.4	17	1.75	2.30	2.00	1000	2.360	7.0	105433	105437	105434	–
8.0	8.4	18	2.00	2.60	2.24	1000	2.760	8.0	105438	105442	105439	105444
10.0	10.5	23	2.50	3.20	2.80	500	5.850	10.0	105449	105454	105450	105456
12.0	13.0	29	3.00	3.95	3.43	250	11.700	12.0	105460	105464	105461	105466
14.0	15.0	35	3.50	4.65	4.04	100	20.100	14.0	105472	105474	105473	–
16.0	17.0	39	4.00	5.25	4.58	100	28.100	16.0	105479	105483	105480	105484
18.0	19.0	42	4.50	5.80	5.08	100	35.400	18.0	105487	105489	105488	105490
20.0	21.0	45	5.00	6.40	5.60	100	44.500	20.0	105491	105493	105492	105494
22.0	23.0	49	5.50	7.05	6.15	100	58.900	22.0	105496	105498	105497	–
24.0	25.0	56	6.00	7.75	6.77	50	86.800	24.0	105499	105501	105500	–
27.0	28.0	60	6.50	8.35	7.30	50	105.200	27.0	105503	105505	105504	–
30.0	31.0	70	7.00	9.20	8.00	50	158.900	30.0	105506	105508	105507	–

<sup>1)</sup> 1,000 items

<sup>4)</sup> Dimensional tolerances according to DIN EN 10 140

<sup>5)</sup> Max. dimensions in as-received condition

<sup>6)</sup> Min. dimensions after setting test according to DIN 267-26

<sup>7)</sup> For nominal thread diameters

<sup>8)</sup> No test data available for these nominal sizes as established by spring force testing to DIN 267-26.

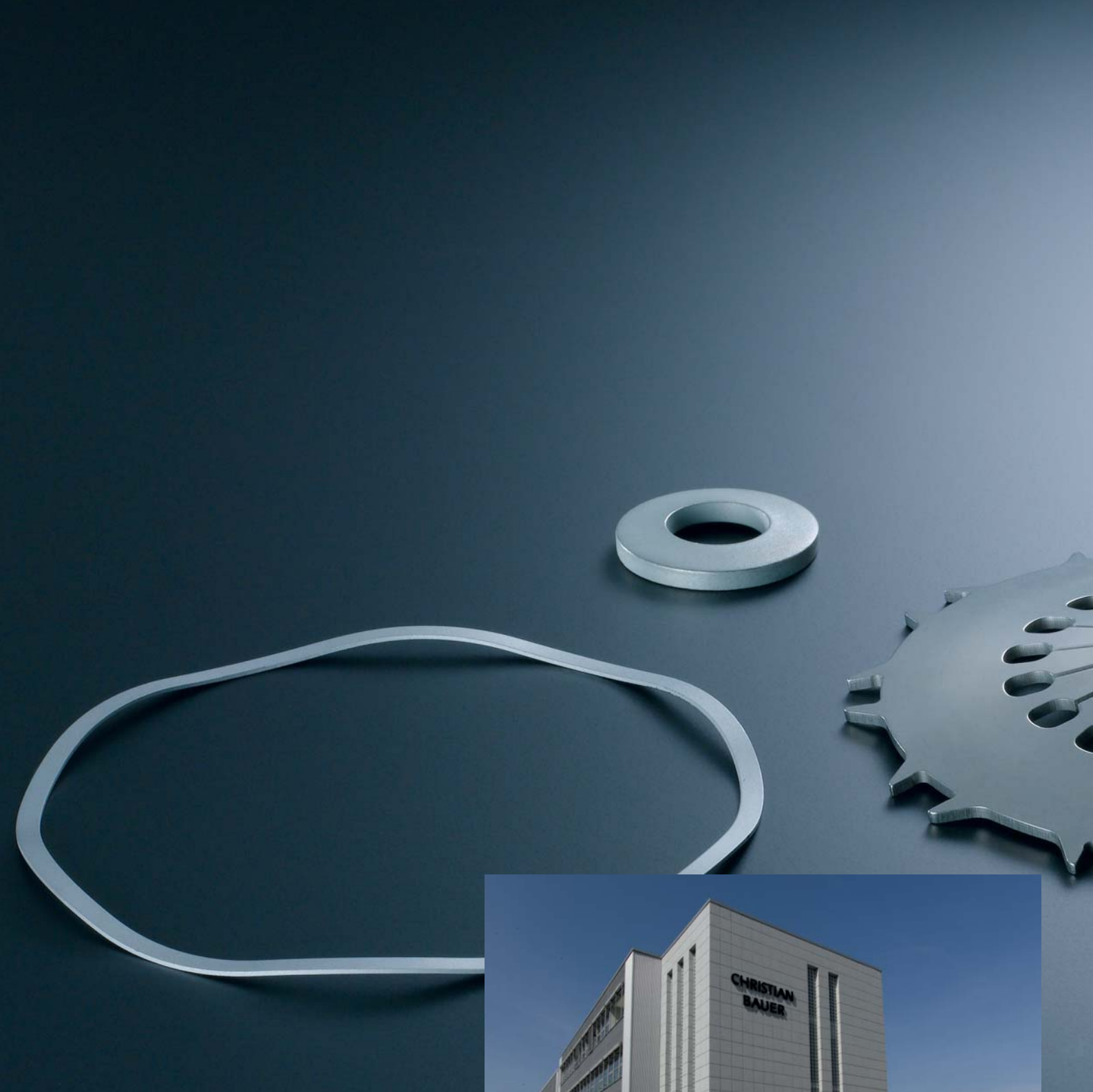
<sup>9)</sup> As a result of layering, the

dimensions deviate from DIN 6796 as follows:

d<sub>1</sub> up to – 0,4 mm;

d<sub>2</sub> up to + 0,4 mm;

s and h up to + 0,4 mm.



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