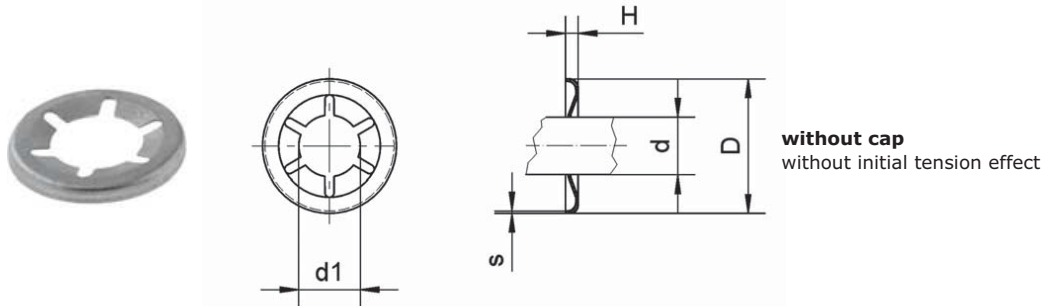


## Spring washers retainers for bolts and shafts without groove



**Example for ordering:** Spring washer without cap for shaft diameter  $d = 10$  mm, stainless steel;  
 Spring washer without cap 10 mbo 28 stainless steel  
 Order number: 10 28 0100 0184/000

mbo standard 28

Shaft $\varnothing$ d mm	Order number	Inner- $\varnothing$ d1 mm	Outer- $\varnothing$ D $\pm 0.2$ mm	Height H $\pm 0.2$ mm	Material thickness S $\pm 0.03$ mm	Number of slots	Trigger force* ca. N	Surface		
								Spring steel		Stainless steel
								Mechanically galvanized white	Varnished	
1.6	10 28 0016 0097/...	1.23 - 1.46	9.7	1.3	0.2	4	200	... / 200**	... / 006	... / 000**
2	10 28 0020 0097/...	1.61 - 1.84	9.7	1.3	0.2	4	200	... / 200	... / 006	... / 000
2.4	10 28 0024 0097/...	2.02 - 2.25	9.7	1.3	0.2	4	200	... / 200	... / 006	... / 000**
3	10 28 0030 0097/...	2.58 - 2.81	9.7	1.3	0.2	4	200	... / 200	... / 006	... / 000
3.2	10 28 0032 0097/...	2.78 - 3.01	9.7	1.3	0.2	4	200	... / 200	... / 006	... / 000**
4	10 28 0040 0115/...	3.57 - 3.8	11.5	1.3	0.2	5	400	... / 200	... / 006	... / 000
4.8	10 28 0048 0115/...	4.31 - 4.53	11.5	1.3	0.2	6	400	... / 200	... / 006	... / 000**
5	10 28 0050 0115/...	4.51 - 4.74	11.5	1.3	0.2	6	400	... / 200	... / 006	... / 000
6	10 28 0060 0153/...	5.45 - 5.7	15.3	1.3	0.25	6	800	... / 200	... / 006	... / 000
6.35	10 28 0635 0153/...	5.83 - 6.08	15.3	1.3	0.25	6	800	... / 200	... / 006	... / 000**
7	10 28 0070 0153/...	6.46 - 6.72	15.3	1.3	0.25	6	800	... / 200	... / 006	... / 000
8	10 28 0080 0153/...	7.4 - 7.66	15.3	1.3	0.25	6	800	... / 200	... / 006	... / 000
9	10 28 0090 0184/...	8.5 - 8.75	18.4	1.9	0.3	6	1000	... / 200	... / 006	... / 000
9.5	10 28 0095 0184/...	9 - 9.26	18.4	1.9	0.3	6	1000	... / 200**	... / 006	... / 000
10	10 28 0100 0184/...	9.49 - 9.74	18.4	1.9	0.3	6	1000	... / 200	... / 006	... / 000
11	10 28 0110 0184/...	10.5 - 10.76	18.4	1.9	0.3	6	1000	... / 200	... / 006	... / 000
12	10 28 0120 0250/...	11.37 - 11.62	25	2.3	0.4	6	2500	... / 200	... / 006	... / 000
12.7	10 28 0127 0250/...	12.1 - 12.36	25	2.3	0.4	6	2500	... / 200**	... / 006	... / 000**
13	10 28 0130 0250/...	12.38 - 12.64	25	2.3	0.4	6	2500	... / 200	... / 006	... / 000**
14	10 28 0140 0282/...	13.4 - 13.66	28.2	2.3	0.4	6	2500	... / 200	... / 006	... / 000
15	10 28 0150 0282/...	14.43 - 14.68	28.2	2.3	0.4	6	2500	... / 200	... / 006	... / 000**
16	10 28 0160 0282/...	15.28 - 15.53	28.2	2.3	0.4	6	2500	... / 200	... / 006	... / 000
17	10 28 0170 0282/...	16.42 - 16.68	28.2	2.3	0.4	6	2500	... / 200**	... / 006	... / 000**
18	10 28 0180 0366/...	17.34 - 17.62	36.6	3	0.4	9	3500	... / 200	... / 006	... / 000**
19	10 28 0190 0366/...	18.4 - 18.69	36.6	3	0.4	9	3500	... / 200	... / 006	... / 000**
20	10 28 0200 0366/...	19.3 - 19.63	36.6	3	0.4	9	3500	... / 200	... / 006	... / 000
21	10 28 0210 0366/...	20.33 - 20.61	36.6	3	0.4	9	3500	... / 200**	... / 006	... / 000**
22	10 28 0220 0366/...	21.37 - 21.65	36.6	3	0.4	9	3500	... / 200**	... / 006	... / 000**
23	10 28 0230 0382/...	22.34 - 22.62	38.2	2.9	0.45	9	3500	... / 200**	... / 006	... / 000**
24	10 28 0240 0382/...	23.33 - 23.66	38.2	3.2	0.5	9	3850	... / 200	... / 006	-
25	10 28 0250 0414/...	24.3 - 24.63	41.4	3.2	0.5	9	3850	... / 200	... / 006	-

\* the trigger values are valid for steel versions using a standard polished steel bolt St 37 (tolerance field h 11)

\*\* special sizes manufactured in respective quantities to order; number of clamps at manufacturer's choice

14\_01  
01/2007

**Material:** spring steel  
**Surface protection:** mechanically galvanized white or brownish resp. bluish varnished

**Material:** stainless steel

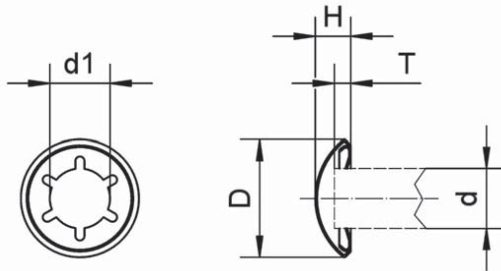


**Special versions upon request**

**Assembly tools:**

see mbo catalog section 15

## Spring washers with cap retainers for bolts and shafts without groove



with standard cap made  
of stainless steel  
without initial tension effect

**Example for ordering:** Spring washer with cap for shaft diameter  $d = 10$  mm, stainless steel;  
Spring washer with cap 10 mbo 29 stainless steel  
Order number: 10 29 0100 0197/000

mbo standard 29

Shaft $\varnothing$ d mm	Order number	Inner- $\varnothing$ d1 mm	Outer- $\varnothing$ D $\pm 0.3$ mm	Height H $\pm 0.3$ mm	Material thickness T max. mm	Number of slots	Trigger force* ca. N	Surface		
								Spring steel		Stainless steel
								Mechanically galvanized white	Varnished	
1.6	10 29 0016 0106/...	1.23 - 1.46	10.6	3	2.5	4	200	... / 200**	... / 006**	... / 000**
2	10 29 0020 0106/...	1.61 - 1.84	10.6	3	2.5	4	200	... / 200**	... / 006	... / 000**
2.4	10 29 0024 0106/...	2.02 - 2.25	10.6	3	2.5	4	200	... / 200	... / 006**	... / 000**
3	10 29 0030 0106/...	2.58 - 2.81	10.6	3	2.5	4	200	... / 200	... / 006	... / 000
3.2	10 29 0032 0106/...	2.78 - 3.01	10.6	3	2.5	4	200	... / 200	... / 006	... / 000**
4	10 29 0040 0124/...	3.57 - 3.8	12.4	3.8	3	5	400	... / 200	... / 006	... / 000
4.8	10 29 0048 0124/...	4.31 - 4.53	12.4	3.8	3	6	400	... / 200	... / 006	... / 000**
5	10 29 0050 0124/...	4.51 - 4.74	12.4	3.8	3	6	400	... / 200	... / 006	... / 000
6	10 29 0060 0162/...	5.45 - 5.7	16.2	5	4	6	800	... / 200	... / 006	... / 000
6.35	10 29 0635 0162/...	5.83 - 6.08	16.2	5	4	6	800	... / 200**	... / 006**	... / 000**
7	10 29 0070 0162/...	6.46 - 6.72	16.2	5	4	6	800	... / 200	... / 006	... / 000
8	10 29 0080 0162/...	7.4 - 7.66	16.2	5	4	6	800	... / 200	... / 006	... / 000
9	10 29 0090 0197/...	8.5 - 8.75	19.7	5.9	4.5	6	1000	... / 200	... / 006	... / 000
9.5	10 29 0095 0197/...	9 - 9.26	19.7	5.9	4.5	6	1000	... / 200**	... / 006**	... / 000**
10	10 29 0100 0197/...	9.49 - 9.74	19.7	5.9	4.5	6	1000	... / 200	... / 006	... / 000
11	10 29 0110 0197/...	10.5 - 10.76	19.7	5.9	4.5	6	1000	... / 200	... / 006	... / 000
12	10 29 0120 0260/...	11.37 - 11.62	26	7.5	6	6	2500	... / 200	... / 006	... / 000
12.7	10 29 0127 0260/...	12.1 - 12.36	26	7.5	6	6	2500	... / 200**	... / 006**	... / 000**
13	10 29 0130 0260/...	12.38 - 12.64	26	7.5	6	6	2500	... / 200**	... / 006**	... / 000**
14	10 29 0140 0294/...	13.40 - 13.66	29.4	9	7	6	2500	... / 200	... / 006	... / 000**
15	10 29 0150 0294/...	14.43 - 14.68	29.4	9	7	6	2500	... / 200	... / 006	... / 000**
16	10 29 0160 0294/...	15.28 - 15.53	29.4	9	7	6	2500	... / 200	... / 006	... / 000**
17	10 29 0170 0294/...	16.42 - 16.68	29.4	9	7	6	2500	... / 200**	... / 006	... / 000**
18	10 29 0180 0382/...	17.34 - 17.62	38.2	11.7	8.7	9	3500	... / 200	... / 006	... / 000**
19	10 29 0190 0382/...	18.4 - 18.69	38.2	11.7	8.7	9	3500	... / 200**	... / 006**	... / 000**
20	10 29 0200 0382/...	19.3 - 19.63	38.2	11.7	8.7	9	3500	... / 200	... / 006	... / 000**
21	10 29 0210 0382/...	20.33 - 20.61	38.2	11.7	8.7	9	3500	... / 200**	... / 006**	... / 000**
22	10 29 0220 0382/...	21.37 - 21.65	38.2	11.7	8.7	9	3500	... / 200**	... / 006**	... / 000**
23	10 29 0230 0398/...	22.34 - 22.62	39.8	13	9.5	9	3500	... / 200**	... / 006**	... / 000**
24	10 29 0240 0430/...	23.33 - 23.66	43	12.5	9.5	9	3850	... / 200**	... / 006**	-
25	10 29 0250 0430/...	24.3 - 24.63	43	12.5	9.5	9	3850	... / 200**	... / 006	-

\* the trigger values are valid for steel versions using a standard polished steel bolt St 37 (tolerance field h 11)

\*\* special sizes manufactured in respective quantities to order; number of clamps at manufacturer's choice

14\_02  
01/2007

**Material:** spring steel

**Surface protection:** mechanically galvanized white or brownish resp. bluish varnished

**Material:** stainless steel



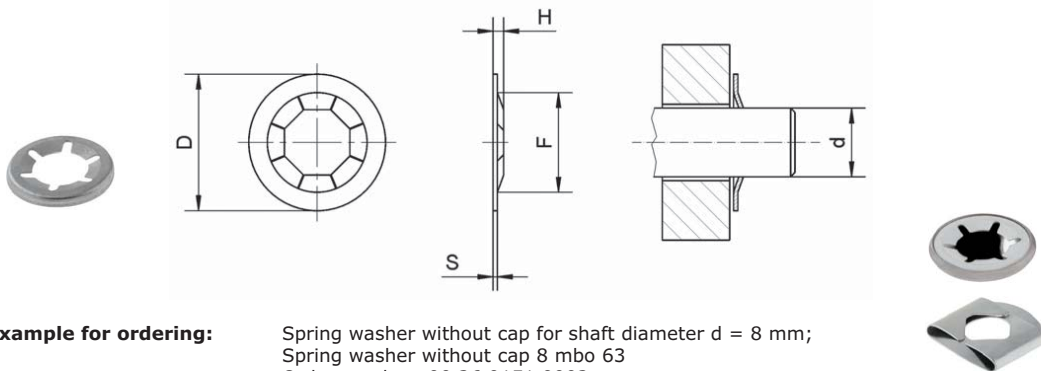
**Special versions upon request**

**Assembly tools:**

see mbo catalog section 15

## Spring washers

retainers for bolts and shafts without groove



### Example for ordering:

Spring washer without cap for shaft diameter  $d = 8$  mm;  
Spring washer without cap 8 mbo 63  
Order number: 00 26 0151 0002

mbo standard 63

Shaft $\varnothing$ d mm*)	Order number	H mm	F mm	D mm	Material thickness S mm	Impact force N	Clamping force N	Min. retaining force N
6	00 26 0151 0001	1.6	9.4	13.5	0.5	111	–	1780
8	00 26 0151 0002	1.7	11.6	15.9	0.5	256	–	3969

\*) bolt tolerance:  $+0.05/-0.07$  mm

14\_03  
01/2007

**Version:** hardened, annealed

**Material:** spring band steel

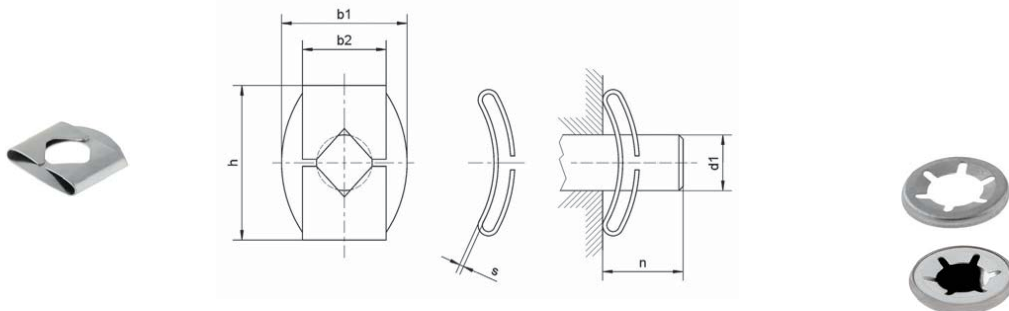
**Surface protection:** phosphatized and oiled, mechanically galvanized, other surfaces upon request

The hardness of surface should not exceed 208 HV. Nickel, chromium and other hard surfaced are to be avoided when used in connection with steel.

### Special versions upon request

## Duo clips

retainers for bolts and shafts without groove



### Example for ordering:

Duo-clip for bolt diameter  $d_1 = 8$  mm;

Duo-clip 8 mbo 10; Order number: 10 10 0000 0008

mbo standard 10

mbo identifier*)	Order number	Nominal size $d_1h_9$	$\approx b_1$	$b_2$	$\approx h$	s	Min. dimension n	Max. adm. thrust approx. $N^{1)}$ static	Mass (kg) 100 pcs
3 mbo 10	10 10 0000 0003	3	7	4.5	8	0.25	2.5	400	0.014
4 mbo 10	10 10 0000 0004	4	9	6	10	0.3	3	720	0.028
5 mbo 10	10 10 0000 0005	5	11	7	11	0.3	3.5	1120	0.034
6 mbo 10	10 10 0000 0006	6	13	9	13	0.3	4	1280	0.052
8 mbo 10	10 10 0000 0008	8	17	12	17	0.35	5	1520	0.102
10 mbo 10	10 10 0000 0010	10	22	15	22	0.4	6	2000	0.193

<sup>1)</sup> special sizes manufactured in respective quantities upon request

\*) for non-hardened, non-chromium-plated cardan joints of regular strength and for galvanized parts with a layer of max. 5 my

14\_04  
01/2007

### Material:

spring band steel, hardened and annealed to 1450 to 1600 N/mm<sup>2</sup> tensile strength

### Surface protection:

phosphatized, oiled;

optional: electroplated galvanized, passivated in white-blue (silver/clear) or yellow

### Assembly:

possible with or without tools; removable

### Assembly tools:

see mbo catalog section 15

### Special versions upon request