

 **Growermetal**

CONICAL CONTACT WASHERS

# CONICAL CONTACT WASHERS

## Description

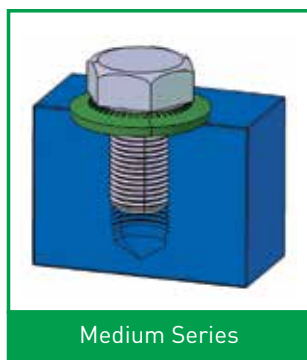
Elastic washer that has a round knurled ring with resistance to loosening on the surface in contact with the screw's underhead. The conical Contact washers of Growermetal are produced according to the standards NF E 25-511 and Siemens SN 70093.

## Materials

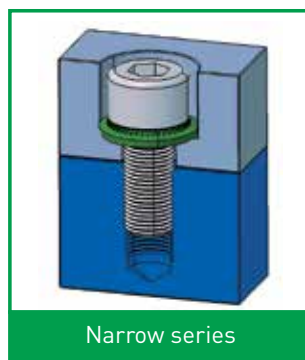
- Carbon steel C60S DIN EN 10132, hardness 420–510 Hv 10 after heat-treatment for hardening and tempering.
- Stainless steel AISI 304 (Inox A2) EN 10088, N°1.4301 cold rolled at high resistance.
- Stainless steel AISI 316 (Inox A4) EN 10088, N°1.4401 cold rolled at high resistance.

## Surface treatments

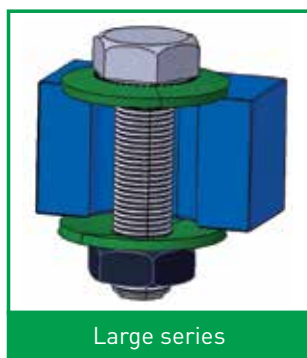
- Burnished with slightly protective oiling.
- Mechanical zinc plating Cr6 free.
- Geomet®.
- Other surface treatments on request, according to the minimum delivery quantities.



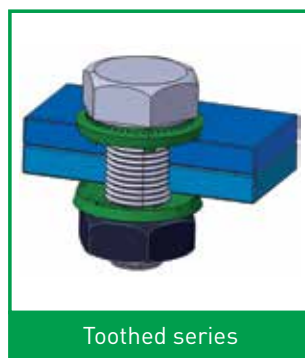
Contact washer according to **NF E 25-511 M** standard. To be used with hexagonal screw heads of resistance class 8.8 and 10.9.



Contact washer according to **NF E 25-511 N** standard. To be used with cylindrical screw head of resistance class  $\leq 8.8$  and applications with counter bores.

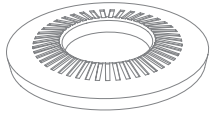


Contact washer according to **NF E 25-511 L** standard. To be used with oval bores and "soft" underlying surfaces (aluminium, plastic materials, etc.) with screws of resistance classes 8.8 and 10.9.

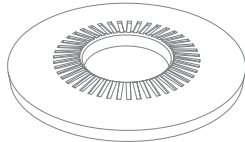


Contact washer with teeth according to **SN 70093** Siemens standard. Ideally suited for improving the electrical conductivity of the bolted joint connection. The six teeth have to be directed towards the underlying surface in order to penetrate into the surface and facilitate the electrical conductivity. To be used with screws of resistance classes 6.8, 8.8 and 10.9.

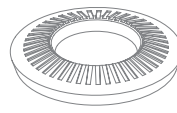
## DIMENSIONS AND FEATURES



NF E 25-511 M (medium series)



NF E 25-511 L (large series)



NF E 25-511 N (narrow series)



SN 70093 (toothed series)

Screw size	Internal diameter min.-max.	External diameter min.-max.	Thickness min.-max.	Height min.-max.	N° of ribs	Kg/1000 pieces	Loading test [N]	Residual deflection after loading test	N° pieces standard packaging	N° pieces bulk packaging	N° pieces micro packaging
<b>NF E 25-511 M (MEDIUM SERIES)</b>											
M 3	3.10-3.35	7.71-8.29	0.57-0.63	0.80-1.00	28	0.180	2.400	0.15	2.000	60.000	500
M 4	4.10-4.40	9.71-10.29	0.86-0.94	1.15-1.40	32	0.430	4.200	0.15	2.000	25.000	500
M 5	5.10-5.40	11.65-12.35	1.06-1.14	1.45-1.80	36	0.720	6.800	0.20	1.000	15.000	200
M 6	6.10-6.40	13.65-14.35	1.26-1.34	1.75-2.10	45	1.150	9.500	0.25	1.000	10.000	200
M 8	8.20-8.56	17.65-18.35	1.36-1.44	1.90-2.35	45	2.000	17.500	0.35	1.000	5.000	100
M 10	10.20-10.56	21.58-22.42	1.55-1.65	2.25-2.75	45	3.600	27.500	0.45	1.000	3.000	100
M 12	12.40-12.83	26.58-27.42	1.75-1.85	2.60-3.10	45	6.010	40.000	0.60	500	1.750	50
M 14	14.40-14.83	29.58-30.42	2.34-2.46	3.20-3.70	45	9.700	55.000	0.60	250	1.000	
M 16	16.40-16.83	31.50-32.50	2.74-2.86	3.60-4.10	60	12.100	75.000	0.65	250	900	
M 20	20.50-21.02	39.50-40.50	3.14-3.26	4.30-4.90	60	22.100	100.000	0.70	100	500	

<b>NF E 25-511 L (LARGE SERIES)</b>											
M 3	3.10-3.35	9.65-10.35	0.57-0.63	0.95-1.20	28	0.325	2.400	0.25	2.000	30.000	500
M 4	4.10-4.40	13.65-14.35	0.96-1.04	1.40-1.80	32	1.102	4.200	0.30	2.000	13.000	500
M 5	5.10-5.40	15.65-16.35	1.16-1.24	1.70-2.10	36	1.568	6.800	0.35	1.000	6.500	200
M 6	6.10-6.40	17.65-18.35	1.36-1.44	2.10-2.50	45	2.466	9.500	0.40	1.000	5.000	200
M 8	8.20-8.56	21.58-22.42	1.55-1.65	2.20-2.70	45	3.760	17.500	0.50	1.000	3.000	200
M 10	10.20-10.56	26.58-27.42	1.75-1.85	2.60-3.10	45	6.938	27.500	0.70	500	1.750	100
M 12	12.40-12.83	31.50-32.50	1.95-2.05	3.10-3.60	45	10.694	40.000	0.90	250	1.100	50

<b>NF E 25-511 N (NARROW SERIES)</b>											
M 3	3.10-3.35	5.76-6.24	0.47-0.53	0.70-0.90	28	0.070	2.400	0.10	2.000	17.5000	500
M 4	4.10-4.40	7.71-8.29	0.77-0.83	1.00-1.20	32	0.200	4.200	0.12	2.000	45.000	500
M 5	5.10-5.40	9.71-10.29	0.96-1.04	1.25-1.50	36	0.400	6.800	0.15	1.000	25.000	500
M 6	6.10-6.40	11.65-12.35	1.16-1.24	1.55-1.85	45	0.707	9.500	0.20	1.000	12.500	500
M 8	8.20-8.56	15.65-16.35	1.36-1.44	1.80-2.20	45	1.500	17.500	0.25	1.000	7.000	200
M 10	10.20-10.56	19.58-20.42	1.55-1.65	2.10-2.60	45	2.640	27.500	0.35	1.000	3.500	200
M 12	12.40-12.83	23.58-24.42	1.75-1.85	2.40-2.90	45	4.350	40.000	0.40	500	2.000	100

<b>SN 70093 (TOOTHED SERIES)</b>												
Screw size	Internal diameter min.-max.	External diameter min.-max.	Thickness min.-max.	Height min.-max.	N° of ribs	N° of teeth	Height of teeth	Width of teeth	Kg/1000 pieces	N° pieces standard packaging	N° pieces bulk packaging	N° pieces micro packaging
M 3	3.10-3.35	5.80-6.20	0.57-0.63	0.80-0.95	28	6	0.20-0.40	0.70-0.90	0.087	2.000	100.000	200
M 4	4.10-4.40	7.80-8.20	0.77-0.83	1.00-1.15	32	6	0.20-0.40	1.10-1.30	0.200	2.000	50.000	200
M 5	5.10-5.40	9.80-10.20	0.97-1.03	1.25-1.50	36	6	0.30-0.70	1.90-2.10	0.410	1.000	22.000	100
M 6	6.10-6.40	11.80-12.20	1.16-1.24	1.50-1.80	45	6	0.30-0.70	2.00-2.20	0.680	1.000	12.000	100
M 8	8.20-8.50	15.80-16.20	1.36-1.44	1.95-2.40	45	6	0.30-0.70	2.00-2.20	1.500	1.000	6.000	100
M 10	10.20-10.56	19.75-20.25	1.56-1.64	2.15-2.60	45	6	0.30-0.70	2.00-2.20	2.680	1.000	3.500	100
M 12	12.40-12.80	23.75-24.25	1.56-1.64	2.15-2.60	45	6	0.30-0.70	2.00-2.20	3.850	500	2.250	100
M 14	14.40-14.83	23.75-24.25	1.56-1.64	2.05-2.50	60	6	0.30-0.70	2.00-2.20	3.210	500	2.250	100
M 16	16.40-16.80	31.70-32.30	2.44-2.56	3.50-3.95	60	6	0.30-0.70	4.50-4.70	10.900	100	1.000	100
M 20	20.50-21.00	39.70-40.30	2.94-3.06	4.20-4.65	60	6	0.40-0.80	4.50-4.70	21.300	100	400	

Dimensions in mm.

## TORQUE OF CONICAL CONTACT WASHERS NF E 25-511 M (MEDIUM SERIES) - MECHANICAL ZINC PLATED<sup>a</sup>

### DIMENSIONS AND FEATURES

Internal diameter x external diameter [mm]	Screw size	Bolt 8.8 <sup>b</sup> Oiled		Bolt 8.8 <sup>b</sup> Dry		Bolt 10.9 <sup>c</sup> Oiled		Bolt 10.9 <sup>c</sup> Dry	
		Torque [Nm]	Load <sup>d</sup> [kN]	Torque [Nm]	Load <sup>d</sup> [kN]	Torque [Nm]	Load <sup>d</sup> [kN]	Torque [Nm]	Load <sup>d</sup> [kN]
3.10x8.00	M 3	1.5	2.4	1.7	2.4	1.8	3.4	2.0	3.4
4.10x10.00	M 4	3.1	4.2	3.6	4.2	4.2	5.9	4.5	5.9
5.10x12.00	M 5	7.3	6.8	7.5	6.8	8.2	9.6	9	9.6
6.10x14.00	M 6	13	9.7	13.6	9.7	14	13.6	16.5	13.6
8.20x18.00	M 8	27	18	29	18	40	25	46	25
10.20x22.00	M 10	74	28	79	28	89	39	95	39
12.40x27.00	M 12	98	40	101	40	113	57	121	57
14.40x30.00	M 14	153	55	161	55	181	78	190	78
16.40x32.00	M 16	245	75	254	75	282	106	301	106
20.50x40.00	M 20	452	118	477	118	498	165	517	165

## TORQUE OF CONICAL CONTACT WASHERS SN 70093 (TOOTHED SERIES) - MECHANICAL ZINC PLATED<sup>a</sup>

### DIMENSIONS AND FEATURES

Internal diameter x external diameter [mm]	Screw size	Bolt 8.8 <sup>b</sup> Oiled		Bolt 8.8 <sup>b</sup> Dry		Bolt 10.9 <sup>c</sup> Oiled		Bolt 10.9 <sup>c</sup> Dry	
		Torque [Nm]	Load <sup>d</sup> [kN]	Torque [Nm]	Load <sup>d</sup> [kN]	Torque [Nm]	Load <sup>d</sup> [kN]	Torque [Nm]	Load <sup>d</sup> [kN]
3.10x6.00	M 3	1.4	2.4	1.5	2.4	1.5	3.4	1.8	3.4
4.10x8.00	M 4	3.3	4.2	3.4	4.2	3.6	5.9	4.2	5.9
5.10x10.00	M 5	10.5	6.8	11	6.8	11.2	9.6	13	9.6
6.10x12.00	M 6	14	9.7	15.6	9.7	16	13.6	19	13.6
8.20x16.00	M 8	36	18	36	18	39	25	45	25
10.20x20.00	M 10	68	28	70	28	73	39	81	39
12.40x24.00	M 12	90	40	101	40	106	57	124	57
14.40x24.00	M 14	160	55	164	55	180	78	210	78
16.40x32.00	M 16	253	75	290	75	314	106	337	106
20.50x40.00	M 20	427	118	472	118	502	165	524	165

### Remarks:

Test conditions according to ISO 16047, bearing surface hardness 200-250 Hv, roughness  $R_a$  0.6 uncoated and degreased.

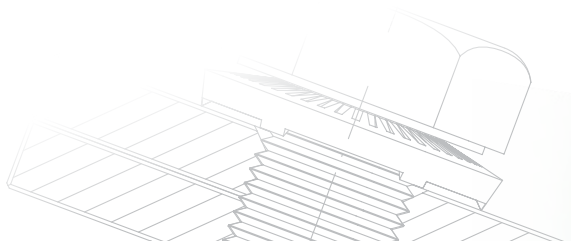
<sup>a</sup> Mechanical zinc plating 11-13my + passivation Cr6 free.

<sup>b</sup> Screw class 8.8 DIN 931 / DIN 933 uncoated + Nut DIN 934 uncoated, coarse pitch thread.

<sup>c</sup> Screw class 10.9 DIN 931 / DIN 933 uncoated + Nut DIN 934 uncoated, coarse pitch thread.

<sup>d</sup> 75% of nominal yield point (stress at 0.2% non-proportional elongation  $R_{p0.2}$ ) according to ISO 898-1

The abovementioned information, which has been obtained following empirical laboratory tests, are to be considered as a mere information, provided by Growermetal S.r.l. at the sole purpose to improve the assembling of the product. Growermetal S.r.l. refuses any responsibility related to the terms of use of the product, which fall under the single user's responsibility.



## APPLICATION FIELDS

The conical Contact washers are generally used with bolts of 6.8, 8.8 and 10.9 classes and thanks to their features they are suitable in several fields of application where high elastic and fastening performances are required.



Motors



Safety assembling



Transmissions



Electromechanics



Industry supplies



Heavy - construction mechanics

## PACKAGING



### Types of packaging available:

Standard packaging (1)

Bulk packaging (2)

Micro packaging (3)



## **Growermetal**

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