



PRODUCTS CATALOGUE
CATALOGO PRODOTTI
PRODUKTKATALOG

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Toothed washers

Rondelle dentellate

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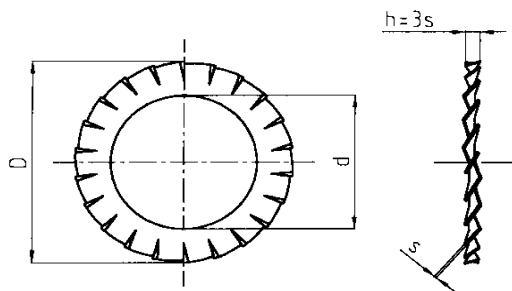
Teethed washer

Rondella dentellata

Fächerscheibe

EXTERNAL TEETHED DIN 6798 A

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	9	0.027	5000	180000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	9	0.041	5000	140000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	9	0.048	5000	125000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	9	0.058	2000	100000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	10	0.101	2000	65000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	11	0.129	2000	45000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	11	0.147	1000	35000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	11	0.228	1000	20000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	12	0.290	1000	17500	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	14	0.440	1000	12000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	14	0.515	1000	10000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	14	0.678	1000	7500	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	16	1.020	1000	5000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	16	1.260	1000	3500	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	18	1.906	500	2000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	18	2.559	500	1500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	18	4.270	250	900	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	20	5.300	250	750	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	20	6.530	200	650	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	20	6.901	150	600	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	22	8.787	100	450	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	22	11.620	100	350	

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 cr6 free.

Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

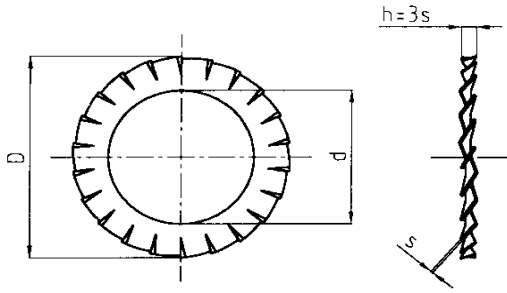
Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques.

Teethed washer

Rondella dentellata

Fächerscheibe



EXTERNAL TEETHED DIN 6798 A

STAINLESS STEEL AISI 304 EN 10088-2

STAINLESS STEEL AISI 316 EN 10088-2

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	9	0.028	5000	180000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	9	0.044	5000	140000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	9	0.050	5000	125000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	9	0.067	2000	100000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	10	0.103	2000	65000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	11	0.125	2000	45000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	11	0.165	1000	35000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	11	0.239	1000	20000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	12	0.305	1000	17500	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	14	0.447	1000	12000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	14	0.544	1000	10000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	14	0.661	1000	7500	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	16	1.060	1000	5000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	16	1.235	1000	3500	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	18	2.055	500	2000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	18	2.600	500	1500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	18	4.490	250	900	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	20	5.690	250	750	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	20	6.120	200	650	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	20	7.200	150	600	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	22	9.250	100	450	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	22	12.201	100	350	

Dimensions in mm

Technical details:

Hardness: 140 - 250 Hv.

Tightening torques: see table.

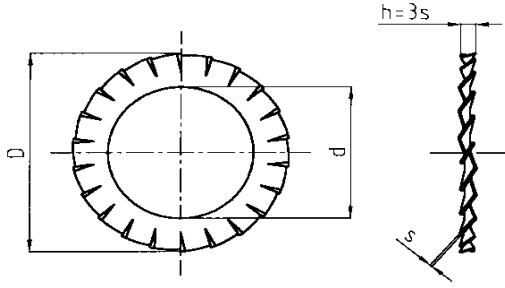
Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques.

The washer in bronze is recommended for electrical contact fasteners.



Teethed washer

Rondella dentellata

Fächerscheibe

EXTERNAL TEETHED DIN 6798 A

BRONZE CuSn8 EN 1652

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	9	0.032	5000	180000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	9	0.058	5000	125000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	9	0.068	2000	100000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	11	0.146	2000	45000	500
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	11	0.260	1000	20000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	12	0.350	1000	17500	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	14	0.760	1000	7500	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	16	1.240	1000	5000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	16	1.436	1000	3500	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	18	2.350	500	2000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	18	3.000	500	1500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	18	5.160	250	900	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	20	6.520	250	750	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	20	7.020	200	650	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	20	8.230	150	600	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	22	10.590	100	450	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	22	13.900	100	350	

Dimensions in mm

Technical details:

Hardness: 185 - 215 Hv.

Tightening torques: see table.

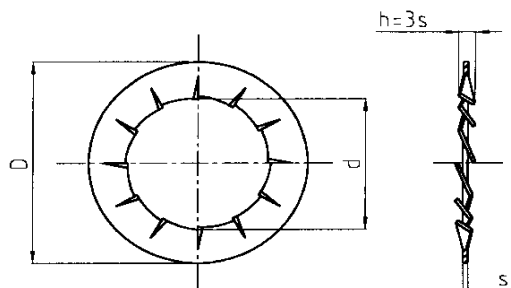
Chemical analysis of raw material: see table.

Bronze has a good corrosion resistance.

Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques.

The washer in bronze is recommended for electrical contact fasteners.


INTERNAL TEETHED DIN 6798 J
CARBON STEEL C 60 EN 10132

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	7	0.025	5000	180000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	7	0.044	5000	140000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	7	0.046	5000	125000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	7	0.056	2000	100000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	8	0.097	2000	65000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.119	2000	45000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	8	0.145	1000	35000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.230	1000	20000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	9	0.299	1000	17500	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	10	0.390	1000	12000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	10	0.565	1000	10000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	10	0.687	1000	7500	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	12	1.059	1000	5000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	12	1.254	1000	3500	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	14	1.962	500	2000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	14	2.710	500	1500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	14	4.085	250	900	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	16	5.400	250	750	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	16	6.630	200	650	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	16	6.980	150	600	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	18	10.600	100	450	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	18	12.700	100	350	

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 cr6 free.

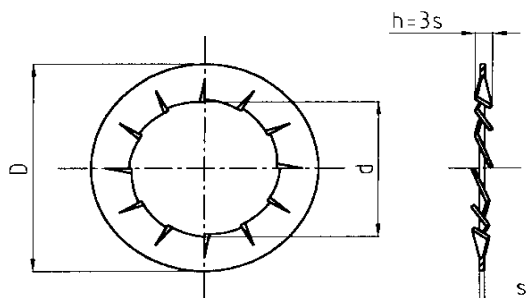
Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques.

In comparison with the external toothing type, this washer is recommended for not flat supporting surface.


INTERNAL TEETHED DIN 6798 J
STAINLESS STEEL AISI 304 EN 10088-2
STAINLESS STEEL AISI 316 EN 10088-2

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	7	0.025	5000	180000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	7	0.044	5000	140000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	7	0.048	5000	125000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	7	0.054	2000	100000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	8	0.099	2000	65000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.136	2000	45000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	8	0.163	1000	35000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.265	1000	20000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	9	0.343	1000	17500	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	10	0.409	1000	12000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	10	0.597	1000	10000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	10	0.698	1000	7500	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	12	1.130	1000	5000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	12	1.365	1000	3500	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	14	2.070	500	2000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	14	2.857	500	1500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	14	4.300	250	900	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	16	5.004	250	750	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	16	6.960	200	650	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	16	7.300	150	600	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	18	12.000	100	450	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	18	13.000	100	350	

Dimensions in mm

Technical details:

Hardness: 140 - 250 Hv.

Tightening torques: see table.

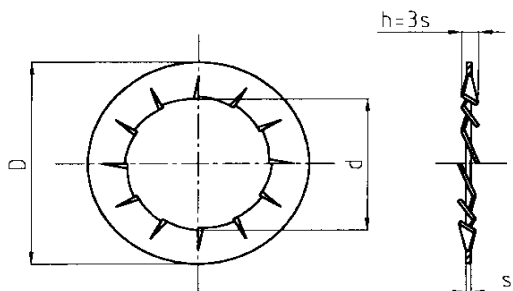
Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques.

In comparison with the external toothing type, this washer is recommended for not flat supporting surface.



INTERNAL TEETHED DIN 6798 J

BRONZE CuSn8 EN 1652

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	7	0.029	5000	180000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	7	0.058	5000	125000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	7	0.064	2000	100000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	8	0.114	2000	65000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.146	2000	45000	500
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.272	1000	20000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	9	0.350	1000	17500	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	10	0.822	1000	7500	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	12	1.300	1000	5000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	12	1.570	1000	3500	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	14	2.381	500	2000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	14	3.286	500	1500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	14	4.910	250	900	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	16	6.210	250	750	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	16	8.004	200	650	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	16	8.395	150	600	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	18	11.155	100	450	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	18	14.950	100	350	

Dimensions in mm

Technical details:

Hardness: 185 - 215 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Bronze has a good corrosion resistance.

Features and specific use:

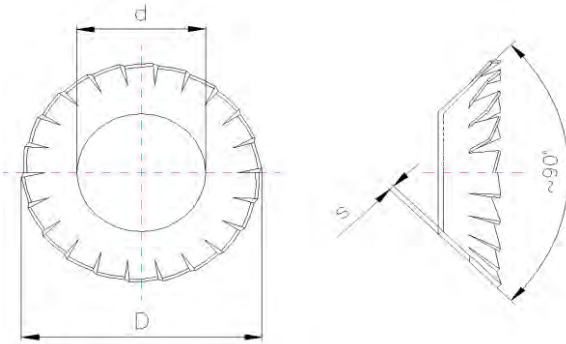
Washer with overlapped teeth for fasteners with limited tightening torques.

In comparison with the external toothing type, this washer is recommended for not flat supporting surface.

The washer in bronze is recommended for electrical contact fasteners.

EXTERNAL TEETHED FOR COUNTERSUNK HEAD DIN 6798 V

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING	
For screws of	d min.-max.	D ~	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 4.0	4.30-4.48	8.00	0.24-0.27	14	0.100	2.000	45.000
M 5.0	5.30-5.48	9.80	0.29-0.32	14	0.200	1.000	30.000
M 6.0	6.40-6.62	11.80	0.39-0.42	16	0.300	1.000	15.000
M 8.0	8.40-8.62	15.30	0.39-0.42	18	0.500	1.000	6.500
M 10.0	10.50-10.77	19.00	0.48-0.52	20	1.000	1.000	4.000
M 12.0	13.00-13.27	23.00	0.48-0.52	26	1.500	1.000	2.500
M 14.0	15.00-15.27	26.20	0.58-0.62	28	1.900	500	2.000
M 16.0	17.00-17.27	30.20	0.58-0.62	30	2.300	500	1.200

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 cr6 free.

Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Washer with overlapped

teeth for fasteners with

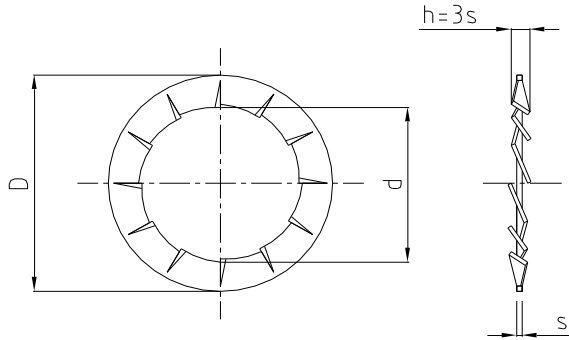
limited tightening torques.

Recommended exclusively for clamping conical head screws.

Teethed washer

Rondella dentellata

Fächerscheibe



NARROW BAND INTERNAL TEETHED

CARBON STEEL C 60 EN 10132

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. teeth	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging	N° of pcs micro packaging
M 8.0	8.15-8.51	10.45-11.15	0.57-0.63	12	0.180	1000	40000	
M 10.0	10.20-10.63	13.85-14.55	0.47-0.53	12	0.270	1000	14000	

Dimensions in mm

Technical details:

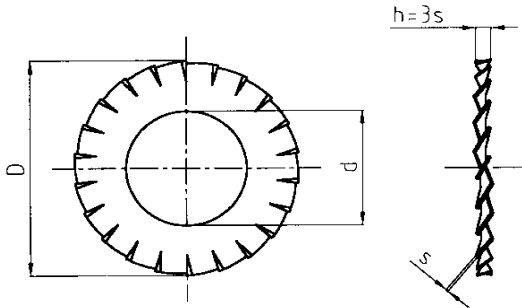
Hardness: 400 - 480 Hv
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.
 Electro zinc plating 6-8 cr6 free.
 Mechanical zinc plating 12 my cr6 free.
 Other coatings upon customer request.

Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques.
 It is advised to use this washer when the supporting surface is small.



EXTERNAL TEETHED DIN 6907

CARBON STEEL C 60 EN 10132

STAINLESS STEEL AISI 304 EN 10088-2

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.5	2.25-2.35	5.32-5.50	0.36-0.44	9	0.055		125000	
M 3.0	2.70-2.80	5.82-6.00	0.36-0.44	9	0.070		100000	
M 3.5	3.20-3.32	6.78-7.00	0.46-0.54	10	0.118		65000	
M 4.0	3.60-3.72	7.78-8.00	0.46-0.54	11	0.154		50000	
M 5.0	4.55-4.67	8.78-9.00	0.55-0.65	11	0.210		35000	
M 6.0	5.50-5.62	10.73-11.00	0.65-0.75	12	0.389		20000	
M 8.0	7.40-7.55	13.73-14.00	0.75-0.85	14	0.620		10000	

Dimensions in mm

Technical details:

Hardness:

- Steel C60 350 - 425 Hv.
- Stainless steel A2 140 - 250 Hv.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.
Copper plating 3-4 my.

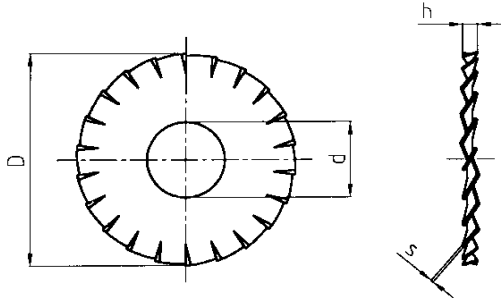
Features and specific use:

Washer to be used only for preassembling with metric pitch screws (for sems).

Teethed washer

Rondella dentellata

Fächerscheibe



EXTERNAL TEETHED FOR SELF-TAPPING SCREW

STEEL Fe 50 UNI 5961

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
3.5	3.04-3.09	8.90-9.10	0.55-0.65	1.43-1.57	0.250		35000	
3.9	3.35-3.40	8.90-9.10	0.55-0.65	1.43-1.57	0.254		35000	
4.2	3.60-3.65	8.90-9.10	0.55-0.65	1.43-1.57	0.247		35000	
4.2	3.60-3.67	7.78-8.00	0.46-0.54	1.23-1.37	0.154		50000	
4.8	4.07-4.13	10.90-11.10	0.75-0.85	1.90-2.10	0.514		17500	
5.5	4.53-4.59	10.90-11.10	0.75-0.85	1.90-2.10	0.502		17500	
6.3	5.37-5.42	10.90-11.10	0.75-0.85	1.90-2.10	0.455		17500	
6.3	5.37-5.42	12.40-12.60	0.75-0.85	1.90-2.10	0.639		12000	

Dimensions in mm

Technical details:

Hardness: 150 - 170 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.
 Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.
 Copper plating 3-4 my.

Features and specific use:

Washer to be used for preassembling with self-tapping screws only (for sems).

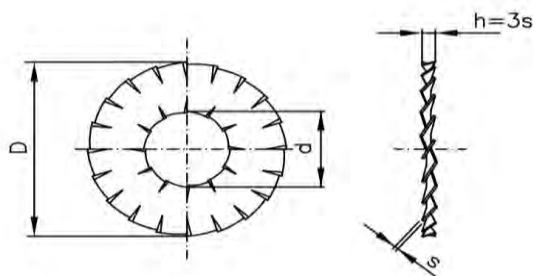
Internal - external teathed washer

Rondella dentellata doppia

Doppelfächerscheibe

INTERNAL - EXTERNAL TEETHED

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of internal teeth	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.20-4.38	15.17-15.60	0.77-0.83	7	16	1.100	1000	6500	
M 5.0	5.10-5.28	17.47-17.90	0.77-0.83	7	16	1.450	1000	5000	
M 6.0	6.10-6.32	17.77-18.20	0.87-0.93	8	16	1.529	1000	4500	
M 8.0	8.20-8.42	21.73-22.25	0.96-1.04	10	16	2.490	500	2750	
M 10.0	10.20-10.47	25.58-26.10	1.06-1.14	12	18	4.150	500	1750	
M 12.0	12.50-12.77	29.78-30.30	1.16-1.24	12	18	5.400	200	1000	
M 16.0	16.30-16.73	35.48-36.10	1.36-1.44	12	20	8.699	250	800	

Dimensions in mm

Technical details:

Hardness: 430 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 cr6 free.

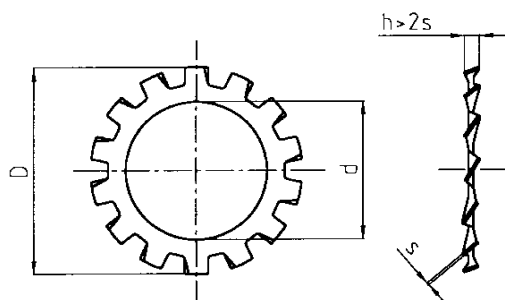
Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Double toothed washers.

Suitable when the diameter of the bore is larger than the diameter of the screw or when the bore is lengthened.


EXTERNAL TOOTHED DIN 6797 A
CARBON STEEL C 60 EN 10132

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	6	0.020	5000	275000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	6	0.026	5000	200000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	6	0.037	5000	170000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	6	0.041	2000	160000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	6	0.071	2000	80000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.087	2000	60000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	8	0.122	1000	50000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.175	1000	35000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	8	0.217	1000	25000	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	8	0.330	1000	16000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	8	0.400	1000	12000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	8	0.479	1000	12000	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	9	0.750	1000	6000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	10	1.000	1000	4000	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	10	1.390	1000	3000	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	12	1.920	500	2000	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	12	3.235	500	1500	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	12	4.029	250	1000	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	14	4.500	250	950	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	14	4.854	250	850	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	14	7.350	150	500	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	14	9.029	150	400	

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.
 Electro zinc plating 6-8 cr6 free.
 Mechanical zinc plating 12 my cr6 free.
 Other coatings upon customer request.

Features and specific use:

Toothed washer for fasteners with limited tightening torques.

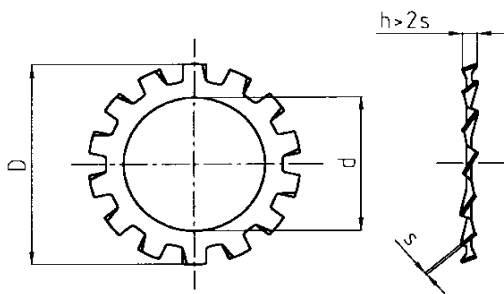
Toothed washer

Rondella dentellata

Zahnscheibe

EXTERNAL TOOTHED ASME B 18.21.1

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
N.10	4.96-5.18	10.04-10.41	0.46-0.60	8	0.180	1000	30000	
1/4"	6.51-6.78	12.55-12.95	0.59-0.71	10	0.320	1000	15000	
5/16"	8.13-8.43	14.94-15.49	0.72-0.86	8	0.500	1000	10000	
3/8"	9.76-10.10	17.02-17.62	0.82-1.01	12	0.745	1000	7500	
7/16"	11.38-11.78	18.80-19.30	0.82-1.01	12	0.950	1000	5000	
1/2"	13.03-13.46	22.36-22.86	0.94-1.14	12	1.410	1000	3750	
1"	26.03-26.92	40.39-41.15	1.50-1.70	14	7.800	150	500	

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

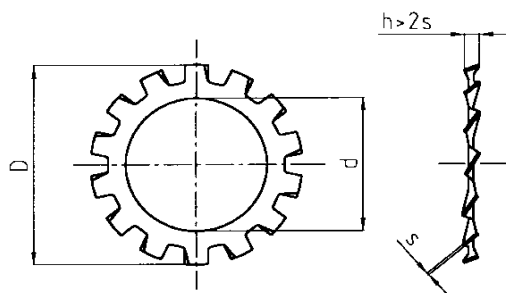
Electrozinc plating 6-8 cr6 free.

Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Toothed washer for fasteners with limited tightening torques.



EXTERNAL TOOTHED DIN 6797 A

STAINLESS STEEL AISI 304 EN 10088-2

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	6	0.025	5000	275000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	6	0.031	5000	200000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	6	0.039	5000	170000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	6	0.039	2000	160000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	6	0.070	2000	80000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.100	2000	60000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	8	0.110	1000	50000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.175	1000	35000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	8	0.234	1000	25000	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	8	0.362	1000	16000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	8	0.442	1000	12000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	8	0.523	1000	12000	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	9	0.759	1000	6000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	10	0.920	1000	5000	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	10	1.365	1000	3750	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	12	1.922	500	2500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	12	3.400	500	1500	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	12	4.350	250	1200	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	14	4.700	250	950	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	14	4.577	250	850	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	14	7.119	150	500	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	14	8.640	150	400	

Dimensions in mm

Technical details:

Hardness: 140 - 250 Hv.

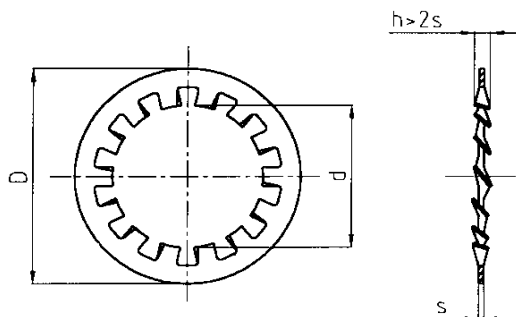
Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Features and specific use:

Toothed washer for fasteners with limited tightening torques.

INTERNAL TOOTHED DIN 6797 J
CARBON STEEL C 60 EN 10132


DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	6	0.025	5000	275000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	6	0.032	5000	200000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	6	0.040	5000	170000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	6	0.047	2000	160000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	6	0.079	2000	80000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.103	2000	60000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	8	0.114	1000	50000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.198	1000	35000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	8	0.243	1000	25000	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	8	0.361	1000	16000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	8	0.460	1000	12000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	8	0.560	1000	12000	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	9	0.855	1000	6000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	10	0.950	1000	5000	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	10	1.300	1000	3750	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	12	1.910	500	2500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	12	3.480	500	1250	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	12	4.199	250	1200	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	14	4.916	250	950	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	14	5.800	250	850	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	14	8.100	150	500	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	14	9.400	150	400	

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electro zinc plating 6-8 cr6 free.

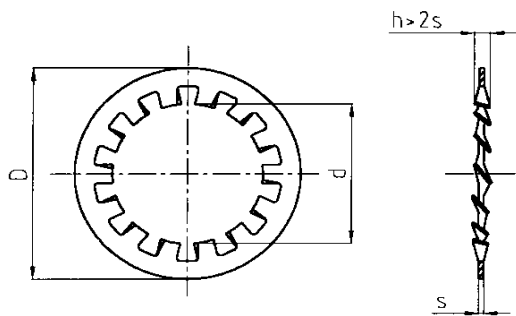
Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Toothed washer for fasteners with limited tightening torques.

In comparison with the external toothing type, this washer is recommended for not flat supporting surface.



Toothed washer

Rondella dentellata

Zahnscheibe

INTERNAL TOOTHED ASME B 18.21.1

CARBON STEEL C 60 EN 10132

DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
N.10	4.95-5.18	9.37-9.67	0.45-0.61	8	0.153	1000	35000	
1/4"	6.50-6.78	11.83-12.14	0.59-0.71	8	0.300	1000	15000	
5/16"	8.12-8.43	15.08-15.41	0.71-0.86	8	0.530	1000	10000	
3/8"	9.75-10.05	17.20-17.57	0.81-1.01	10	0.750	1000	7500	
7/16"	11.37-11.70	19.58-20.04	0.81-1.01	10	1.164	1000	5000	
1/2"	13.00-13.43	22.02-22.42	0.94-1.14	10	1.360	1000	3750	
1"	25.88-26.49	40.97-41.57	1.50-1.70	14	7.800	150	500	

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 cr6 free.

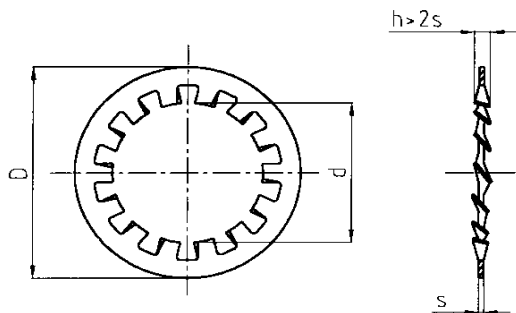
Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Toothed washer for fasteners with limited tightening torques.

In comparison with the external toothing type, this washer is recommended for not flat supporting surface.

INTERNAL TOOTHED DIN 6797 J
STAINLESS STEEL AISI 304 EN 10088-2


DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.34	4.20-4.50	0.27-0.33	6	0.020	5000	275000	1000
M 2.3	2.50-2.64	4.70-5.00	0.36-0.44	6	0.033	5000	200000	1000
M 2.5	2.70-2.84	5.20-5.50	0.36-0.44	6	0.044	5000	170000	1000
M 3.0	3.20-3.38	5.70-6.00	0.36-0.44	6	0.048	2000	160000	500
M 3.5	3.70-3.88	6.64-7.00	0.46-0.54	6	0.078	2000	80000	500
M 4.0	4.30-4.48	7.64-8.00	0.46-0.54	8	0.115	2000	60000	500
M 5.0	5.10-5.28	8.64-9.00	0.46-0.54	8	0.124	1000	50000	200
M 5.0	5.30-5.48	9.64-10.00	0.55-0.65	8	0.190	1000	35000	200
M 6.0	6.40-6.62	10.57-11.00	0.65-0.75	8	0.249	1000	25000	200
M 7.0	7.40-7.62	12.07-12.50	0.75-0.85	8	0.376	1000	16000	200
M 8.0	8.20-8.42	13.57-14.00	0.75-0.85	8	0.470	1000	12000	200
M 8.0	8.40-8.62	14.57-15.00	0.75-0.85	8	0.570	1000	12000	200
M 10.0	10.50-10.77	17.57-18.00	0.85-0.95	9	0.870	1000	6000	100
M 12.0	13.00-13.27	19.98-20.50	0.94-1.06	10	0.990	1000	5000	100
M 14.0	15.00-15.27	23.48-24.00	0.94-1.06	10	1.330	1000	3750	100
M 16.0	17.00-17.27	25.48-26.00	1.14-1.26	12	2.090	500	2500	100
M 18.0	19.00-19.33	29.48-30.00	1.34-1.46	12	3.550	500	1500	
M 20.0	21.00-21.33	32.38-33.00	1.34-1.46	12	3.850	250	1200	
M 22.0	23.00-23.33	35.38-36.00	1.42-1.58	14	4.780	250	950	
M 24.0	25.00-25.33	37.38-38.00	1.42-1.58	14	5.565	250	850	
M 27.0	28.00-28.33	43.38-44.00	1.52-1.68	14	6.800	150	500	
M 30.0	31.00-31.39	47.38-48.00	1.52-1.68	14	8.800	150	400	

Dimensions in mm

Technical details:

Hardness: 140 - 250 Hv.

Tightening torques: see table.

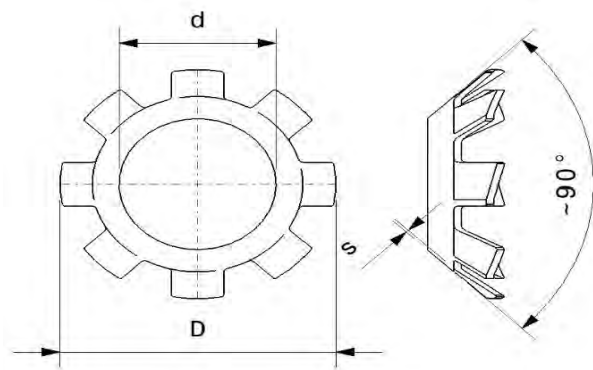
Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Features and specific use:

Toothed washer for fasteners with limited tightening torques.

In comparison with the external toothing type, this washer is recommended for not flat supporting surface.



EXTERNAL TOOTHED FOR COUNTERSUNK HEAD DIN 6797 V

CARBON STEEL C 60 EN 10132

DIMENSIONS AND FEATURES						PACKAGING	
For screws of	d min.-max.	D ~	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 4.0	4.30-4.48	8.00	0.24-0.27	8	0.050	2000	65000
M 5.0	5.30-5.48	9.80	0.29-0.32	8	0.120	1000	2000
M 6.0	6.40-6.62	11.80	0.39-0.42	10	0.200	1000	25000
M 8.0	8.40-8.62	15.30	0.39-0.42	10	0.400	1000	10000
M 10.0	10.50-10.77	19.00	0.48-0.52	10	0.700	1000	4000
M 12.0	13.00-13.27	23.00	0.48-0.52	10	1.200	1000	3000
M 14.0	15.00-15.27	26.20	0.58-0.62	12	1.300	500	2000
M 16.0	17.00-17.27	30.20	0.58-0.62	12	1.300	500	1500

Dimensions in mm

Technical details:

Hardness: 350 - 425 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 cr6 free.

Mechanical zinc plating 12 my cr6 free.

Other coatings upon customer request.

Features and specific use:

Washer with overlapped teeth for fasteners with limited tightening torques. Recommended exclusively for clamping conical head screws.

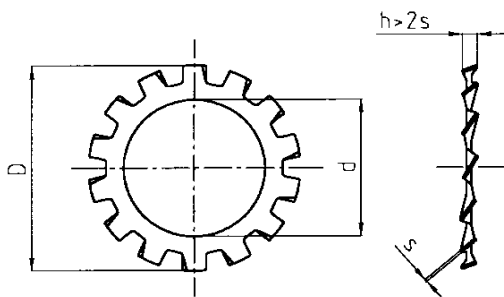
Toothed washer

Rondella dentellata

Zahnscheibe

EXTERNAL TOOTHED DIN 6906

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.5	2.25-2.35	5.32-5.50	0.36-0.44	6	0.045		170000	
M 3.0	2.70-2.80	5.82-6.00	0.36-0.44	6	0.050		160000	
M 3.5	3.20-3.32	6.78-7.00	0.46-0.54	6	0.080		100000	
M 4.0	3.60-3.72	7.78-8.00	0.46-0.54	8	0.100		60000	
M 5.0	4.55-4.67	8.78-9.00	0.55-0.65	8	0.167		40000	
M 6.0	5.50-5.57	10.73-11.00	0.65-0.75	8	0.220		25000	
M 8.0	7.40-7.55	13.73-14.00	0.75-0.85	8	0.400		12000	

Dimensions in mm

Technical details:

Hardness: 410 - 490 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Sorted out material to prevent the presence of foreign parts.

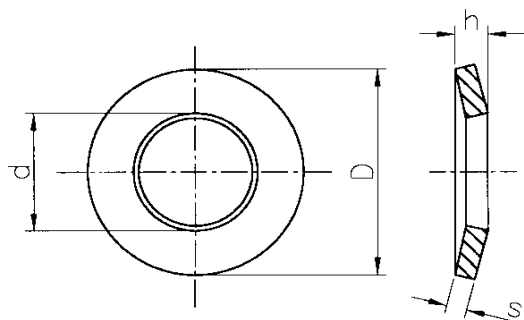
Anticorrosion surface treatment:

Dry and clean surface.

Copper plating 3-4 my.

Features and specific use:

Washer to be used only for preassembling with metric pitch screws (for sems).



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.45	4.70-5.00	0.37-0.43	0.50-0.60	0.039	5000	250000	1000
M 2.5	2.70-2.95	5.70-6.00	0.47-0.53	0.62-0.72	0.071	5000	110000	1000
M 3.0	3.20-3.50	6.64-7.00	0.57-0.63	0.75-0.85	0.126	2000	100000	500
M 3.5	3.70-4.00	7.64-8.00	0.77-0.83	0.96-1.06	0.209	2000	45000	500
M 4.0	4.30-4.60	8.64-9.00	0.96-1.04	1.18-1.30	0.335	2000	35000	500
M 5.0	5.30-5.60	10.57-11.00	1.16-1.24	1.40-1.55	0.625	1000	17500	200
M 6.0	6.40-6.76	13.57-14.00	1.46-1.54	1.80-2.00	1.289	1000	9000	200
M 7.0	7.40-7.76	16.57-17.00	1.70-1.80	2.10-2.30	2.529	1000	5000	100
M 8.0	8.40-8.76	17.57-18.00	1.95-2.05	2.35-2.60	2.829	1000	4000	100
M 10.0	10.50-10.93	22.48-23.00	2.45-2.55	2.90-3.20	5.920	500	2000	100
M 12.0	13.00-13.43	28.48-29.00	2.94-3.06	3.65-3.95	11.399	250	1000	50
M 14.0	15.00-15.43	34.38-35.00	3.44-3.56	4.30-4.65	21.440	200	500	
M 16.0	17.00-17.43	38.38-39.00	3.92-4.08	4.85-5.25	28.299	100	400	
M 18.0	19.00-19.52	41.38-42.00	4.42-4.58	5.40-5.80	36.759	50	250	
M 20.0	21.00-21.52	44.38-45.00	4.92-5.08	6.00-6.40	47.500	50	250	
M 22.0	23.00-23.52	48.38-49.00	5.42-5.58	6.55-7.05	61.000		150	
M 24.0	25.00-25.52	55.26-56.00	5.92-6.08	7.25-7.75	87.400		125	

Dimensions in mm

Technical details:

Hardness: 420 - 490 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mechanical zinc plating 12my Cr6 free.

Yellow mechanical zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

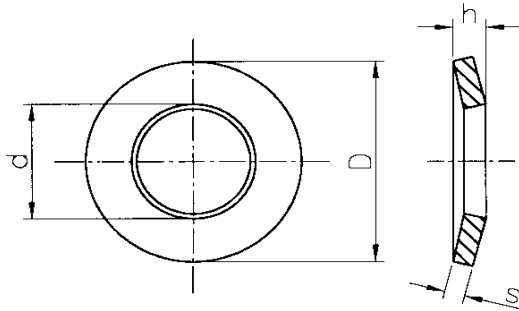
Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with high elastic stress for heavy applications with high tightening torques.

Recommended in case of breaking, settlements, erosion and differential expansion of the parts which constitute the assembling.



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.45	4.70-5.00	0.37-0.43	0.50-0.60	0.050	5000		1000
M 2.5	2.70-2.95	5.70-6.00	0.47-0.53	0.61-0.72	0.074	5000		1000
M 3.0	3.20-3.50	6.64-7.00	0.57-0.63	0.72-0.85	0.125	2000		500
M 3.5	3.70-4.00	7.64-8.00	0.77-0.83	0.92-1.06	0.250	2000		500
M 4.0	4.30-4.60	8.64-9.00	0.96-1.04	1.12-1.30	0.380	2000		500
M 5.0	5.30-5.60	10.57-11.00	1.16-1.24	1.35-1.55	0.620	1000		200
M 6.0	6.40-6.76	13.57-14.00	1.46-1.54	1.70-2.00	1.523	1000		200
M 7.0	7.40-7.76	16.57-17.00	1.70-1.80	2.00-2.30	2.530	1000		100
M 8.0	8.40-8.76	17.57-18.00	1.95-2.05	2.24-2.60	2.850	1000		100
M 10.0	10.50-10.93	22.48-23.00	2.45-2.55	2.80-3.20	6.450	500		100
M 12.0	13.00-13.43	28.48-29.00	2.94-3.06	3.43-3.95	12.400	250		50
M 14.0	15.00-15.43	34.38-35.00	3.44-3.56	4.04-4.65	21.441	200		
M 16.0	17.00-17.43	38.38-39.00	3.92-4.08	4.58-5.25	28.799	100		

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

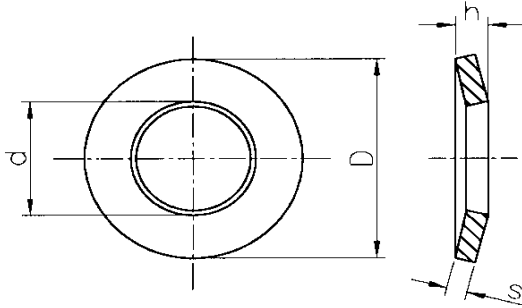
Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Features and specific use:

Stainless steel washer with the highest coefficient of elasticity for heavy applications with high tightening torques. Recommended in case of breaking, settlements, erosion and differential expansion of the parts of the joint connection.



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 5.0	5.30-5.60	14.57-15.35	1.36-1.44	1.80-2.10	1.650		7500	
M 6.0	6.40-6.76	17.57-18.35	1.65-1.75	2.10-2.40	2.800		4000	
M 8.0	8.40-8.76	17.57-18.35	1.95-2.05	2.40-2.70	3,200		4000	
M 8.0	8.40-8.76	21.48-22.42	1.95-2.05	2.60-3.00	5.480		2250	
M 10.0	10.50-10.93	26.48-27.42	2.74-2.86	3.30-3.70	10.100		1000	
M 12.0	13.00-13.43	23.48-24.42	2.74-2.86	3.20-3.60	6.450		1500	
M 12.0	13.00-13.43	29.48-30.42	3.14-3.26	3.80-4.20	14.415		750	
M 14.0	15.00-15.43	27.48-28.42	2.94-3.06	3.50-3.90	9.300		1200	
M 16.0	17.00-17.43	31.50-32.50	3.33-3.47	3.90-4.30	14.230		750	
M 20.0	21.00-21.52	44.50-45.50	4.33-4.47	5.90-6.40	41.800		250	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

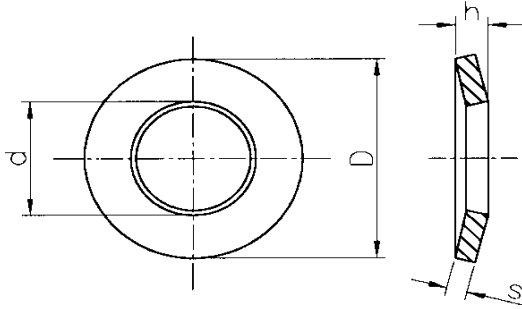
Burnishing and light oiling.
 White mechanical zinc plating 12my Cr6 free.
 Yellow mechanical zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Other coatings upon customer request.

Features and specific use:

Washer with high elastic stress for heavy applications with high tightening torques.
 Recommended in case of breaking, settlements, erosion and differential expansion of the parts of the joint connection.

Conical elastic washer

Rondella conica Spannscheibe

DIN 6908
CARBON STEEL C 60 EN 10132


DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	2.75-2.85	6.64-7.00	0.56-0.64	0.72-0.85	0.157		100000	
M 4.0	3.60-3.72	8.64-9.00	0.95-1.05	1.12-1.30	0.416		35000	
M 5.0	4.55-4.67	10.57-11.00	1.14-1.26	1.35-1.55	0.741		17500	
M 6.0	5.50-5.62	13.57-14.00	1.43-1.57	2.30-2.60	1.409		9000	
M 8.0	7.40-7.55	17.57-18.00	1.91-2.09	2.80-3.10	3.160		4000	
M 10.0	9.30-9.45	22.48-23.00	2.46-2.54	3.30-3.60	6.824		1750	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.
 Tightening couples: see table.
 Chemical analysis of raw material: see table.
 Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.

Features and specific use:

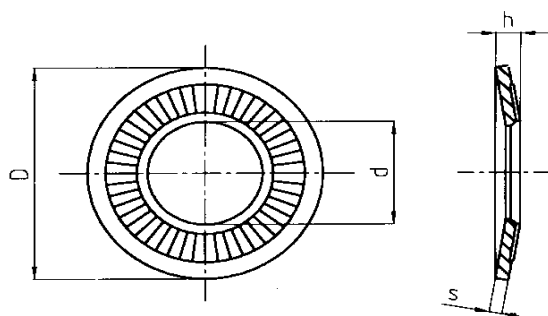
Washer to be used only for preassembling with metric pitch screws (for sems)

Conical elastic contact washer

Rondella conica contact Kontaktscheibe

CS N FE 25-511 M

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	Loading test [N] [N]	Min. residual deflection	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.35	7.71-8.29	0.57-0.63	0.80-1.00	28	0.180	2400	0.15	2000	60000	200
M 4.0	4.10-4.40	9.71-10.29	0.86-0.94	1.15-1.40	32	0.430	4200	0.15	2000	25000	500
M 5.0	5.10-5.40	11.65-12.35	1.06-1.14	1.45-1.80	36	0.720	6800	0.20	1000	15000	200
M 6.0	6.10-6.40	13.65-14.35	1.26-1.34	1.75-2.10	45	1.254	9500	0.25	1000	10000	200
M 8.0	8.20-8.56	17.65-18.35	1.36-1.44	1.90-2.35	45	2.000	17500	0.35	1000	5000	100
M 10.0	10.20-10.56	21.58-22.42	1.55-1.65	2.25-2.75	45	3.600	27500	0.45	1000	3000	100
M 12.0	12.40-12.83	26.58-27.42	1.75-1.85	2.60-3.10	45	6.316	40000	0.60	500	1750	50
M 14.0	14.40-14.83	29.58-30.42	2.34-2.46	3.20-3.70	45	9.700	55000	0.60	250	1000	
M 16.0	16.40-16.83	31.50-32.50	2.74-2.86	3.60-4.10	60	12.100	75000	0.65	250	900	
M 20.0	20.50-21.02	39.50-40.50	3.14-3.26	4.30-4.90	60	22.100	100000	0.70	100	500	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

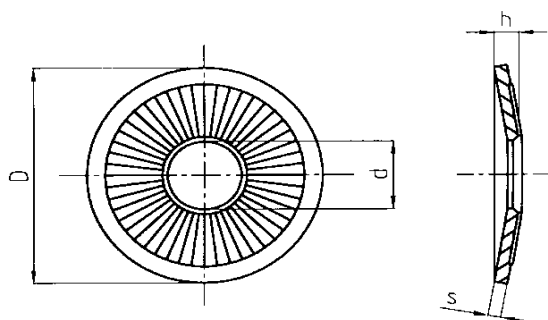
Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

In every field of applications in which high resistance to loosening and elastic stress are required on large supporting surface.



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	Loading test [N] [N]	Min. residual deflection	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.35	9.65-10.35	0.57-0.63	0.95-1.20	28	0.325	2400	0.25	2000	30000	
M 4.0	4.10-4.40	13.65-14.35	0.96-1.04	1.40-1.80	32	1.102	4200	0.30	2000	13000	
M 5.0	5.10-5.40	15.65-16.35	1.16-1.24	1.70-2.10	36	1.568	6800	0.35	1000	6500	
M 6.0	6.10-6.40	17.65-18.35	1.36-1.44	2.10-2.50	45	2.466	9500	0.40	1000	5000	
M 8.0	8.20-8.56	21.58-22.42	1.55-1.65	2.20-2.70	45	3.759	17500	0.50	1000	3000	
M 10.0	10.20-10.56	26.58-27.42	1.75-1.85	2.60-3.10	45	6.938	27500	0.70	500	1750	
M 12.0	12.40-12.83	31.50-32.50	1.95-2.05	3.10-3.60	45	10.694	40000	0.90	250	1100	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

In every field of applications in which high resistances to loosening and elastic stress are required on soft surfaces (plastic, aluminium, etc...) and slotted holes.

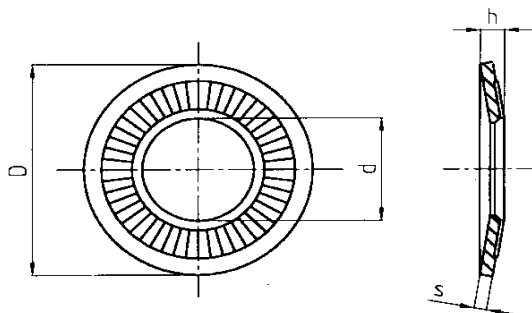
Conical elastic contact washer

Rondella conica contact Kontaktscheibe

CS N FE 25-511 M

STAINLESS STEEL AISI 304 EN 10088-2

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.35	7.71-8.29	0.57-0.63	0.80-1.00	28	0.188	2000	60000	500
M 4.0	4.10-4.40	9.71-10.29	0.86-0.94	1.15-1.40	32	0.430	2000	25000	500
M 5.0	5.10-5.40	11.65-12.35	1.06-1.14	1.45-1.80	36	0.730	1000	15000	200
M 6.0	6.10-6.40	13.65-14.35	1.26-1.34	1.75-2.10	45	1.170	1000	10000	200
M 8.0	8.20-8.56	17.65-18.35	1.36-1.44	1.90-2.35	45	2.200	1000	5000	100
M 10.0	10.20-10.56	21.58-22.42	1.55-1.65	2.25-2.75	45	3.706	1000	3000	100
M 12.0	12.40-12.83	26.58-27.42	1.75-1.85	2.60-3.10	45	6.316	500	1750	50
M 14.0	14.40-14.83	29.58-30.42	2.34-2.46	3.20-3.70	45	9.800	250	1000	
M 16.0	16.40-16.83	31.50-32.50	2.74-2.86	3.60-4.10	60	12.500	250	900	
M 20.0	20.50-21.02	39.50-40.50	3.14-3.26	4.30-4.90	60	23.290	100	500	

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Stainless steel washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead. In every field of applications in which high resistance to loosening and elastic stress are required on large supporting surface.

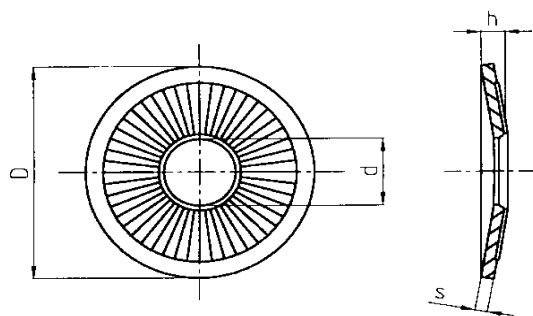
Conical elastic contact washer

Rondella conica contact Kontaktscheibe

CS N FE 25-511 L

STAINLESS STEEL AISI 304 EN 10088-2

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	13.65-14.35	0.96-1.04	1.40-1.80	32	1.102	2000		
M 5.0	5.10-5.40	15.65-16.35	1.16-1.24	1.70-2.10	36	1.650	1000		
M 6.0	6.10-6.40	17.65-18.35	1.36-1.44	2.10-2.50	45	2.466	1000		
M 8.0	8.20-8.56	21.58-22.42	1.55-1.65	2.20-2.70	45	4.085	1000		
M 10.0	10.20-10.56	26.58-27.42	1.75-1.85	2.60-3.10	45	6.938	500		
M 12.0	12.40-12.83	31.50-32.50	1.95-2.05	3.10-3.60	45	10.694	250		

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) guarantees
a good corrosion resistance.

Features and specific use:

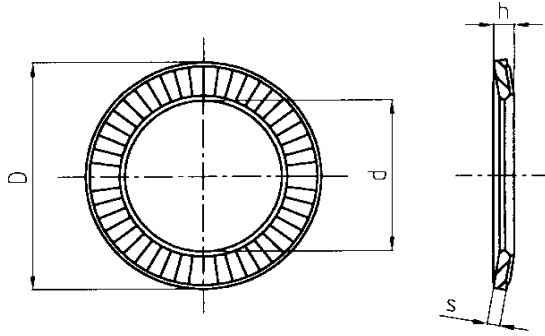
Stainless steel washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead. In every field of applications in which high resistances to loosening and elastic stress are required on soft surfaces (plastic, aluminium, etc...).

Conical elastic contact washer

Rondella conica contact Kontaktscheibe

CS N FE 25-511 N

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	Loading test [N] [N]	Min. residual deflection	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.35	5.76-6.24	0.47-0.53	0.70-0.90	28	0.081	2400	0.10	2000	175000	
M 4.0	4.10-4.40	7.71-8.29	0.77-0.83	1.00-1.20	32	0.200	4200	0.12	2000	45000	
M 5.0	5.10-5.40	9.71-10.29	0.96-1.04	1.25-1.50	36	0.456	6800	0.15	1000	25000	
M 6.0	6.10-6.40	11.65-12.35	1.16-1.24	1.55-1.85	45	0.790	9500	0.20	1000	12500	
M 8.0	8.20-8.56	15.65-16.35	1.36-1.44	1.80-2.20	45	1.500	17500	0.25	1000	7000	
M 10.0	10.20-10.56	19.58-20.42	1.55-1.65	2.10-2.60	45	2.640	27500	0.35	1000	3500	
M 12.0	12.40-12.83	23.58-24.42	1.75-1.85	2.40-2.90	45	4.350	40000	0.40	500	2000	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

In every range of applications where resistance to loosening and elastic stress are required with a small washer diameter.

Conical elastic contact washer

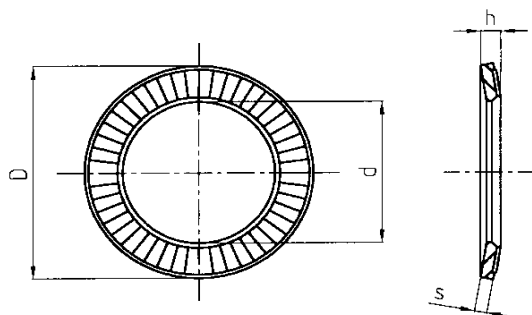
Rondella conica contact

Kontaktscheibe

CS N FE 25-511 N

STAINLESS STEEL AISI 304 EN 10088-2

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.35	5.76-6.24	0.47-0.53	0.70-0.90	28	0.071	2000		
M 4.0	4.10-4.40	7.71-8.29	0.77-0.83	1.00-1.20	32	0.195	2000		
M 5.0	5.10-5.40	9.71-10.29	0.96-1.04	1.25-1.50	36	0.405	1000		
M 6.0	6.10-6.40	11.65-12.35	1.16-1.24	1.55-1.85	45	0.790	1000		
M 8.0	8.20-8.56	15.65-16.35	1.36-1.44	1.80-2.20	45	1.500	1000		
M 10.0	10.20-10.56	19.58-20.42	1.55-1.65	2.10-2.60	45	2.710	1000		
M 12.0	12.40-12.83	23.58-24.42	1.75-1.85	2.40-2.90	45	4.701	500		

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Features and specific use:

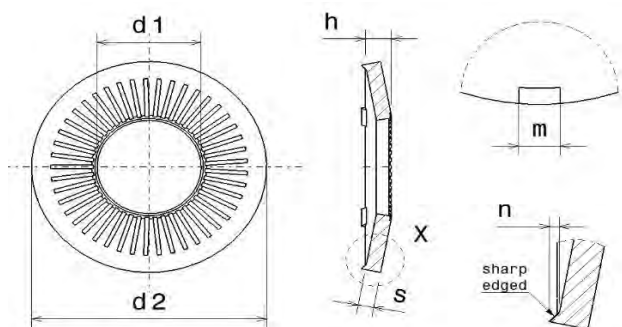
Stainless steel washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead. In every range of applications where resistance to loosening and elastic stress are required with a small washer diameter.

Conical elastic contact washer

Rondella conica contact Kontaktscheibe

TOOTHED - SN 70093

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES										PACKAGING	
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	n min.-max.	m min.-max.	No. of knurls	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 3.0	3.10-3.35	5.80-6.20	0.57-0.63	0.80-0.95	0.10-0.30	0.70-0.90	28	6	0.081	2000	175000
M 4.0	4.10-4.40	7.80-8.20	0.77-0.83	1.00-1.15	0.20-0.40	1.10-1.30	32	6	0.200	2000	50000
M 5.0	5.10-5.40	9.80-10.20	0.97-1.03	1.25-1.50	0.30-0.70	1.90-2.10	36	6	0.410	1000	22000
M 6.0	6.10-6.40	11.80-12.20	1.16-1.24	1.50-1.80	0.30-0.70	2.00-2.20	45	6	0.710	1000	12000
M 8.0	8.20-8.56	15.80-16.20	1.36-1.44	1.95-2.40	0.30-0.70	2.00-2.20	45	6	1.500	1000	6500
M 10.0	10.20-10.56	19.75-20.25	1.56-1.64	2.15-2.60	0.30-0.70	2.00-2.20	45	6	2.680	1000	3500
M 12.0	12.40-12.80	23.75-24.25	1.56-1.64	2.15-2.60	0.30-0.70	2.00-2.20	45	6	3.850	500	3000
M 14.0	14.40-14.83	23.75-24.25	1.56-1.64	2.05-2.50	0.30-0.70	2.00-2.20	60	6	3.210	500	3000
M 16.0	16.40-16.80	31.70-32.30	2.44-2.56	3.50-3.95	0.30-0.70	4.50-4.70	60	6	10.900	100	1000
M 20.0	20.50-21.00	39.70-40.30	2.94-3.06	4.20-4.65	0.40-0.80	4.50-4.70	60	6	20.200	100	400

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Spring washer which has:

- a round knurled ring with resistance to loosening on its contact surface with the screw's underhead.

- a series of teeth on the surface in contact with the supporting field, which doesn't allow the rotation of the washer during the tightening.

Recommended for electrical contact fasteners.

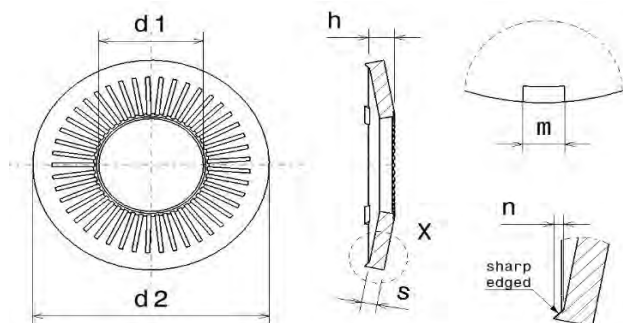
Conical elastic contact washer

Rondella conica contact Kontaktscheibe

TOOTHED - SN 70093

STAINLESS STEEL AISI 304 EN 10088-2

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES										PACKAGING	
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	n min.-max.	m min.-max.	No. of knurls	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 3.0	3.10-3.35	5.80-6.20	0.57-0.63	0.80-0.95	0.10-0.30	0.70-0.90	28	6	0.085	2000	175000
M 4.0	4.10-4.40	7.80-8.20	0.77-0.83	1.00-1.15	0.20-0.40	1.10-1.30	32	6	0.200	2000	50000
M 5.0	5.10-5.40	9.80-10.20	0.97-1.03	1.25-1.50	0.30-0.70	1.90-2.10	36	6	0.410	1000	22000
M 6.0	6.10-6.40	11.80-12.20	1.16-1.24	1.50-1.80	0.30-0.70	2.00-2.20	45	6	0.700	1000	12000
M 8.0	8.20-8.56	15.80-16.20	1.36-1.44	1.95-2.40	0.30-0.70	2.00-2.20	45	6	1.500	1000	6500
M 8.0*	8.20-8.56	15.80-16.20	1.36-1.44	1.95-2.40	0.90-1.30	2.00-2.20	45	6	1.500	1000	6500
M 10.0	10.20-10.56	19.75-20.25	1.56-1.64	2.15-2.60	0.30-0.70	2.00-2.20	45	6	2.750	1000	3500
M 10.0*	10.20-10.56	19.75-20.25	1.56-1.64	2.15-2.60	0.90-1.30	2.00-2.20	45	6	2.750	1000	3500
M 12.0	12.40-12.80	23.75-24.25	1.56-1.64	2.15-2.60	0.30-0.70	2.00-2.20	45	6	3.920	500	3000
M 12.0*	12.40-12.80	23.75-24.25	1.56-1.64	2.15-2.60	0.90-1.30	2.00-2.20	45	6	3.920	500	3000
M 16.0	16.40-16.80	31.70-32.30	2.44-2.56	3.50-3.95	0.30-0.70	4.50-4.70	60	6	10.950	250	1000
M 16.0*	16.40-16.80	31.70-32.30	2.44-2.56	3.50-3.95	0.90-1.30	4.50-4.70	60	6	10.950	250	1000
M 20.0	20.50-21.00	39.70-40.30	2.94-3.06	4.20-4.65	0.40-0.80	4.50-4.70	60	6	21.040	100	400
M 20.0*	20.50-21.00	39.70-40.30	2.94-3.06	4.20-4.65	1.00-1.40	4.50-5.50	60	6	21.040	100	400

Dimensions in mm

* Version with higher teeth available just in stainless steel A4

Technical details:

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Spring washer which has:

- a round knurled ring with resistance to loosening on its contact surface with the screw's underhead.

- a series of teeth on the surface in contact with the supporting field, which doesn't allow the rotation of the washer during the tightening.

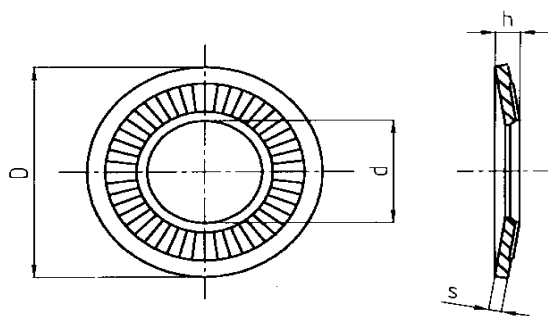
Recommended for electrical contact

Conical elastic contact washer

Rondella conica contact
Kontaktscheibe

CS N FE 25-511 M KOMBI

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	3.60-3.72	9.71-10.29	0.86-0.94	1.15-1.40	0.450		25000	
M 5.0	4.55-4.67	11.65-12.35	1.06-1.14	1.45-1.80	0.768		15000	
M 6.0	5.50-5.62	13.80-14.20	1.26-1.34	1.75-2.10	1.230		10000	
M 8.0	7.35-7.50	17.80-18.20	1.35-1.45	2.10-2.40	2.205		6000	
M 10.0	9.30-9.55	21.60-22.40	1.55-1.65	2.20-2.70	3.730		3000	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

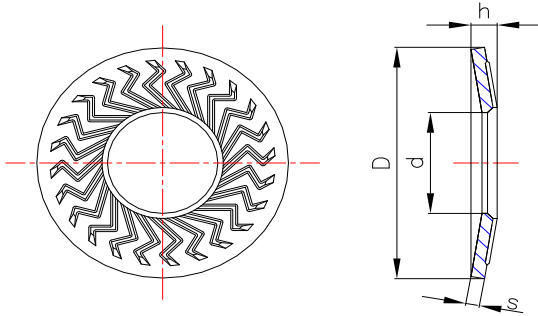
Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.

Features and specific use:

Washer to be used only for preassembling with metric pitch screws (for sems).



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	9.80-10.20	0.95-1.05	1.25-1.50	16	0.470	2000	25000	500
M 5.0	5.10-5.40	11.80-12.20	1.16-1.24	1.55-1.90	20	0.790	1000	15000	200
M 6.0	6.10-6.40	13.77-14.20	1.36-1.44	1.85-2.20	20	1.240	1000	10000	200
M 8.0	8.20-8.56	17.68-18.20	1.36-1.44	1.95-2.40	24	2.030	1000	5000	100
M 10.0	10.20-10.56	21.73-22.25	1.55-1.65	2.25-2.75	24	3.490	1000	3000	100
M 12.0	12.40-12.83	26.73-27.25	1.75-1.85	2.60-3.10	24	6.010	500	1750	50
M 14.0	14.40-14.83	29.63-30.25	2.34-2.46	3.20-3.70	24	9.370	250	1000	
M 16.0	16.40-16.83	31.88-32.50	2.44-2.56	3.45-3.95	28	10.650	250	900	
M 18.0	18.50-19.25	34.38-35.00	2.94-3.06	4.00-4.50	28	15.200	250	750	
M 20.0	21.00-21.75	39.38-40.00	2.94-3.06	4.20-4.70	30	20.400	100	500	
M 22.0	23.00-23.75	44.38-45.00	3.44-3.56	4.80-5.30	30	30.400	100	400	
M 24.0	25.00-25.75	49.38-50.00	3.44-3.56	5.10-5.60	32	38.200	100	350	
M 27.0	28.00-28.85	59.26-60.00	3.91-4.09	6.10-6.60	36	69.000	50	200	
M 30.0	31.00-31.85	69.26-70.00	4.41-4.59	7.30-7.80	36	109.000	50	125	

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.
 White mech. zinc plating 12my Cr6 free.
 Yellow mech. zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Other coatings upon customer request.

Features and specific use:

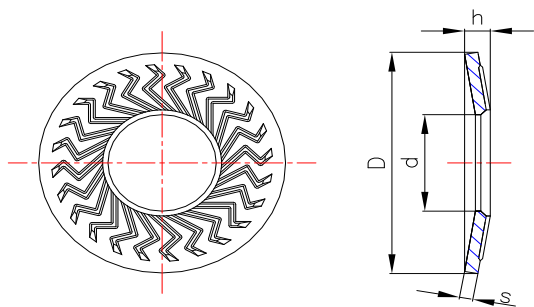
Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.
 In every field of applications in which high resistance to loosening and elastic stress are required on large supporting surface.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT M

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	9.80-10.20	0.95-1.05	1.25-1.50	16	0.469	2000	25000	500
M 5.0	5.10-5.40	11.80-12.20	1.16-1.24	1.55-1.90	20	0.810	1000	15000	200
M 6.0	6.10-6.40	13.77-14.20	1.36-1.44	1.85-2.20	20	1.280	1000	10000	200
M 8.0	8.20-8.56	17.68-18.20	1.36-1.44	1.95-2.40	24	2.050	1000	5000	100
M 10.0	10.20-10.56	21.73-22.25	1.55-1.65	2.25-2.75	24	3.710	1000	3000	100
M 12.0	12.40-12.83	26.73-27.25	1.75-1.85	2.60-3.10	24	6.320	500	1750	50
M 14.0	14.40-14.83	29.63-30.25	2.34-2.46	3.20-3.70	24	10.230	250	1000	
M 16.0	16.40-16.83	31.88-32.50	2.44-2.56	3.45-3.95	28	11.160	250	900	
M 18.0	18.50-19.25	34.38-35.00	2.94-3.06	4.00-4.50	28	15.200	250	750	
M 20.0	21.00-21.75	39.38-40.00	2.94-3.06	4.20-4.70	30	20.400	100	500	
M 22.0	23.00-23.75	44.38-45.00	3.44-3.56	4.80-5.30	30	30.400	100	400	
M 24.0	25.00-25.75	49.38-50.00	3.44-3.56	5.10-5.60	32	38.200	100	350	
M 27.0	28.00-28.85	59.26-60.00	3.91-4.09	6.10-6.60	36	69.000	50	200	
M 30.0	31.00-31.85	69.26-70.00	4.41-4.59	7.30-7.80	36	109.000	50	125	

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 316 (A4)

has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

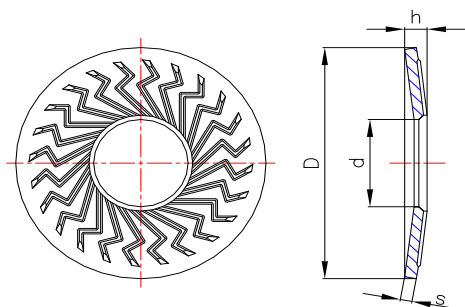
Stainless steel washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead. In every field of applications in which high resistance to loosening and elastic stress are required on large supporting surface.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT L

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 6.0	6.10-6.40	17.68-18.20	1.36-1.44	2.15-2.55	20	2.470	1000	5000	200
M 8.0	8.20-8.56	21.73-22.25	1.84-1.96	2.60-3.00	24	4.599	1000	2500	100
M 10.0	10.20-10.56	26.73-27.25	2.34-2.46	3.20-3.70	24	9.200	500	1400	100
M 12.0	12.40-12.83	31.68-32.30	2.74-2.86	4.10-4.60	24	14.620	250	1000	50

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

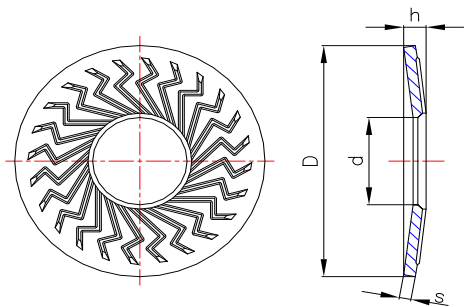
In every field of applications in which high resistances to loosening and elastic stress are required on soft surfaces (plastic, aluminium, etc...) and slotted holes.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT L

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 6.0	6.10-6.40	17.68-18.20	1.36-1.44	2.15-2.55	20	2.500	1000	5000	200
M 8.0	8.20-8.56	21.73-22.25	1.84-1.96	2.60-3.00	24	4.600	1000	2500	100
M 10.0	10.20-10.56	26.73-27.25	2.34-2.46	3.20-3.70	24	9.300	500	1400	100
M 12.0	12.40-12.83	31.68-32.30	2.74-2.86	4.10-4.60	24	14.700	250	1000	50

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 316 (A4)

has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

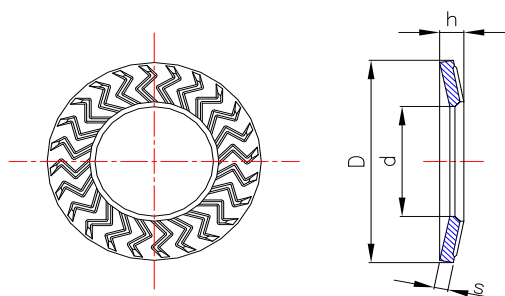
Stainless steel washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead. In every field of applications in which high resistance to loosening and elastic stress are required on very large supporting surface and slotted holes.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT S

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	7.80-8.20	0.95-1.05	1.15-1.40	16	0.250	2000	50000	500
M 5.0	5.10-5.40	9.80-10.20	0.95-1.05	1.25-1.50	20	0.400	1000	25000	500
M 6.0	6.10-6.40	11.77-12.20	1.16-1.24	1.55-1.85	20	0.707	1000	12500	500
M 8.0	8.20-8.56	15.77-16.20	1.36-1.44	1.90-2.40	24	1.500	1000	7000	200
M 10.0	10.20-10.56	19.73-20.25	1.55-1.65	2.10-2.60	24	2.640	1000	3500	200
M 12.0	12.40-12.83	23.73-24.25	1.55-1.65	2.20-2.70	24	3.870	500	2750	100

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

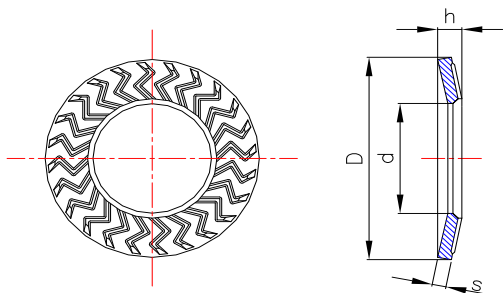
In every range of applications where resistance to loosening and elastic stress are required with a small washer diameter.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT S

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	7.80-8.20	0.95-1.05	1.15-1.40	16	0.250	2000	50000	500
M 5.0	5.10-5.40	9.80-10.20	0.95-1.05	1.25-1.50	20	0.400	1000	25000	500
M 6.0	6.10-6.40	11.77-12.20	1.16-1.24	1.55-1.85	20	0.720	1000	12500	500
M 8.0	8.20-8.56	15.77-16.20	1.36-1.44	1.90-2.40	24	1.500	1000	7000	200
M 10.0	10.20-10.56	19.73-20.25	1.55-1.65	2.10-2.60	24	2.830	1000	3500	200
M 12.0	12.40-12.83	23.73-24.25	1.55-1.65	2.20-2.70	24	3.930	500	2750	100

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

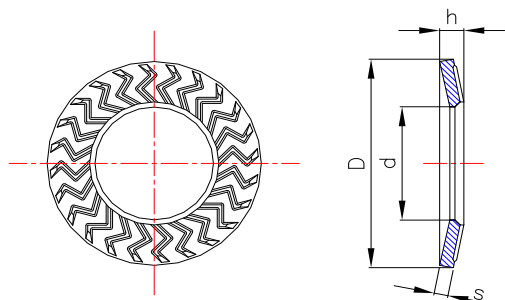
In every range of applications where resistance to loosening and elastic stress are required with a small washer diameter.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT C

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 6.0	6.10-6.40	9.54-9.90	1.36-1.44	1.50-1.80	20	0.410	1000	25000	500
M 8.0	8.20-8.56	12.34-12.70	1.36-1.44	1.55-1.85	24	0.670	1000	17500	200
M 10.0	10.20-10.56	15.74-16.10	1.55-1.65	1.85-2.20	24	1.300	1000	8000	200
M 12.0	12.40-12.83	17.78-18.30	1.75-1.85	2.05-2.45	24	1.650	1000	7500	100
M 14.0	14.40-14.83	20.88-21.40	2.34-2.46	2.70-3.10	24	3.000	1000	3750	100
M 16.0	16.40-16.83	24.08-24.60	2.44-2.56	2.90-3.30	28	4.400	500	2750	100

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

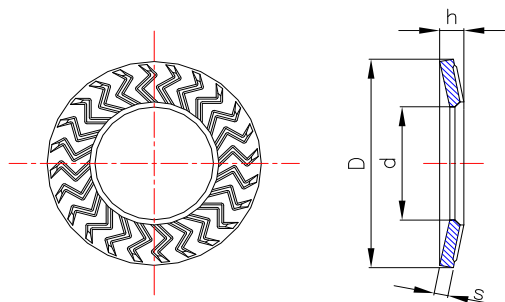
In every range of applications where resistance to loosening and elastic stress are required with a small washer diameter.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

SPERRKANT C

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 6.0	6.10-6.40	9.54-9.90	1.36-1.44	1.50-1.80	20	0.430	1000	25000	500
M 8.0	8.20-8.56	12.34-12.70	1.36-1.44	1.55-1.85	24	0.690	1000	17500	200
M 10.0	10.20-10.56	15.74-16.10	1.55-1.65	1.85-2.20	24	1.310	1000	8000	200
M 12.0	12.40-12.83	17.78-18.30	1.75-1.85	2.05-2.45	24	1.800	1000	7500	100
M 16.0	16.40-16.83	24.08-24.60	2.44-2.56	2.90-3.30	28	4.560	500	2750	100

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 316 (A4)

has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Washer with elasticity that has a round, knurled ring with resistance to loosening on its contact surface with the screw's underhead.

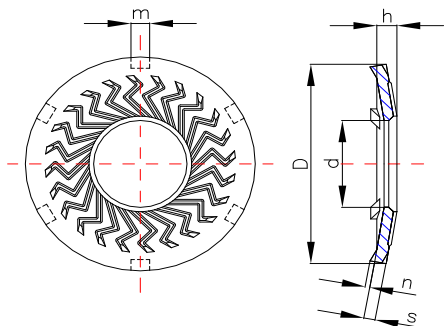
In every range of applications where resistance to loosening and elastic stress are required with a small washer diameter.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

TOOTHED SPERRKANT

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES								PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	7.80-8.20	0.97-1.03	1.20-1.35	16	6	0.250	2000	50000	500
M 5.0	5.10-5.40	9.80-10.20	0.97-1.03	1.25-1.50	20	6	0.410	1000	22000	500
M 6.0	6.10-6.40	11.80-12.20	1.16-1.24	1.50-1.80	20	6	0.710	1000	12000	500
M 8.0	8.20-8.50	15.80-16.20	1.36-1.44	1.95-2.40	24	6	1.500	1000	6500	200
M 10.0	10.20-10.56	19.75-20.25	1.56-1.64	2.15-2.60	24	6	2.680	1000	3500	200
M 12.0	12.40-12.80	23.75-24.25	1.56-1.64	2.15-2.60	24	6	3.850	500	3000	100

Dimensions in mm

Technical details:

Hardness: 420 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.

Features and specific use:

Spring washer which has:

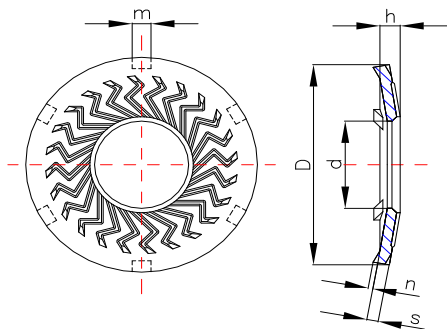
- a round knurled ring with resistance to loosening on its contact surface with the screw's underhead.
- a series of teeth on the surface in contact with the supporting field, which doesn't allow the rotation of the washer during the tightening.

Conical elastic sperrkant washer

Rondella conica sperrkant Sperrkantscheiben

TOOTHED SPERRKANT

STAINLESS STEEL AISI 316 EN 10088-2



DIMENSIONS AND FEATURES								PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	No. of knurls	No. of teeth	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 4.0	4.10-4.40	7.80-8.20	0.97-1.03	1.20-1.35	16	6	0.250	2000	50000	500
M 5.0	5.10-5.40	9.80-10.20	0.97-1.03	1.25-1.50	20	6	0.410	1000	22000	500
M 6.0	6.10-6.40	11.80-12.20	1.16-1.24	1.50-1.80	20	6	0.710	1000	12000	500
M 8.0	8.20-8.50	15.80-16.20	1.36-1.44	1.95-2.40	24	6	1.500	1000	6500	200
M 10.0	10.20-10.56	19.75-20.25	1.56-1.64	2.15-2.60	24	6	2.680	1000	3500	200
M 12.0	12.40-12.80	23.75-24.25	1.56-1.64	2.15-2.60	24	6	3.850	500	3000	100

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 316 (A4)

has a very high acid resistance and it is an antimagnetic material.

Features and specific use:

Spring washer which has:

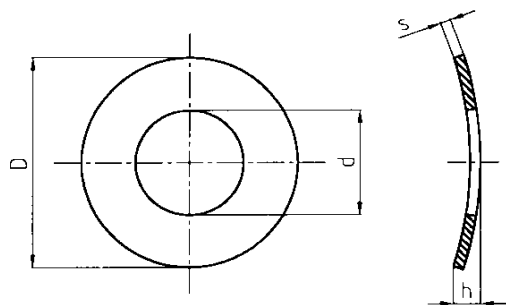
- a round knurled ring with resistance to loosening on its contact surface with the screw's underhead.
 - a series of teeth on the surface in contact with the supporting field, which doesn't allow the rotation of the washer during the tightening.
- Recommended for electrical contact fasteners.

Convexed elastic washer

Rondella bombata
Federscheibe

DIN 137 A

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.45	4.13-4.87	0.27-0.33	0.50-1.00	0.030	5000	280000	1000
M 2.3	2.50-2.75	4.63-5.37	0.27-0.33	0.50-1.00	0.035	5000	240000	1000
M 2.6	2.80-3.05	5.13-5.87	0.27-0.33	0.55-1.10	0.029	5000	200000	1000
M 3.0	3.20-3.50	5.63-6.37	0.35-0.45	0.65-1.30	0.053	2000	170000	500
M 3.5	3.70-4.00	6.55-7.45	0.35-0.45	0.70-1.40	0.070	2000	110000	500
M 4.0	4.30-4.60	7.55-8.45	0.45-0.55	0.80-1.60	0.130	2000	75000	500
M 5.0	5.30-5.60	9.55-10.45	0.45-0.55	0.90-1.80	0.206	1000	35000	200
M 6.0	6.40-6.76	10.45-11.55	0.45-0.55	1.10-2.20	0.235	1000	32000	200
M 7.0	7.40-7.76	11.45-12.55	0.45-0.55	1.20-2.40	0.265	1000	30000	200
M 8.0	8.40-8.76	14.45-15.55	0.45-0.55	1.70-3.40	0.476	1000	15000	200
M 10.0	10.50-10.93	17.45-18.55	0.74-0.86	2.00-4.00	1.050	1000	8500	100

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.
 Electro zinc plating 6-8 my Cr6 free.
 White mech. zinc plating 12my Cr6 free.
 Other coatings upon customer request.

Features and specific use:

Spring washer with reduced thickness and outside diameter for light applications and limited tightening torques.

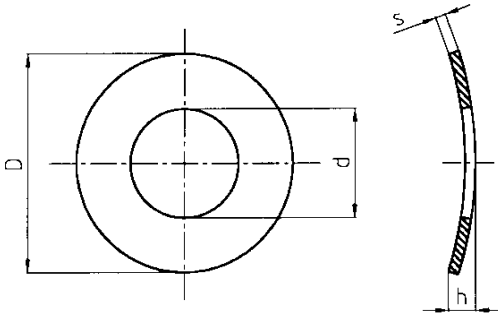
Convexed elastic washer

Rondella bombata

Federscheibe

DIN 137 A

STAINLESS STEEL AISI 304 EN 10088-2



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.20-2.45	4.13-4.87	0.27-0.33	0.50-1.00	0.029	5000		1000
M 2.3	2.50-2.75	4.63-5.37	0.27-0.33	0.50-1.00	0.029	5000		1000
M 2.6	2.80-3.05	5.13-5.87	0.27-0.33	0.55-1.10	0.036	5000		1000
M 3.0	3.20-3.50	5.63-6.37	0.35-0.45	0.65-1.30	0.053	2000		500
M 3.5	3.70-4.00	6.55-7.45	0.35-0.45	0.70-1.40	0.088	2000		500
M 4.0	4.30-4.60	7.55-8.45	0.45-0.55	0.80-1.60	0.130	2000		500
M 5.0	5.30-5.60	9.55-10.45	0.45-0.55	0.90-1.80	0.222	1000		200
M 6.0	6.40-6.76	10.45-11.55	0.45-0.55	1.10-2.20	0.247	1000		200
M 7.0	7.40-7.76	11.45-12.55	0.45-0.55	1.20-2.40	0.265	1000		200
M 8.0	8.40-8.76	14.45-15.55	0.45-0.55	1.70-3.40	0.476	1000		200
M 10.0	10.50-10.93	17.45-18.55	0.74-0.86	2.00-4.00	1.136	1000		100

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

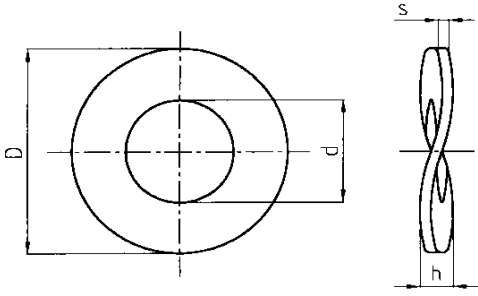
Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Features and specific use:

Stainless steel spring washer with reduced thickness and outside diameter for light applications and limited tightening torques.

Corrugated elastic washer

Rondella ondulata Federscheibe

DIN 137 B
CARBON STEEL C 60 EN 10132


DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.20-3.50	7.55-8.45	0.45-0.55	1.20-1.60	0.144	2000	70000	500
M 3.5	3.70-4.00	7.55-8.45	0.45-0.55	1.30-1.80	0.154	2000	70000	500
M 4.0	4.30-4.60	8.55-9.45	0.45-0.55	1.50-2.00	0.193	2000	60000	500
M 5.0	5.30-5.60	10.45-11.55	0.45-0.55	1.60-2.20	0.266	1000	30000	200
M 6.0	6.40-6.76	11.45-12.55	0.45-0.55	2.00-2.60	0.318	1000	30000	200
M 7.0	7.40-7.76	13.45-14.55	0.74-0.86	2.00-3.00	0.800	1000	15000	200
M 8.0	8.40-8.76	14.45-15.55	0.74-0.86	2.00-3.00	0.700	1000	10000	200
M 10.0	10.50-10.93	20.35-21.65	0.93-1.07	3.20-4.20	2.040	1000	7000	100
M 12.0	13.00-13.43	23.35-24.65	1.13-1.27	3.50-5.00	3.100	1000	4500	100
M 14.0	15.00-15.43	27.58-28.42	1.52-1.68	4.00-6.00	5.500	250	2500	
M 16.0	17.00-17.43	29.35-30.65	1.52-1.68	4.40-6.40	5.700	500	2500	
M 18.0	19.00-19.52	33.20-34.80	1.52-1.68	4.60-6.60	7.400	500	1500	
M 20.0	21.00-21.52	35.20-36.80	1.52-1.68	5.40-7.40	8.430	250	650	
M 22.0	23.00-23.52	39.20-40.80	1.70-1.90	5.80-7.80	11.880	200	750	
M 20.0	25.00-25.52	43.20-44.80	1.70-1.90	6.20-8.20	14.500	150	500	

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

Electrozinc plating 6-8 my Cr6 free.

White mech. zinc plating 12my Cr6 free.

Other coatings upon customer request.

Features and specific use:

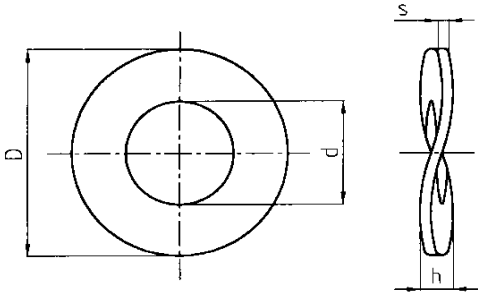
Spring washer with major supporting surface which enables to have more resistance to loosening in comparison with the convixed one.

Corrugated elastic washer

Rondella ondulata
Federscheibe

DIN 137 B

STAINLESS STEEL AISI 304 EN 10088-2



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.20-3.50	7.55-8.45	0.45-0.55	0.80-1.60	0.166	2000		500
M 3.5	3.70-4.00	7.55-8.45	0.45-0.55	0.90-1.80	0.140	2000		500
M 4.0	4.30-4.60	8.55-9.45	0.45-0.55	1.00-2.00	0.180	2000		500
M 5.0	5.30-5.60	10.45-11.55	0.45-0.55	1.10-2.20	0.284	1000		200
M 6.0	6.40-6.76	11.45-12.55	0.45-0.55	1.30-2.60	0.318	1000		200
M 7.0	7.40-7.76	13.45-14.55	0.74-0.86	1.50-3.00	0.800	1000		200
M 8.0	8.40-8.76	14.45-15.55	0.74-0.86	1.50-3.00	0.700	1000		200
M 10.0	10.50-10.93	20.35-21.65	0.93-1.07	2.10-4.20	2.040	1000		100
M 12.0	13.00-13.43	23.35-24.65	1.13-1.27	2.50-5.00	3.100	1000		100
M 16.0	17.00-17.43	29.35-30.65	1.52-1.68	3.20-6.40	5.580	500		50

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Features and specific use:

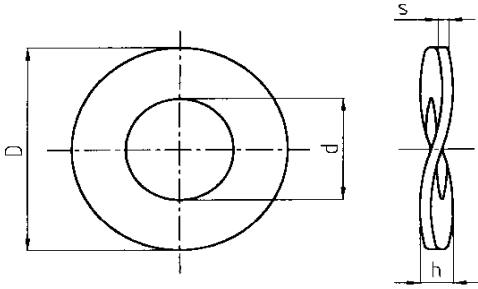
Stainless steel spring washer with major supporting surface and that is able to guarantee more resistance to the loosening in comparison with the convixed one.

Corrugated elastic washer

Rondella ondulata
Federscheibe

DIN 6904

CARBON STEEL C 60 EN 10132



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.5	2.25-2.35	6.78-7.00	0.45-0.55	0.90-1.05	0.140		100000	
M 3.0	2.70-2.80	7.78-8.00	0.45-0.55	0.90-1.05	0.170		60000	
M 3.5	3.20-3.32	7.78-8.00	0.45-0.55	1.00-1.15	0.164		60000	
M 4.0	3.60-3.72	8.78-9.00	0.74-0.86	1.50-1.65	0.308		40000	
M 5.0	4.55-4.67	10.73-11.00	0.74-0.86	1.60-1.75	0.480		25000	
M 6.0	5.40-5.52	11.73-12.00	0.74-0.86	1.85-2.00	0.558		20000	
M 7.0	6.50-6.65	13.73-14.00	0.93-1.07	2.20-2.40	0.941		10000	
M 8.0	7.38-7.45	14.75-15.00	0.93-1.07	2.20-2.40	1.033		10000	
M 10.0	9.20-9.35	20.67-21.00	0.93-1.07	2.40-2.60	2.040		5000	

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.
 Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.

Features and specific use:

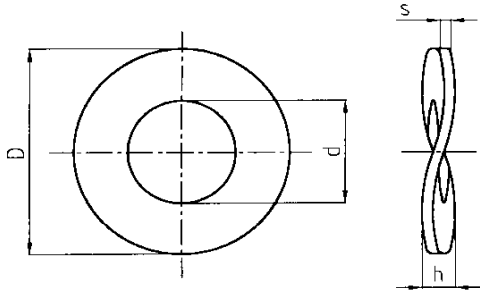
Washer to be used only for preassembling with metric pitch screws (for sems).

Corrugated elastic washer

Rondella ondulata
Federscheibe

DIN 6904

STAINLESS STEEL AISI 304 EN 10088-2



DIMENSIONS AND FEATURES						PACKAGING		
For screws of	d min.-max.	D min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.5	2.25-2.35	6.78-7.00	0.45-0.55	0.90-1.05	0.140		100000	
M 3.0	2.70-2.80	7.78-8.00	0.45-0.55	0.90-1.05	0.170		60000	
M 3.5	3.20-3.32	7.78-8.00	0.45-0.55	1.00-1.15	0.164		60000	
M 4.0	3.60-3.72	8.78-9.00	0.74-0.86	1.50-1.65	0.308		40000	
M 5.0	4.55-4.67	10.73-11.00	0.74-0.86	1.60-1.75	0.480		25000	
M 6.0	5.40-5.52	11.73-12.00	0.74-0.86	1.85-2.00	0.558		20000	
M 8.0	7.30-7.45	14.73-15.00	0.93-1.07	2.20-2.40	1.033		10000	
M 10.0	9.20-9.35	20.67-21.00	0.93-1.07	2.40-2.60	2.040		5000	

Dimensions in mm

Technical details:

Hardness: 265 Hv minimum.

Tightening torques: see table.

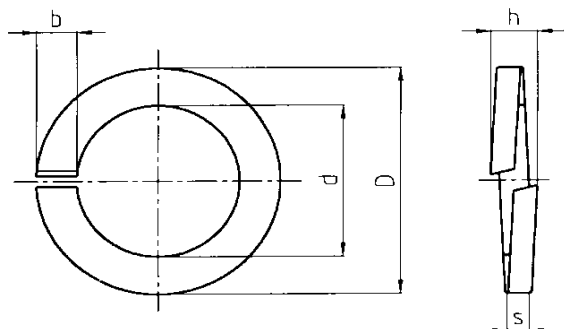
Chemical analysis of raw material: see table.

Stainless steel AISI 304 (A2) guarantees a good corrosion resistance.

Sorted out material to prevent the presence of foreign parts.

Features and specific use:

Washer to be used only for preassembling with metric pitch screws (for sems).



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	Loading test [N]	Min. residual height	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.10-2.40	4.40	0.80-1.00	0.40-0.60	1.00-1.20	0.035	700	0.80	5000	200000	1000
M 2.3	2.30-2.60	4.80	0.90-1.10	0.50-0.70	1.20-1.40	0.050	700	0.80	5000	180000	1000
M 2.5	2.60-2.90	5.10	0.90-1.10	0.50-0.70	1.20-1.40	0.056	1160	1.00	5000	180000	500
M 3.0	3.10-3.40	6.20	1.20-1.40	0.70-0.90	1.60-1.90	0.104	1760	1.30	2000	100000	500
M 3.5	3.60-3.90	6.70	1.20-1.40	0.70-0.90	1.60-1.90	0.118	2370	1.30	2000	80000	500
M 4.0	4.10-4.40	7.60	1.40-1.60	0.80-1.00	1.80-2.10	0.170	3050	1.40	2000	50000	200
M 5.0	5.10-5.40	9.20	1.70-1.90	1.10-1.30	2.20-2.60	0.333	5050	1.90	1000	25000	200
M 6.0	6.10-6.50	11.80	2.35-2.65	1.50-1.70	3.00-3.60	0.733	7050	2.60	1000	12500	200
M 7.0	7.10-7.50	12.80	2.35-2.65	1.50-1.70	3.40-4.20	0.896	9000	2.60	1000	9000	200
M 8.0	8.10-8.50	14.80	2.85-3.15	1.90-2.10	3.80-4.50	1.504	12900	3.20	1000	6000	100
M 10.0	10.20-10.70	18.10	3.30-3.70	2.05-2.35	4.10-4.90	2.265	20600	3.50	1000	4000	100
M 12.0	12.20-12.70	21.10	3.80-4.20	2.35-2.65	4.70-5.60	3.599	30000	4.00	1000	2500	100
M 14.0	14.20-14.70	24.10	4.30-4.70	2.85-3.15	6.00-7.10	6.139	41300	4.80	500	1750	50
M 16.0	16.20-17.00	27.40	4.80-5.20	3.30-3.70	6.60-7.90	8.101	56300	5.60	250	1000	50
M 18.0	18.20-19.00	29.40	4.80-5.20	3.30-3.70	7.00-8.30	8.977	69000	5.60	250	800	
M 20.0	20.20-21.20	33.60	5.80-6.20	3.80-4.20	8.00-9.40	15.133	88000	6.40	200	500	
M 22.0	22.50-23.50	35.90	5.80-6.20	3.80-4.20	8.00-9.40	16.265	110000	6.40	200	400	
M 24.0	24.50-25.50	40.00	6.75-7.25	4.80-5.20	10.00-11.80	26.920	127000	8.00	100	250	
M 27.0	27.50-28.50	43.00	6.75-7.25	4.80-5.20	10.00-11.80	26.400	167000	8.00	100	200	
M 30.0	30.50-31.70	48.20	7.75-8.25	5.80-6.20	12.00-14.20	44.300	204000	9.60	50	125	
M 36.0	36.50-37.70	58.20	9.75-10.25	5.80-6.20	12.00-14.20	67.300	298000	9.60	25		
M 39.0	39.50-40.70	61.20	9.75-10.25	5.80-6.20	12.00-14.20	71.700			25		
M 42.0	42.50-43.70	68.20	11.75-12.25	6.75-7.25	14.00-16.50	108.700			25		
M 45.0	45.50-46.70	71.20	11.75-12.25	6.75-7.25	14.00-16.50	119.000			25		
M 48.0	49.00-50.50	75.00	11.75-12.25	6.75-7.25	14.00-16.50	118.500			25		
M 52.0	53.00-54.50	83.00	13.75-14.25	7.75-8.25	16.00-18.90	162.000			20		

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

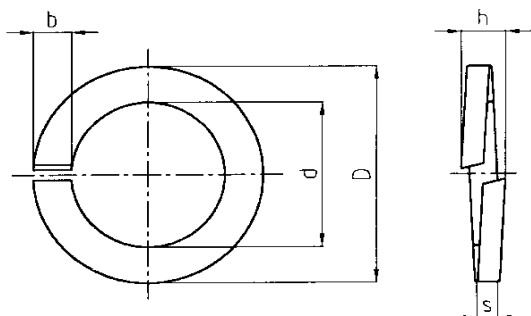
Burnishing and light oiling.
 White mech. zinc plating 12 my Cr6 free.
 Yellow mech. zinc plating 12 my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Other coatings upon customer request.

Single coiled washer

Rondella grower
Federring

DIN 127 B inches

CARBON STEEL C 60 EN 10016-2



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
1/4"	6.55-6.85	12.15	2.35-2.65	1.50-1.70	3.00-3.60	0.792	1000	12500	
3/8"	9.80-10.20	17.60	3.30-3.70	2.05-2.35	4.10-4.90	2.262	1000	4500	
7/16"	11.40-11.80	20.20	3.80-4.20	2.35-2.65	4.70-5.60	3.245	1000	3250	
1/2"	13.10-13.50	21.90	3.80-4.20	2.35-2.65	4.70-5.60	3.663	500	2500	
3/4"	19.50-20.10	32.50	5.80-6.20	3.80-4.20	7.60-9.00	13.515	250	650	
1"	25.80-26.60	41.10	6.75-7.25	4.80-5.20	9.60-11.40	28.829	100	350	

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

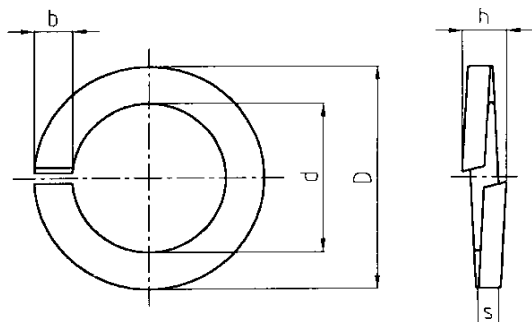
White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.0	2.10-2.40	4.40	0.80-1.00	0.40-0.60	1.00-1.20	0.035	5000	200000	1000
M 2.3	2.30-2.60	4.80	0.90-1.10	0.50-0.70	1.00-1.20	0.050	5000	180000	1000
M 2.5	2.60-2.90	5.10	0.90-1.10	0.50-0.70	1.20-1.40	0.056	5000	180000	500
M 3.0	3.10-3.40	6.20	1.20-1.40	0.70-0.90	1.60-1.90	0.095	2000	100000	500
M 3.5	3.60-3.90	6.70	1.20-1.40	0.70-0.90	1.60-1.90	0.118	2000	80000	500
M 4.0	4.10-4.40	7.60	1.40-1.60	0.80-1.00	1.80-2.10	0.170	2000	60000	200
M 5.0	5.10-5.40	9.20	1.70-1.90	1.10-1.30	2.40-2.80	0.333	1000	25000	200
M 6.0	6.10-6.50	11.80	2.35-2.65	1.50-1.70	3.20-3.80	0.733	1000	12500	200
M 7.0	7.10-7.50	12.80	2.35-2.65	1.50-1.70	3.40-4.20	0.896	1000	10000	200
M 8.0	8.10-8.50	14.80	2.85-3.15	1.90-2.10	4.00-4.70	1.504	1000	6000	100
M 10.0	10.20-10.70	18.10	3.30-3.70	2.05-2.35	4.40-5.20	2.265	1000	4000	100
M 12.0	12.20-12.70	21.10	3.80-4.20	2.35-2.65	5.00-5.90	3.599	1000	2500	100
M 14.0	14.20-14.70	24.10	4.30-4.70	2.85-3.15	6.00-7.10	5.629	500	1750	50
M 16.0	16.20-17.00	27.40	4.80-5.20	3.30-3.70	7.00-8.30	0.000	250	1000	50
M 18.0	18.20-19.00	29.40	4.80-5.20	3.30-3.70	7.00-8.30	10.110	250	800	
M 20.0	20.20-21.20	33.60	5.80-6.20	3.80-4.20	8.00-9.40	14.125	200	500	
M 22.0	22.50-23.50	35.90	5.80-6.20	3.80-4.20	8.00-9.40	15.100	200	400	
M 24.0	24.50-25.50	40.00	6.75-7.25	4.80-5.20	10.00-11.80	24.893	100	250	
M 27.0	27.50-28.50	43.00	6.75-7.25	4.80-5.20	10.00-11.80	28.860	100	200	
M 30.0	30.50-31.70	48.20	7.75-8.25	5.80-6.20	12.00-14.20	44.300	50	125	

Dimensions in mm

Technical details:

Hardness: 345 - 460 Hv.

Tightening torques: see table.

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

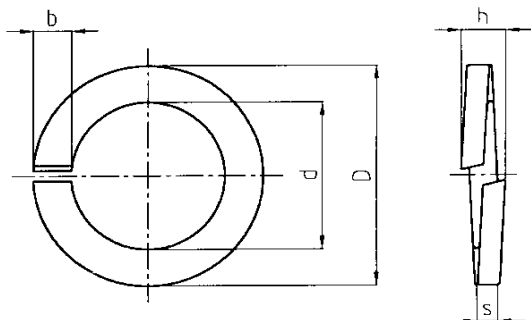
Single coiled washer

Rondella grower
Federring

DIN 127 B inches

STAINLESS STEEL AISI 304 EN 10088-3

STAINLESS STEEL AISI 316 EN 10088-3



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
1/4"	6.55-6.85	12.15	2.35-2.65	1.50-1.70	3.00-3.60	0.792	1000	12500	
3/8"	9.80-10.20	17.60	3.30-3.70	2.05-2.35	4.10-4.90	2.262	1000	4500	
7/16"	11.40-11.80	20.20	3.80-4.20	2.35-2.65	4.70-5.60	3.245	1000	3250	
1/2"	13.10-13.50	21.90	3.80-4.20	2.35-2.65	4.70-5.60	3.663	500	2500	
3/4"	19.50-20.10	32.50	5.80-6.20	3.80-4.20	7.60-9.00	13.515	250	650	
1"	25.80-26.60	41.10	6.75-7.25	4.80-5.20	9.60-11.40	25.952	100	350	

Dimensions in mm

Technical details:

Hardness: 345 - 460 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

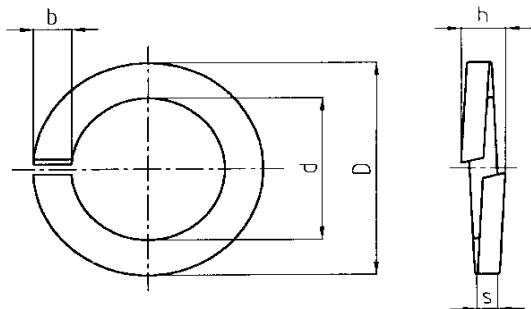
Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

Single coiled washer

Rondella grower Federring

DIN 127 B

BRONZE CuSn8 EN 12166



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.3	2.30-2.60	4.80	0.90-1.10	0.50-0.70	1.20-1.40	0.064	5000	180000	1000
M 2.6	2.70-3.00	5.20	0.90-1.10	0.50-0.70	1.20-1.40	0.064	5000	170000	500
M 3.0	3.10-3.40	6.20	1.20-1.40	0.70-0.90	1.60-1.90	0.114	2000	100000	500
M 3.5	3.60-3.90	6.70	1.20-1.40	0.70-0.90	1.60-1.90	0.134	2000	80000	500
M 4.0	4.10-4.40	7.60	1.40-1.60	0.80-1.00	1.80-2.10	0.197	2000	60000	200
M 5.0	5.10-5.40	9.20	1.70-1.90	1.10-1.30	2.40-2.80	0.375	1000	25000	200
M 6.0	6.10-6.50	11.80	2.35-2.65	1.50-1.70	3.20-3.80	0.847	1000	12500	200
M 8.0	8.10-8.50	14.80	2.85-3.15	1.90-2.10	4.00-4.70	1.712	1000	6000	100
M 10.0	10.20-10.70	18.10	3.30-3.70	2.05-2.35	4.40-5.20	2.760	1000	4000	100
M 12.0	12.20-12.70	21.10	3.80-4.20	2.35-2.65	5.00-5.90	4.100	1000	2500	100

Dimensions in mm

Technical details:

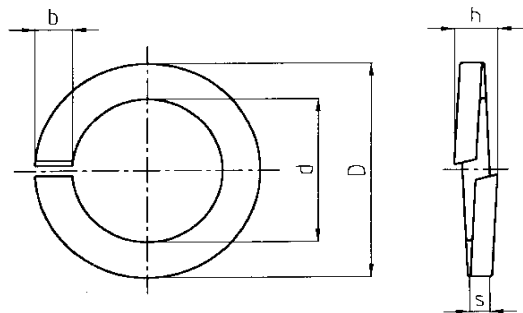
Hardness: 230 - 290 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Features and specific use:

Recommended for electrical contact fasteners.



REGULAR ASME B 18.21.1

STAINLESS STEEL AISI 304 EN 10088-3

STAINLESS STEEL AISI 316 EN 10088-3

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs bulk packaging	No. of pcs micro packaging
N. 2	2.24-2.38	4.36	0.89-1.03	0.51-0.65	1.11-1.31	0.050	200000	1000
N. 3	2.57-2.71	4.95	1.02-1.16	0.64-0.78	1.42-1.68	0.065	100000	1000
N. 4	2.90-3.04	5.30	1.02-1.16	0.64-0.78	1.42-1.68	0.070	100000	1000
N. 5	3.23-3.37	5.99	1.20-1.34	0.79-0.93	1.71-2.01	0.110	100000	1000
N. 6	3.59-3.75	6.35	1.20-1.34	0.79-0.93	1.71-2.01	0.130	80000	500
N. 8	4.25-4.41	7.44	1.40-1.54	1.02-1.16	2.16-2.52	0.220	50000	1000
N. 10	4.90-5.08	8.48	1.58-1.72	1.20-1.34	2.48-2.92	0.305	35000	1000
N. 12	5.59-5.76	9.57	1.78-1.92	1.43-1.57	3.00-3.50	0.490	20000	200
1/4"	6.40-6.60	12.36	2.77-3.01	1.58-1.82	3.38-3.98	1.030	12000	200
5/16"	7.98-8.18	14.80	3.18-3.43	1.98-2.23	4.17-4.91	1.730	6500	100
3/8"	9.58-9.78	17.26	3.58-3.83	2.38-2.64	4.97-5.87	2.770	4000	100
7/16"	11.18-11.43	19.71	3.97-4.21	2.77-3.01	5.71-6.73	4.410	2500	100
1/2"	12.75-13.00	22.06	4.34-4.59	3.18-3.42	6.48-7.64	5.800	2000	250
9/16"	14.33-14.58	24.51	4.78-5.02	3.58-3.83	7.27-8.57	8.060	1250	250
5/8"	15.95-16.28	27.25	5.16-5.40	3.97-4.21	8.00-9.44	10.600	1000	10
3/4"	19.13-19.45	32.13	5.94-6.19	4.78-5.02	9.60-11.32	18.100	600	10
7/8"	22.30-22.70	37.06	6.76-7.25	5.56-6.06	11.40-13.40	29.400	400	
1"	25.48-26.00	42.06	7.55-8.04	6.35-6.85	12.95-15.25	42.600	250	
1" 1/8"	28.68-29.28	46.91	8.34-8.83	7.14-7.63	14.50-16.90	58.500	150	
1" 1/4"	31.86-32.51	51.71	9.12-9.61	7.93-8.42	15.99-18.69	77.120	125	
1" 3/8"	35.03-35.76	56.36	9.94-10.43	8.74-9.23	17.63-20.53	99.700	100	
1" 1/2"	38.21-38.96	61.44	10.72-11.21	9.53-10.02	19.19-22.29	132.000	75	
1" 3/4"	44.66-45.44	68.04	10.77-11.52	9.89-10.63	19.65-22.75	148.130	65	
1" 7/8"	47.83-48.61	71.39	10.85-11.59	10.72-11.46	19.80-22.90	174.050	50	

Dimensions in mm

Technical details:

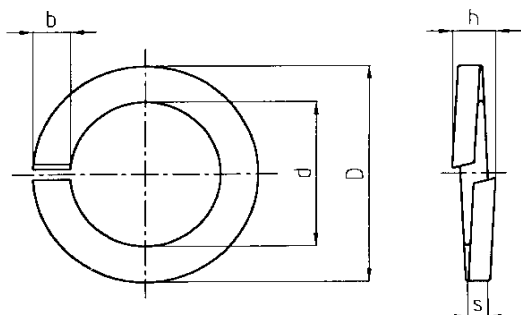
Hardness: 345 - 420 Hv up to 5/8" size.

320 - 420 Hv from 3/4" and bigger.

Tightening torques: see table

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.



REGULAR ASME B 18.21.1

MONEL K-500

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs bulk packaging	No. of pcs micro packaging
N. 2	2.24-2.38	4.36	0.89-1.03	0.51-0.65	1.11-1.31	0.050	200000	1000
N. 3	2.57-2.71	4.95	1.02-1.16	0.64-0.78	1.42-1.68	0.070	100000	1000
N. 4	2.90-3.04	5.30	1.02-1.16	0.64-0.78	1.42-1.68	0.080	100000	1000
N. 5	3.23-3.37	5.99	1.20-1.34	0.79-0.93	1.71-2.01	0.120	100000	1000
N. 6	3.59-3.75	6.35	1.20-1.34	0.79-0.93	1.71-2.01	0.140	80000	500
N. 8	4.25-4.41	7.44	1.40-1.54	1.02-1.16	2.16-2.52	0.240	50000	1000
N. 10	4.90-5.08	8.48	1.58-1.72	1.20-1.34	2.48-2.92	0.330	35000	1000
N. 12	5.59-5.76	9.57	1.78-1.92	1.43-1.57	3.00-3.50	0.530	20000	200
1/4"	6.40-6.60	12.36	2.77-3.01	1.58-1.82	3.38-3.98	1.100	12000	200
5/16"	7.98-8.18	14.80	3.18-3.43	1.98-2.23	4.17-4.91	1.860	6500	100
3/8"	9.58-9.78	17.26	3.58-3.83	2.38-2.64	4.97-5.87	3.000	4000	100
7/16"	11.18-11.43	19.71	3.97-4.21	2.77-3.01	5.71-6.73	4.750	2500	100
1/2"	12.75-13.00	22.06	4.34-4.59	3.18-3.42	6.48-7.64	6.250	2000	250
9/16"	14.33-14.58	24.51	4.78-5.02	3.58-3.83	7.27-8.57	8.650	1250	250
5/8"	15.95-16.28	27.25	5.16-5.40	3.97-4.21	8.00-9.44	11.400	1000	10
3/4"	19.13-19.45	32.13	5.94-6.19	4.78-5.02	9.60-11.32	19.450	600	10
7/8"	22.30-22.70	37.06	6.76-7.25	5.56-6.06	11.40-13.40	31.600	400	
1"	25.48-26.00	42.06	7.55-8.04	6.35-6.85	12.95-15.25	45.800	250	
1" 1/8"	28.68-29.28	46.91	8.34-8.83	7.14-7.63	14.50-16.90	62.900	150	
1" 1/4"	31.86-32.51	51.71	9.12-9.61	7.93-8.42	15.99-18.69	82.900	125	
1" 3/8"	35.03-35.76	56.36	9.94-10.43	8.74-9.23	17.63-20.53	107.180	100	
1" 1/2"	38.21-38.96	61.44	10.72-11.21	9.53-10.02	19.19-22.29	141.900	75	
1" 3/4"	44.66-45.44	68.04	10.77-11.52	9.89-10.63	19.65-22.75	159.250	65	
1" 7/8"	47.83-48.61	71.39	10.85-11.59	10.72-11.46	19.80-22.90	187.100	50	

Dimensions in mm

Technical details:

Hardness: 327 - 392 Hv.

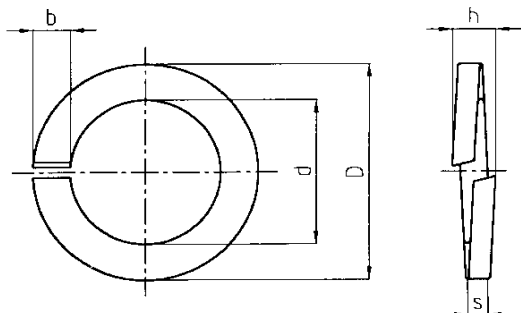
Tightening torques: see table

Chemical analysis of raw material:
see table.

Features and specific use:

Monel K-500 is resistant to sea water and steam at high temperature as well as to salt and caustic solutions.

Monel K-500 also has excellent resistance to stress corrosion cracking in freshwaters. Monel K-500 can be used in temperatures up to 500 °C (1000 °F).



REGULAR ASME B 18.21.1

ALUMINIUM AW-7075

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs bulk packaging	No. of pcs micro packaging
N. 6	3.59-3.75	6.35	1.20-1.34	0.79-0.93	1.71-2.01	0.045	80000	500
N. 8	4.25-4.41	7.44	1.40-1.54	1.02-1.16	2.16-2.52	0.078	50000	1000
N. 10	4.90-5.08	8.48	1.58-1.72	1.20-1.34	2.48-2.92	0.106	35000	1000
1/4"	6.40-6.60	12.36	2.77-3.01	1.58-1.82	3.38-3.98	0.360	12000	200
5/16"	7.98-8.18	14.80	3.18-3.43	1.98-2.23	4.17-4.91	0.640	6500	100
3/8"	9.58-9.78	17.26	3.58-3.83	2.38-2.64	4.97-5.87	0.968	4000	100
7/16"	11.18-11.43	19.71	3.97-4.21	2.77-3.01	5.71-6.73	1.549	2500	100
1/2"	12.75-13.00	22.06	4.34-4.59	3.18-3.42	6.48-7.64	2.093	2000	250
5/8"	15.95-16.28	27.25	5.16-5.40	3.97-4.21	8.00-9.44	3.835	1000	10
3/4"	19.13-19.45	32.13	5.94-6.19	4.78-5.02	9.60-11.32	6.156	600	10
7/8"	22.30-22.70	37.06	6.76-7.25	5.56-6.06	11.40-13.40	10.500	400	
1"	25.48-26.00	42.06	7.55-8.04	6.35-6.85	12.95-15.25	14.770	250	

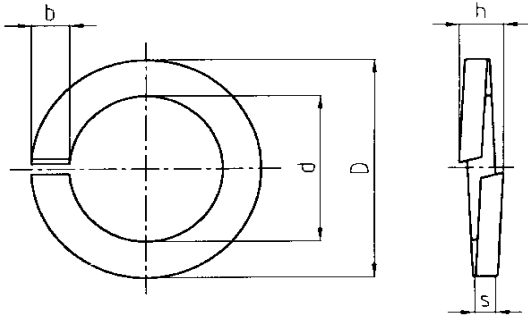
Dimensions in mm

Technical details:

Hardness: 137-222 Hv after solubilisation and aging treatment (T6).
 Chemical analysis of raw material: see table.

Features and specific use:

AW-7075 is applied e.g. in the manufacturing of structural parts for cars, motorbikes, bicycles and mechanical parts for the aerospace and military industries. AW-7075 has excellent mechanical properties, resisting to collision and torsion.



REGULAR ASME B 18.21.1

SILICON BRONZE CDA 65100 ASTM B98

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs bulk packaging	No. of pcs micro packaging
N. 2	2.24-2.38	4.36	0.89-1.03	0.51-0.65	1.11-1.31	0.050	200000	1000
N. 3	2.57-2.71	4.95	1.02-1.16	0.64-0.78	1.42-1.68	0.070	100000	1000
N. 4	2.90-3.04	5.30	1.02-1.16	0.64-0.78	1.42-1.68	0.080	100000	1000
N. 5	3.23-3.37	5.99	1.20-1.34	0.79-0.93	1.71-2.01	0.120	100000	1000
N. 6	3.59-3.75	6.35	1.20-1.34	0.79-0.93	1.71-2.01	0.140	80000	500
N. 8	4.25-4.41	7.44	1.40-1.54	1.02-1.16	2.16-2.52	0.240	50000	1000
N. 10	4.90-5.08	8.48	1.58-1.72	1.20-1.34	2.48-2.92	0.340	35000	1000
N. 12	5.59-5.76	9.57	1.78-1.92	1.43-1.57	3.00-3.50	0.550	20000	200
1/4"	6.40-6.60	12.36	2.77-3.01	1.58-1.82	3.38-3.98	1.120	12000	200
5/16"	7.98-8.18	14.80	3.18-3.43	1.98-2.23	4.17-4.91	1.950	6500	100
3/8"	9.58-9.78	17.26	3.58-3.83	2.38-2.64	4.97-5.87	3.150	4000	100
7/16"	11.18-11.43	19.71	3.97-4.21	2.77-3.01	5.71-6.73	5.110	2500	100
1/2"	12.75-13.00	22.06	4.34-4.59	3.18-3.42	6.48-7.64	6.580	2000	250
9/16"	14.33-14.58	24.51	4.78-5.02	3.58-3.83	7.27-8.57	10.000	1250	250
5/8"	15.95-16.28	27.25	5.16-5.40	3.97-4.21	8.00-9.44	12.080	1000	10
3/4"	19.13-19.45	32.13	5.94-6.19	4.78-5.02	9.60-11.32	19.950	600	10
7/8"	22.30-22.70	37.06	6.76-7.25	5.56-6.06	11.40-13.40	32.470	400	
1"	25.48-26.00	42.06	7.55-8.04	6.35-6.85	12.95-15.25	47.160	250	
1" 1/8"	28.68-29.28	46.91	8.34-8.83	7.14-7.63	14.50-16.90	65.000	150	
1" 1/4"	31.86-32.51	51.71	9.12-9.61	7.93-8.42	15.99-18.69	89.1000	125	
1" 3/8"	35.03-35.76	56.36	9.94-10.43	8.74-9.23	17.63-20.53	108.000	100	
1" 1/2"	38.21-38.96	61.44	10.72-11.21	9.53-10.02	19.19-22.29	144.600	75	
1" 3/4"	44.66-45.44	68.04	10.77-11.52	9.89-10.63	19.65-22.75	166.000	65	
1" 7/8"	47.83-48.61	71.39	10.85-11.59	10.72-11.46	19.80-22.90	195.110	50	

Dimensions in mm

Technical details:

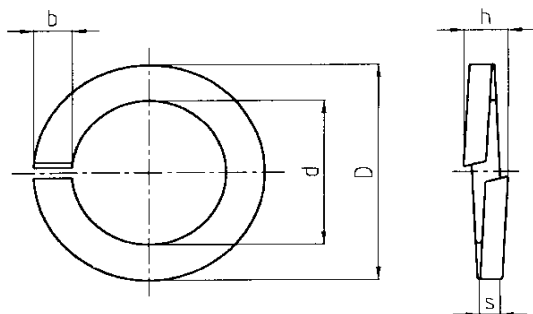
Hardness: 185 - 300 Hv.

Tightening torques: see table.

Chemical analysis of raw material:
see table.

Features and specific use:

Recommended for electrical contact fasteners.



HIGH COLLAR ASME B 18.21.1

STAINLESS STEEL AISI 304 EN 10088-3

STAINLESS STEEL AISI 316 EN 10088-3

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs bulk packaging	No. of pcs micro packaging
N. 2	2.24-2.38	4.36	0.89-1.03	0.51-0.65	1.11-1.31	0.050	200000	1000
N. 3	2.57-2.71	4.95	1.02-1.16	0.64-0.78	1.42-1.68	0.070	100000	1000
N. 4	2.90-3.04	5.30	1.02-1.16	0.64-0.78	1.42-1.68	0.080	100000	1000
N. 5	3.23-3.37	5.99	1.20-1.34	0.79-0.93	1.71-2.01	0.120	100000	1000
N. 6	3.59-3.75	6.35	1.20-1.34	0.79-0.93	1.71-2.01	0.140	80000	500
N. 8	4.25-4.41	7.44	1.40-1.54	1.02-1.16	2.16-2.52	0.240	50000	1000
N. 10	4.90-5.08	8.48	1.58-1.72	1.20-1.34	2.48-2.92	0.330	35000	1000
N. 12	5.59-5.76	9.57	1.78-1.92	1.43-1.57	3.00-3.50	0.530	20000	200
1/4"	6.40-6.60	12.36	2.77-3.01	1.58-1.82	3.38-3.98	1.100	12000	200
5/16"	7.98-8.18	14.80	3.18-3.43	1.98-2.23	4.17-4.91	1.860	6500	100
3/8"	9.58-9.78	17.26	3.58-3.83	2.38-2.64	4.97-5.87	3.000	4000	100
7/16"	11.18-11.43	19.71	3.97-4.21	2.77-3.01	5.71-6.73	4.750	2500	100
1/2"	12.75-13.00	22.06	4.34-4.59	3.18-3.42	6.48-7.64	6.250	2000	250
9/16"	14.33-14.58	24.51	4.78-5.02	3.58-3.83	7.27-8.57	8.650	1250	250
5/8"	15.95-16.28	27.25	5.16-5.40	3.97-4.21	8.00-9.44	11.400	1000	10
3/4"	19.13-19.45	32.13	5.94-6.19	4.78-5.02	9.60-11.32	19.450	600	10
7/8"	22.30-22.70	37.06	6.76-7.25	5.56-6.06	11.40-13.40	31.600	400	
1"	25.48-26.00	42.06	7.55-8.04	6.35-6.85	12.95-15.25	45.800	250	
1" 1/8"	28.68-29.28	46.91	8.34-8.83	7.14-7.63	14.50-16.90	62.900	150	
1" 1/4"	31.86-32.51	51.71	9.12-9.61	7.93-8.42	15.99-18.69	82.900	125	
1" 3/8"	35.03-35.76	56.36	9.94-10.43	8.74-9.23	17.63-20.53	107.180	100	
1" 1/2"	38.21-38.96	61.44	10.72-11.21	9.53-10.02	19.19-22.29	141.900	75	
1" 3/4"	44.66-45.44	68.04	10.77-11.52	9.89-10.63	19.65-22.75	159.250	65	
1" 7/8"	47.83-48.61	71.39	10.85-11.59	10.72-11.46	19.80-22.90	187.100	50	

Dimensions in mm

Technical details:

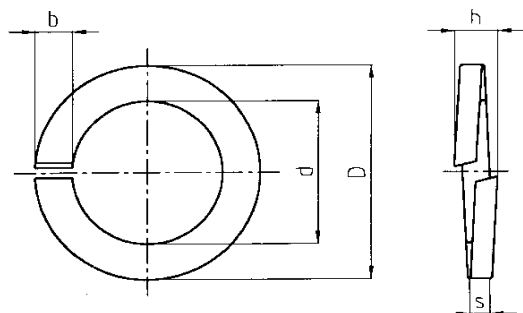
Hardness: 345 - 420 Hv up to 5/8" size.

320 - 420 Hv from 3/4" and bigger.

Tightening torques: see table

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.



HEAVY ASME B 18.21.1

STAINLESS STEEL AISI 304 EN 10088-3

STAINLESS STEEL AISI 316 EN 10088-3

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs bulk packaging	No. of pcs micro packaging
N. 4	2.90-3.04	5.66	1.20-1.34	0.83-0.97	1.71-1.96	0.110	100000	1000
N. 6	3.59-3.75	6.75	1.40-1.54	1.07-1.21	2.09-2.40	0.200	80000	500
N. 8	4.25-4.41	7.79	1.58-1.72	1.25-1.39	2.47-2.71	0.285	50000	1000
N. 10	4.91-5.08	8.89	1.78-1.92	1.48-1.62	2.75-3.11	0.445	35000	1000
1/4"	6.41-6.60	12.42	2.80-3.04	2.05-2.29	3.90-4.50	1.300	12000	200
5/16"	7.98-8.17	15.06	3.31-3.55	2.57-2.81	4.94-5.54	2.330	6500	100
3/8"	9.58-9.77	17.47	3.69-3.93	3.04-3.28	5.60-6.20	3.700	4000	100
7/16"	11.18-11.43	19.91	4.07-4.31	3.38-3.62	6.82-7.42	5.300	2500	100
1/2"	12.76-13.00	22.32	4.48-4.72	3.98-4.22	7.61-8.51	7.200	2000	250
9/16"	14.33-14.58	24.76	4.91-5.15	4.32-4.56	8.25-9.20	11.500	1250	250
5/8"	15.96-16.28	27.60	5.34-5.58	4.98-5.22	9.49-10.59	13.000	1000	10
3/4"	19.13-19.45	32.63	6.20-6.44	5.94-6.18	11.58-12.30	21.800	600	10
7/8"	22.30-22.70	37.82	7.14-7.63	6.75-7.25	13.00-14.50	41.500	400	
1"	25.48-26.00	43.18	8.11-8.53	7.78-8.27	15.00-16.50	61.500	250	

Dimensions in mm

Technical details:

Hardness: 345 - 420 Hv up to 5/8" size.

320 - 420 Hv from 3/4" and bigger.

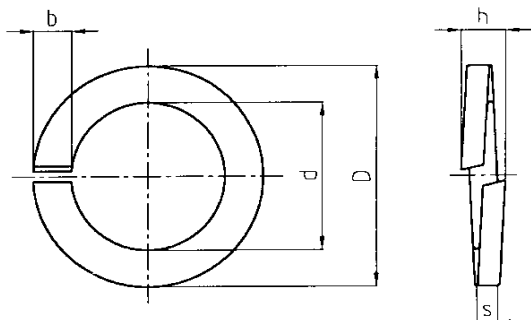
Tightening torques: see table

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.

LIGHT SERIES (US STANDARD)

STAINLESS STEEL AISI 304 EN 10088-3



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
N. 3	2.57-2.71	4.70	0.89-1.07	0.56-0.70	1.16-1.36	0.050		200000	
N. 6	3.58-3.76	5.99	1.01-1.19	0.69-0.83	1.40-1.64	0.096		100000	
N. 8	4.24-4.42	7.04	1.19-1.39	0.86-1.00	1.71-2.01	0.163		65000	
N. 10	4.90-5.08	8.13	1.39-1.59	1.10-1.24	2.16-2.52	0.272		40000	
1/4"	6.40-6.60	12.27	2.72-2.92	1.34-1.54	2.68-3.16	0.810		12500	
5/16"	7.98-8.18	14.40	2.97-3.17	1.58-1.78	3.12-3.68	1.180		10000	
7/16"	11.25-11.56	19.68	3.90-4.10	2.38-2.62	4.60-5.40	3.245		3500	
1/2"	12.75-13.00	22.02	4.32-4.52	2.75-2.99	5.34-6.14	4.600		2000	
5/8"	15.95-16.28	27.15	5.10-5.40	3.48-3.73	6.60-7.80	10.600		1250	

Dimensions in mm

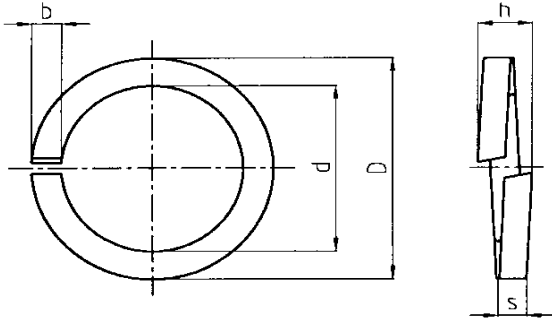
Technical details:

Hardness: 345 - 420 Hv.

Tightening torques: see table

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	Loading test [N]	Min. residual height	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.40	5.60	0.90-1.10	0.90-1.10	2.00-2.36	0.105	1760	1.60	2000	80000	500
M 3.5	3.60-3.90	6.10	0.90-1.10	0.90-1.10	2.00-2.36	0.115	2370	1.60	2000	60000	500
M 4.0	4.10-4.40	7.00	1.10-1.30	1.10-1.30	2.20-2.63	0.164	3050	1.60	2000	50000	200
M 5.0	5.10-5.40	8.80	1.50-1.70	1.50-1.70	3.00-3.58	0.380	5050	0.00	1000	25000	200
M 6.0	6.10-6.50	9.90	1.50-1.70	1.50-1.70	3.00-3.58	0.430	7050	2.60	1000	17500	200
M 8.0	8.10-8.50	12.70	1.90-2.10	1.90-2.10	3.80-4.52	0.920	12900	3.20	1000	10000	100
M 10.0	10.20-10.70	16.00	2.35-2.65	2.35-2.65	4.70-5.60	1.776	20600	4.00	1000	5000	100
M 12.0	12.20-12.70	18.00	2.35-2.65	2.35-2.65	4.70-5.60	2.062	30000	4.00	1000	4000	100
M 14.0	14.20-14.70	21.10	2.80-3.20	2.80-3.20	6.00-7.10	3.400	41300	4.80	1000	2000	50
M 16.0	16.20-17.00	24.40	3.30-3.70	3.30-3.70	7.00-8.25	5.745	56300	5.60	500	1300	50
M 18.0	18.20-19.00	26.40	3.30-3.70	3.30-3.70	7.00-8.25	6.300	69000	5.60	500	1200	
M 20.0	20.20-21.20	30.60	4.30-4.70	4.30-4.70	9.00-10.60	11.805	88000	7.20	250	650	
M 22.0	22.50-23.50	32.90	4.30-4.70	4.30-4.70	9.00-10.60	12.740	110000	7.20	250	500	
M 24.0	24.50-25.50	35.90	4.80-5.20	4.80-5.20	10.00-11.80	16.383	127000	8.00	150	300	
M 27.0	27.50-28.50	38.90	4.80-5.20	4.80-5.20	10.00-11.80	18.193	167000	8.00	150	250	

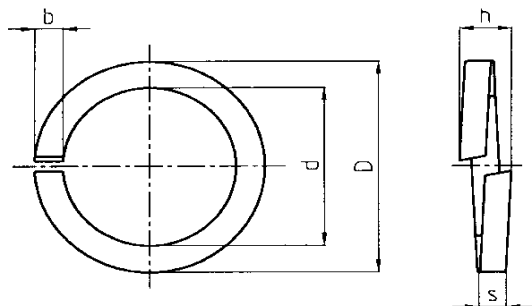
Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.
 White mech. zinc plating 12my Cr6 free.
 Yellow mech. zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Other coatings upon customer request.



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.40	5.60	0.90-1.10	0.90-1.10	2.00-2.36	0.105	2000	80000	500
M 3.5	3.60-3.90	6.10	0.90-1.10	0.90-1.10	2.00-2.36	0.115	2000	60000	500
M 4.0	4.10-4.40	7.00	1.10-1.30	1.10-1.30	2.40-2.83	0.165	2000	50000	200
M 5.0	5.10-5.40	8.80	1.50-1.70	1.50-1.70	3.20-3.78	0.380	1000	25000	200
M 6.0	6.10-6.50	9.90	1.50-1.70	1.50-1.70	3.20-3.78	0.430	1000	17500	200
M 8.0	8.10-8.50	12.70	1.90-2.10	1.90-2.10	3.80-4.52	0.920	1000	10000	100
M 10.0	10.20-10.70	16.00	2.35-2.65	2.35-2.65	5.00-5.90	1.776	1000	5000	100
M 12.0	12.20-12.70	18.00	2.35-2.65	2.35-2.65	5.00-5.90	2.062	1000	4000	100
M 14.0	14.20-14.70	21.10	2.80-3.20	2.80-3.20	6.00-7.10	3.400	1000	2000	50
M 16.0	16.20-17.00	24.40	3.30-3.70	3.30-3.70	7.00-8.25	5.745	500	1300	50
M 18.0	18.20-19.00	26.40	3.30-3.70	3.30-3.70	7.00-8.25	6.300	500	1200	
M 20.0	20.20-21.20	30.60	4.30-4.70	4.30-4.70	9.00-10.60	11.800	250	650	
M 22.0	22.50-23.50	32.90	4.30-4.70	4.30-4.70	9.00-10.60	12.740	250	500	
M 24.0	24.50-25.50	35.90	4.80-5.20	4.80-5.20	10.00-11.80	16.383	150	300	
M 27.0	27.50-28.50	38.90	4.80-5.20	4.80-5.20	10.00-11.80	18.193	150	250	

Dimensions in mm

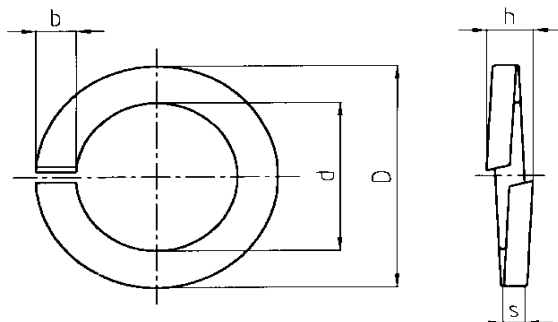
Technical details:

Hardness: 345 - 460 Hv.

Tightening torques: see table.

Chemical analysis of raw material:
see table.

Stainless steel AISI 304 (A2) has a good corrosion resistance. Stainless steel AISI 316 (A4) has a very high acid resistance and it is an antimagnetic material.



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	Loading test [N] [N]	Min. residual height	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.10-3.40	6.20	1.20-1.40	0.70-0.90	1.40-1.70	0.104	1700	1.40	2000	100000	
M 4.0	4.10-4.40	7.60	1.40-1.60	0.80-1.00	1.60-1.90	0.176	2900	1.40	2000	50000	
M 5.0	5.10-5.40	9.20	1.70-1.90	1.10-1.30	2.20-2.60	0.310	4700	1.60	1000	25000	
M 6.0	6.10-6.50	11.80	2.35-2.65	1.70-1.90	3.40-4.20	0.870	6700	2.80	1000	12500	
M 7.0	7.10-7.50	12.80	2.35-2.65	1.70-1.90	3.40-4.20	0.896	9600	2.80	1000	9000	
M 8.0	8.10-8.50	14.80	2.85-3.15	2.10-2.30	4.20-5.10	1.570	12200	3.40	1000	6000	
M 10.0	10.20-10.70	17.70	3.10-3.50	2.35-2.65	4.70-5.80	2.494	19300	3.80	1000	3500	
M 12.0	12.20-12.70	21.10	3.80-4.20	2.95-3.25	5.90-7.10	4.738	28000	4.00	500	2000	
M 14.0	14.20-14.70	24.10	4.30-4.70	3.30-3.70	6.60-8.10	7.200	38200	5.30	500	1400	
M 16.0	16.20-17.00	27.70	5.00-5.40	3.80-4.20	7.60-9.30	10.100	52200	6.10	250	1000	
M 18.0	18.20-19.00	30.60	5.40-5.80	4.00-4.40	8.00-9.70	12.760	64000	6.30	250	650	
M 20.0	20.20-21.20	33.60	5.80-6.20	4.30-4.70	8.60-10.40	17.300	81000	6.90	200	450	
M 22.0	22.30-23.30	36.70	6.30-6.70	4.80-5.20	9.60-11.40	21.320	101000	7.40	150	300	
M 24.0	24.30-25.30	39.80	6.75-7.25	5.30-5.70	10.60-12.80	27.291	117000	8.50	100	250	
1/4"	6.45-6.85	12.05	2.40-2.60	1.70-1.90	3.40-4.20	0.915			1000	11000	
3/8"	9.70-10.20	17.20	3.10-3.50	2.35-2.65	4.70-5.80	2.380			1000	3500	
7/16"	11.30-11.80	20.20	3.80-4.20	2.95-3.25	5.90-7.10	4.519			1000	2500	
1/2"	12.90-13.40	21.80	3.80-4.20	2.95-3.25	5.90-7.10	4.677			500	2000	
3/4"	19.40-20.20	32.60	5.80-6.20	4.30-4.70	8.60-10.40	16.100			200	400	
1"	25.70-26.50	40.90	6.80-7.20	5.30-5.70	10.60-12.80	30.000			100	200	

Dimensions in mm

Technical details:

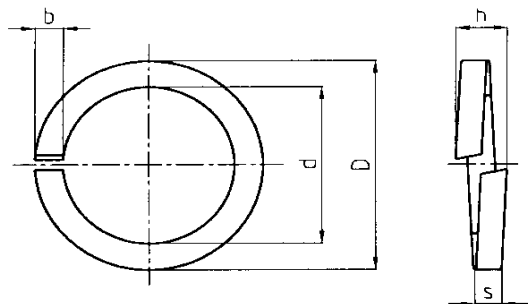
Hardness: 430 - 530 Hv.
 Tightening torques: see table.
 Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.
 White mech. zinc plating 12my Cr6 free.
 Yellow mech. zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Other coatings upon customer request.

Features and specific use:

Split lock washer with reinforced section for heavy applications.



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	3.50-3.98	6.38	0.80-1.20	0.80-1.20	1.80-2.15	0.120	2000	80000	500
M 4.0	4.50-4.98	7.38	0.80-1.20	0.80-1.20	1.80-2.15	0.146	2000	40000	200
M 5.0	5.50-5.98	9.38	1.30-1.70	1.30-1.70	2.80-3.30	0.285	1000	30000	200
M 6.0	6.50-7.08	11.48	1.80-2.20	1.80-2.20	3.80-4.55	0.791	1000	13000	200
M 8.0	8.50-9.08	14.48	2.30-2.70	2.30-2.70	4.70-5.55	1.535	1000	6500	100
M 10.0	10.50-11.20	17.60	2.80-3.20	2.80-3.20	5.60-6.60	2.640	1000	3000	100
M 12.0	13.00-13.70	21.18	3.26-3.74	3.26-3.74	6.60-7.80	5.000	500	2000	100
M 14.0	15.00-15.70	24.18	3.76-4.24	3.76-4.24	7.60-8.90	7.390	500	1250	50
M 16.0	17.00-17.70	26.18	3.76-4.24	3.76-4.24	7.60-8.90	7.830	250	1000	50
M 18.0	19.00-19.84	30.32	4.76-5.24	4.76-5.24	9.60-11.20	13.400	250	600	
M 20.0	21.00-21.84	32.32	4.76-5.24	4.76-5.24	9.60-11.20	15.440	200	500	
M 22.0	23.00-23.84	34.32	4.76-5.24	4.76-5.24	9.60-11.20	15.700	200	400	
M 24.0	25.00-25.84	38.32	5.76-6.24	5.76-6.24	11.60-13.80	26.000	100	250	

Dimensions in mm

Technical details:

Hardness: 440 - 510 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

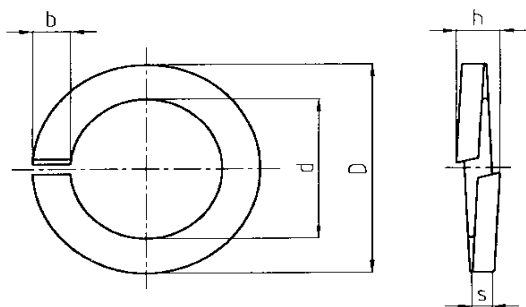
White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Other coatings upon customer request.



Single coiled washer

**Rondella grower
Federring**

DIN 127 B KOMBI

CARBON STEEL C 60 EN 10016-2

DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 3.0	2.70-2.80	5.60	1.20-1.40	0.70-0.90	1.40-1.70	0.083		120000	
M 4.0	3.60-3.75	6.95	1.40-1.60	0.80-1.00	1.60-1.90	0.158		70000	
M 5.0	4.55-4.75	8.55	1.70-1.90	1.10-1.30	2.20-2.60	0.290		35000	
M 6.0	5.50-5.70	11.00	2.35-2.65	1.50-1.70	3.20-3.50	0.685		17000	
M 8.0	7.40-7.65	13.95	2.85-3.15	1.90-2.10	3.80-4.50	1.410		8000	
M 10.0	9.40-9.60	17.00	3.30-3.70	2.05-2.35	4.40-5.20	2.100		4000	
M 12.0	11.30-11.70	19.80	3.80-4.20	2.40-2.70	4.70-5.60	3.350		2500	

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

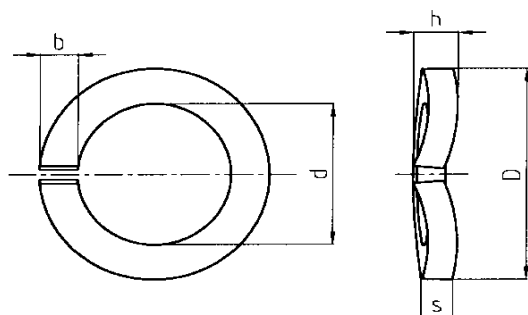
Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.

Features and specific use:

Washer to be used only for preassembling with metric pitch screws (for sems).



DIMENSIONS AND FEATURES							PROOF CONDITIONS		PACKAGING		
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	Loading test [N]	Min. residual height	No. of pcs standard packaging	No. of pcs bulk packaging	No. of pcs micro packaging
M 2.5	2.25-2.35	4.55	0.90-1.10	0.50-0.70	0.90-1.10	0.055	1160	0.70		180000	
M 3.0	2.70-2.80	5.60	1.20-1.40	0.60-0.80	1.10-1.30	0.090	1760	0.85		120000	
M 3.5	3.20-3.30	6.10	1.20-1.40	0.60-0.80	1.10-1.30	0.100	2370	0.85		100000	
M 4.0	3.60-3.75	6.95	1.40-1.60	0.70-0.90	1.20-1.40	0.150	3050	0.95		70000	
M 5.0	4.55-4.75	8.55	1.70-1.90	0.90-1.10	1.50-1.70	0.260	5050	1.20		45000	
M 6.0	5.50-5.70	11.00	2.35-2.65	1.20-1.40	2.00-2.20	0.640	7050	1.50		22000	
M 8.0	7.40-7.65	13.95	2.85-3.15	1.50-1.70	2.45-2.75	1.230	12900	2.00		10000	
M 10.0	9.30-9.55	16.95	3.30-3.70	1.70-1.90	2.85-3.15	2.000	20600	2.25		5000	
M 12.0	11.00-11.30	19.70	3.80-4.20	1.95-2.25	3.35-3.65	3.099	30000	2.65		3000	

Dimensions in mm

Technical details:

Hardness: 430 - 530 Hv.

Tightening torques: see table.

Chemical analysis of raw material: see table.

Sorted out material to prevent the presence of foreign parts.

Anticorrosion surface treatment:

Dry and clean surface.

Features and specific use:

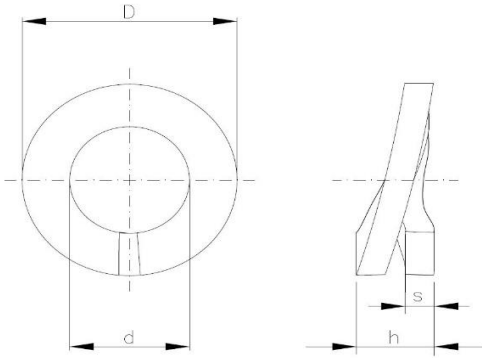
Washer to be used only for preassembling with metric pitch screws (for sems).

Single coiled spring washer for railway tracks

Grower singola per armamento ferroviario
Einfacher Oberbau Federringe

UIC 864

SPRING STEEL 38 Si 7 EN 10089



DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h residual*	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
25	25.20-26.20	46.60	9.80-10.20	5.80-6.20	9.80	50	500	8000

* Washer's height after precompression

Dimensions in mm

Technical details:

Hardness: 43 - 49 HRc.

Chemical analysis of raw material:
see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Hot zinc galvanizing

Other coatings upon customer request.

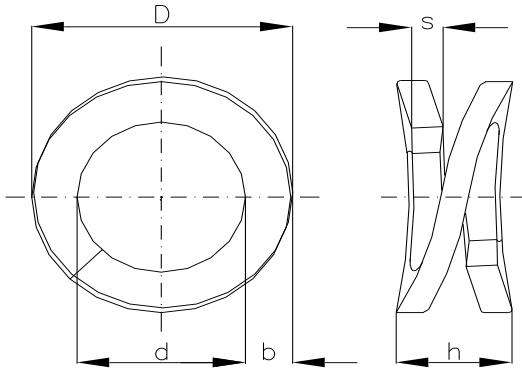
Features and specific use:

Spring washers to be used in railway track industry

Double coiled spring washer for railway tracks

Grower doppia per armamento ferroviario

Doppelte Oberbau Federringe

UIC 864 - UNI 6217
SPRING STEEL 38 Si 7 EN 10089
STAINLESS STEEL AISI 316 EN 10088-3


DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h residual*	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
21	21.00-22.50	42.90	9.80-10.20	5.80-6.20	16.80	84.0	300	4000
22	22.00-23.00	43.80	9.60-10.40	5.70-6.10	16.80	84.5	300	4000
24	23.40-24.60	45.00	9.80-10.20	5.80-6.20	17.80	88.0	300	4000
25	25.00-26.20	46.60	9.80-10.20	5.80-6.20	17.80	92.0	300	4000
26	26.20-27.20	47.00	9.80-10.20	5.80-6.20	17.80	94.0	300	4000
29	29.20-30.00	53.60	9.80-10.20	5.80-6.20	17.80	102.5	200	3500

* Washer's height after precompression

Dimensions in mm

Technical details:

Hardness: 43 - 49 HRc.

Chemical analysis of raw material: see table.

Stainless steel AISI 316 (A4) has a very high acid resistance and it is a antimagnetic material.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Hot zinc galvanizing

Other coatings upon customer request.

Features and specific use:

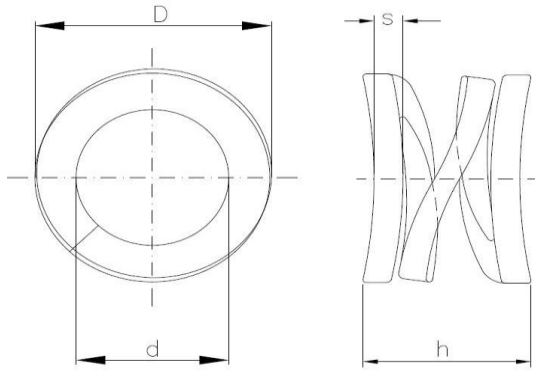
Spring washers to be used in railway track industry

The dimensions D21 and D25 can be also

supplied in the patented version with

partial teeth on the surface.

The teeth guarantee a definite improvement of the unscrewing performance of the washer.



Triple coiled spring washer for railway tracks

Grower tripla per armamento ferroviario

Dreifache Oberbau Federringe

UIC 864
SPRING STEEL 38 Si 7 EN 10089

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h residual*	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
25	25.20-26.20	47.20	9.80-10.20	5.80-6.20	24.50	145	200	1500

* Washer's height after precompression

Dimensions in mm

Technical details:

Hardness: 43 - 49 HRc.

 Chemical analysis of raw material:
 see table.

Anticorrosion surface treatment:

Burnishing and light oiling.

White mech. zinc plating 12my Cr6 free.

Yellow mech. zinc plating 12my Cr6 free.

Delta Protekt® KL 100 6-10 my.

Geomet® 321 type A 5-7 my.

Hot zinc galvanizing

Other coatings upon customer request.

Features and specific use:

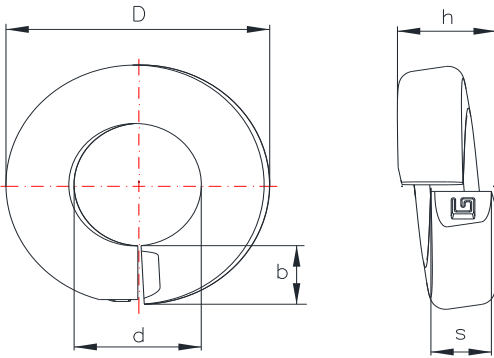
Spring washers to be used in railway track industry

Single coiled spring washer for railway tracks

Grower singola per armamento ferroviario
Oberbau Federringe

1967 A.R.E.A.

SPRING STEEL



DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h residual	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
3/4"	19.84-20.63	41.27	10.00-10.60	10.70-11.30	16.60-18.12	78.0	550	5500
13/16"	21.43-22.22	42.86	10.00-10.60	10.70-11.30	16.60-18.12	81.0	500	5000
7/8"	23.01-23.81	44.45	10.00-10.60	10.70-11.30	16.60-18.12	85.0	500	5000
15/16"	24.60-25.40	46.03	10.00-10.60	10.70-11.30	16.60-18.12	88.0	500	4500
1"	26.20-26.98	53.18	12.40-13.00	12.40-13.00	19.50-21.50	140.0	150	3500
1" 1/16	27.78-28.57	54.76	12.40-13.00	12.40-13.00	19.50-21.50	148.0	150	2750
1" 1/8	29.37-30.16	57.15	13.20-13.80	13.20-13.80	20.50-23.50	178.0	100	2500
1" 1/4	32.55-33.33	60.32	13.20-13.80	13.20-13.80	20.50-23.50	193.0	100	2250
1" 3/8	35.72-36.51	63.50	13.20-13.80	13.20-13.80	20.50-23.50	203.0	100	2000

Dimensions in mm

Technical details:

Hardness: 43 - 49 HRC.

The washers are delivered precompressed according to 1967 A.R.E.A. technical specification.

Anticorrosion surface treatment:

Burnishing and light oiling.
 White mech. zinc plating 12my Cr6 free.
 Yellow mech. zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Hot zinc galvanizing
 Other coatings upon customer request.

Features and specific use:

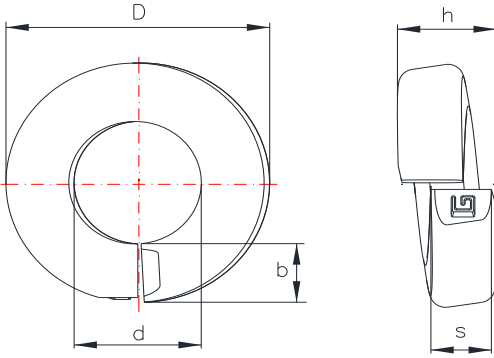
Spring washers to be used in railway track industry. Each washer is identified with the manufacturer mark "G".

Single coiled spring washer for railway tracks

Grower singola per armamento ferroviario
Oberbau Federringe

PLAIN PATTERN SQUARE EDGE

SPRING STEEL



DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D max.	b min.-max.	s min.-max.	h residual	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
3/4"	19.85-20.63	39.68	9.22-9.72	9.22-9.72	17.90-19.90	59.0	800	7000
7/8"	23.02-23.81	42.86	9.22-9.72	9.22-9.72	17.90-19.90	65.0	800	6500
1"	26.20-26.98	46.03	9.22-9.72	9.22-9.72	17.90-19.90	71.0	750	6000
1" 1/8	29.37-30.16	49.21	9.22-9.72	9.22-9.72	17.90-19.90	77.4	675	5500
1" 1/4	32.54-33.33	52.38	9.22-9.72	9.22-9.72	17.90-19.90	83.9	550	5000

Dimensions in mm

Technical details:

Hardness: 40 - 46 HRC.

Anticorrosion surface treatment:

Burnishing and light oiling.
 White mech. zinc plating 12my Cr6 free.
 Yellow mech. zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Hot zinc galvanizing
 Other coatings upon customer request.

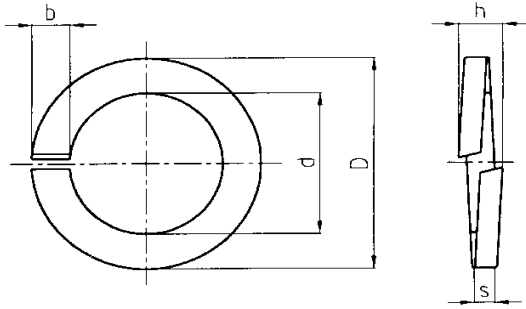
Features and specific use:

Spring washers to be used in railway track industry.
 Each washer is identified with the manufacturer mark "G".

Single coiled spring washer for railway tracks

Grower singola per armamento ferroviario

Oberbau Federringe


NF F 50-001
SPRING STEEL 38 Si 7 EN 10089

DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D	b min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
M 18	20.00-21.20	~ 44.00	11.00-13.00	5.50-6.50	12.00-13.60	56.0	200	6500
M 20	22.00-23.20	~ 46.00	11.00-13.00	5.50-6.50	12.00-13.60	59.0	200	6000
M 22	24.00-25.20	~ 48.00	11.00-13.00	5.50-6.50	12.00-13.60	62.0	200	5500
M 24	26.00-27.20	~ 50.00	11.00-13.00	6.50-7.50	14.00-15.60	77.0	200	5000
M 27	29.00-30.20	~ 53.00	11.00-13.00	7.50-8.50	16.00-17.60	95.0	175	3500
M 30	32.00-33.20	~ 56.00	11.00-13.00	7.50-8.50	16.00-17.60	102.0	125	3000

Dimensions in mm

Technical details:

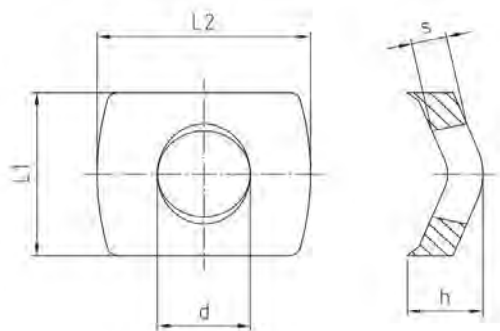
Hardness: 43 - 49 HRc.

Anticorrosion surface treatment:

 Burnishing and light oiling.
 White mech. zinc plating 12my Cr6 free.
 Yellow mech. zinc plating 12my Cr6 free.
 Delta Protekt® KL 100 6-10 my.
 Geomet® 321 type A 5-7 my.
 Hot zinc galvanizing
 Other coatings upon customer request.

Features and specific use:

Spring washers to be used in railway track industry



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	Side 1 min.-max.	Side 2 min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging	N° of pcs micro packaging
M 3.0	3.20-3.50	5.90-6.10	6.85-7.15	1.10-1.30	2.40-2.60	0.300		40000	
M 3.5	3.70-4.00	6.90-7.10	7.35-7.65	1.30-1.50	2.90-3.10	0.510		22500	
M 4.0	4.30-4.60	7.90-8.10	9.85-10.15	1.46-1.54	2.80-3.20	0.660		17500	
M 5.0	5.30-5.60	11.30-11.70	12.80-13.20	1.60-1.80	4.10-4.30	1.490		7500	
M 6.0	6.40-6.76	18.30-18.70	19.80-20.20	2.40-2.60	6.10-6.30	5.875		2000	

Dimensions in mm

Technical details:

Hardness: 400 - 490 Hv

Tightening torques: see table.

Chemical analysis of raw material : see table.

Anticorrosion surface treatment:

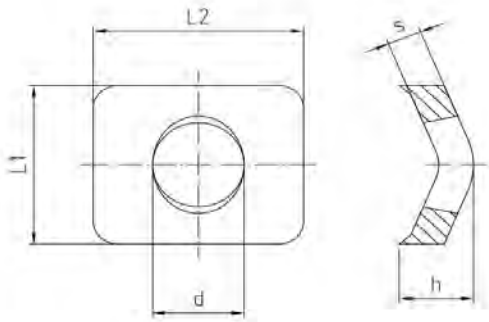
Burnishing and light oiling.

Nickel plating

Other coatings upon customer request.

Features and specific use:

To be used in the electrical contact industry.



DIMENSIONS AND FEATURES							PACKAGING		
For screws of	d min.-max.	Side 1 min.-max.	Side 2 min.-max.	s min.-max.	h min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging	N° of pcs micro packaging
M 3.0	3.20-3.50	5.90-6.10	6.85-7.15	1.10-1.30	2.40-2.60	0.300		40000	
M 3.5	3.70-4.00	6.90-7.10	8.35-8.65	1.36-1.44	2.90-3.10	0.510		22500	
M 4.0	4.30-4.60	7.90-8.10	9.85-10.15	1.40-1.60	2.90-3.10	0.740		17500	
M 5.0	5.30-5.60	11.30-11.70	13.80-14.20	1.60-1.80	4.10-4.30	1.860		7500	
M 6.0	6.40-6.76	18.30-18.70	19.80-20.20	2.40-2.60	6.10-6.30	6.675		2000	

Dimensions in mm

Technical details:

Hardness: 415 - 490 Hv
 Tightening torques: see table.
 Chemical analysis of raw material : see table.

Anticorrosion surface treatment:

Dry and clean surface.
 Nickel plating
 Other coatings upon customer request.

Features and specific use:

To be used in the electrical contact industry.

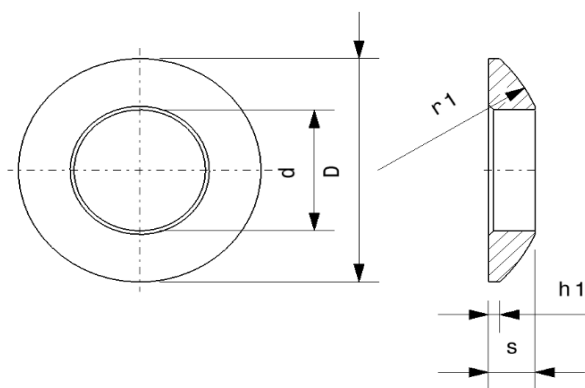
Spherical washer

Rondella sferica

Kugelscheiben

DIN 6319 C

LOW CARBON STEEL



DIMENSIONS AND FEATURES								PACKAGING	
For screws of	d min.-max.	D min.-max.	s min.-max.	h1 min.-max.	r1 min.-max.	Static load max. KN	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 6.0	6.40-6.62	11.80-12.20	2.20-2.40	0.60-0.80	8.80-9.20	9	0.95	1.000	
M 8.0	8.40-8.62	16.80-17.20	3.10-3.30	0.50-0.70	11.80-12.20	17	2.6	1.000	
M 10.0	10.50-10.77	20.80-21.20	3.90-4.10	0.70-0.90	14.80-15.20	26	4.9	500	
M 12.0	13.00-13.27	23.80-24.20	4.50-4.70	1.00-1.20	16.80-17.20	38	7.4	250	
M 14.0	15.00-15.27	27.80-28.20	4.90-5.10	1.10-1.30	21.80-22.20	53	10.8	200	
M 16.0	17.00-17.33	29.80-30.20	5.20-5.40	1.20-1.40	21.80-22.20	73	12.7	100	
M 20.0	21.00-21.33	35.70-36.30	6.10-6.50	1.90-2.10	26.80-27.20	117	22.5	50	
M 24.0	25.00-25.33	43.70-44.30	8.00-8.40	2.30-2.50	31.70-32.30	168	44.6	50	
M 30.0	31.00-31.39	55.70-56.30	11.00-11.40	3.50-3.70	40.70-41.30	269	98	20	
M 36.0	37.00-37.39	67.70-68.30	13.80-14.20	4.50-4.70	49.70-50.30	394	190	20	
M 42.0	43.00-43.39	77.70-78.30	16.80-17.20	6.30-6.70	57.70-58.30	542	310	10	
M 48.0	50.00-50.46	91.70-92.30	20.80-21.20	7.80-8.20	66.70-67.30	714	540	3	

Dimensions in mm

Technical details:

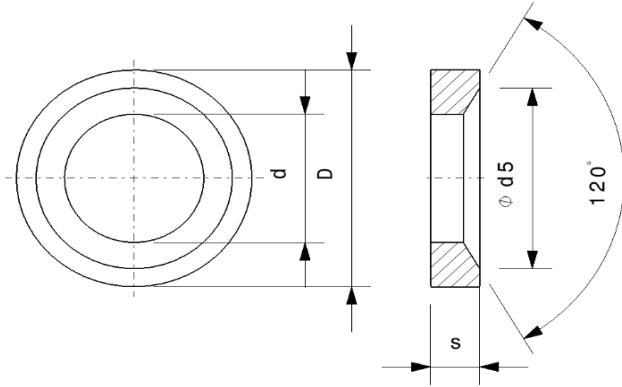
Carbon steel, case hardened at a depth of 0.2 - 0.4 mm with a surface hardness of 550-650 Hv10.

Anticorrosion surface treatment:

Burnishing and light oiling.
Phosphating.
Other coatings upon customer request.

Features and specific use:

Used in combination with the washer DIN 6319 type D, guarantees thanks to their coupling a safe locking function on non-parallel bearing surfaces.

**Rondella piana con sede conica
Kegelpfanne**
DIN 6319 D
LOW CARBON STEEL


DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D min.-max.	s min.-max.	d5 min.-max.	Static load max. KN	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 6.0	7.10-7.32	11.80-12.20	2.70-2.90	10.80-11.20	9	1.4	1.000	
M 8.0	9.60-9.82	16.80-17.20	3.40-3.60	14.30-14.70	17	3.8	500	
M 10.0	12.00-12.27	20.80-21.20	4.10-4.30	18.30-18.70	26	6.5	500	
M 12.0	14.20-14.47	23.80-24.20	4.90-5.10	19.80-20.20	38	10.6	250	
M 14.0	16.50-16.77	27.80-28.20	5.50-5.70	24.60-25.00	53	15.5	200	
M 16.0	19.00-19.33	29.80-30.20	6.10-6.30	25.80-26.20	73	18.7	100	
M 20.0	23.20-23.53	35.70-36.30	7.30-7.70	30.70-31.30	117	32	50	
M 24.0	28.00-28.33	43.70-44.30	9.30-9.70	36.70-37.30	168	63	50	
M 30.0	35.00-35.39	55.70-56.30	11.80-12.20	48.70-49.30	269	130	25	
M 36.0	42.00-42.39	67.70-68.30	14.80-15.20	59.70-60.30	394	236	20	
M 42.0	49.00-49.39	77.70-78.30	17.80-18.20	69.70-70.30	542	365	10	
M 48.0	56.00-56.46	91.70-92.30	21.80-22.20	81.70-82.30	714	643	3	

Dimensions in mm

Technical details:

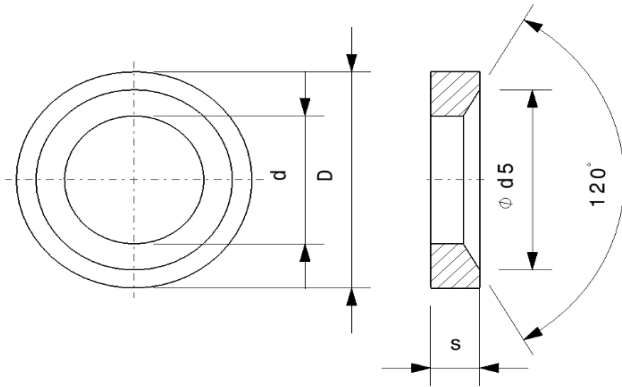
Carbon steel, case hardened at a depth of 0.2 - 0.4 mm with a surface hardness of 550-650 Hv10.

Anticorrosion surface treatment:

Burnishing and light oiling.
Phosphating.
Other coatings upon customer request.

Features and specific use:

Used in combination with the washer DIN 6319 type C, guarantees thanks to their coupling a safe locking function on non-parallel bearing surfaces.

**Rondella piana con sede conica
 Kegelpfanne**
DIN 6319 G
CARBON STEEL


DIMENSIONS AND FEATURES							PACKAGING	
For screws of	d min.-max.	D min.-max.	s min.-max.	d5 min.-max.	Static load max. KN	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
M 6.0	7.10-7.32	16.80-17.20	3.90-4.10	10.80-11.20	9	5.6	1.000	
M 8.0	9.60-9.82	23.80-24.20	4.90-5.10	14.30-14.70	17	14	500	
M 10.0	12.00-12.27	29.80-30.20	4.90-5.10	18.30-18.70	26	21	500	
M 12.0	14.20-14.47	35.70-36.30	5.90-6.10	19.80-20.20	38	38	250	
M 14.0	16.50-16.77	39.70-40.30	5.90-6.10	24.60-25.00	53	47	200	
M 16.0	19.00-19.33	43.70-44.30	6.80-7.20	25.80-26.20	73	68	100	
M 20.0	23.20-23.53	49.70-50.30	7.80-8.20	30.70-31.30	117	94	50	
M 24.0	28.00-28.33	59.70-60.30	9.80-10.20	36.70-37.30	168	169	50	
M 30.0	35.00-35.39	67.70-68.30	11.80-12.20	48.70-49.30	269	237	25	

Dimensions in mm

Technical details:

Hardness: 350-430 Hv30

Tightening couples: see table.

 Chemical analysis of raw material:
 see table.

Anticorrosion surface treatment:

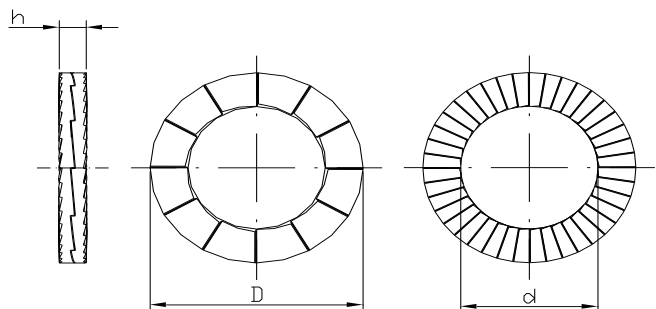
Burnishing and light oiling.

Phosphating.

Other coatings upon customer request.

Features and specific use:

Used in combination with the washer DIN 6319 type C, guarantees thanks to their coupling a safe locking function on non-parallel bearing surfaces.


GROWER TWIN-LOCK® STANDARD SERIES
CARBON STEEL 27CrMnB5 EN 683-2

DIMENSIONS AND FEATURES					PACKAGING	
For screws of	d min.-max.	D min.-max.	h pair min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
M 6.0	6.40-6.60	10.60-11.00	1.55-1.93	0.70	200	14.000
1/4"	7.10-7.30	11.30-11.70	1.55-1.93	0.80	200	13.000
M 8.0	8.60-8.80	13.30-13.70	2.25-2.63	1.50	200	6.500
3/8"	10.10-10.50	16.40-16.80	2.25-2.63	2.30	200	4.500
M 10.0	10.50-10.90	16.40-16.80	2.25-2.63	2.30	200	4.500
7/16"	11.20-11.60	18.30-18.70	2.25-2.63	2.90	200	3.250
M 12.0	12.80-13.20	19.30-19.70	2.25-2.63	2.90	200	3.250
1/2"	13.30-13.70	19.30-19.70	2.25-2.63	2.70	200	3.500
M 14.0	15.00-15.40	22.80-23.20	3.15-3.53	6.20	100	1.500
M 16.0	16.80-17.20	25.20-25.60	3.15-3.53	6.60	100	1.300
M 18.0	19.30-19.70	28.80-29.20	3.15-3.53	8.50	100	1.000
3/4"	19.80-20.20	30.50-30.90	3.15-3.53	10.20	100	950
M 20.0	21.20-21.60	30.50-30.90	3.15-3.53	9.30	100	950

Dimensions in mm

Technical details:

Hardness: 485 - 540 Hv10.

 Chemical analysis of raw material:
 see table.

General applications in non aggressive environments and with low temperature.

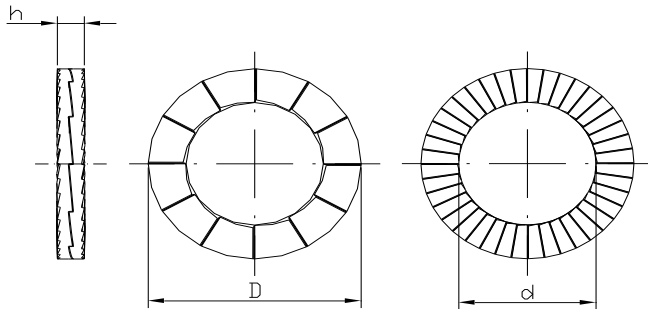
Anticorrosion surface treatment:

Delta Protekt® KL100+VH302 GZ.

Features and specific use:

Securing system ideal in the presence of vibrations or dynamic loads.

These washers are supplied glued in pairs.


GROWER TWIN-LOCK® STANDARD SERIES
STAINLESS STEEL AISI 316L EN 10088-2

DIMENSIONS AND FEATURES					PACKAGING	
For screws of	d min.-max.	D min.-max.	h pair min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
M 6.0	6.40-6.60	10.60-11.00	1.75-2.25	0.90	200	11.000
1/4"	7.10-7.30	11.30-11.70	1.75-2.25	0.95	200	13.000
M 8.0	8.60-8.80	13.30-13.70	1.75-2.25	1.25	200	7.500
3/8"	10.10-10.50	16.40-16.80	1.75-2.25	1.95	200	4.500
M 10.0	10.50-10.90	16.40-16.80	1.75-2.25	1.90	200	5.000
7/16"	11.20-11.60	18.30-18.70	1.75-2.25	2.60	200	3.750
M 12.0	12.80-13.20	19.30-19.70	1.75-2.25	2.50	200	3.750
1/2"	13.30-13.70	19.30-19.70	1.75-2.25	2.35	200	4.000
M 14.0	15.00-15.40	22.80-23.20	2.75-3.25	5.20	100	1.500
M 16.0	16.80-17.20	25.20-25.60	2.75-3.25	6.30	100	1.300
M 18.0	19.30-19.70	28.80-29.20	2.75-3.25	8.30	100	1.000
3/4"	19.80-20.20	30.50-30.90	2.75-3.25	9.60	100	950
M 20.0	21.20-21.60	30.50-30.90	2.75-3.25	8.55	100	950

Dimensions in mm

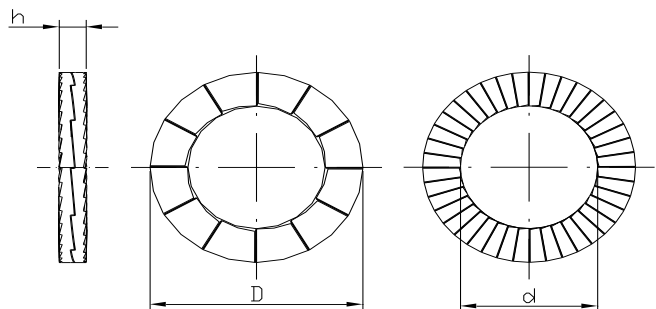
Technical details:

Hardness: minimum 530 Hv0.05 after surface hardening treatment.
 Chemical analysis of raw material: see table.

For aggressive environments, non acid/chloride environments, no acid chlorine, fluoride, sulphuric.

Features and specific use:

Securing system ideal in the presence of vibrations or dynamic loads.
 These washers are supplied glued in pairs.


GROWER TWIN-LOCK® LARGE SERIES
CARBON STEEL 27CrMnB5 EN 683-2

DIMENSIONS AND FEATURES					PACKAGING	
For screws of	d min.-max.	D min.-max.	h pair min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
M 6.0	6.40-6.60	13.30-13.70	2.25-2.63	2.00	200	5.000
1/4"	7.10-7.30	13.30-13.70	2.25-2.63	1.80	200	6.000
M 8.0	8.60-8.80	16.40-16.80	2.25-2.63	2.90	200	3.250
3/8"	10.10-10.50	20.80-21.20	2.25-2.63	4.70	200	2.250
M 10.0	10.50-10.90	20.80-21.20	2.25-2.63	4.65	200	2.000
M 12.0	12.80-13.20	25.20-25.60	3.15-3.53	9.10	100	1.300
1/2"	13.30-13.70	25.20-25.60	3.15-3.53	9.00	100	1.100
M 14.0	15.00-15.40	30.50-30.90	3.15-3.53	14.00	100	650
M 16.0	16.80-17.20	30.50-30.90	3.15-3.53	12.70	100	650
M 18.0	19.30-19.70	34.30-34.70	3.15-3.53	15.50	100	500
3/4"	19.80-20.20	38.80-39.20	3.15-3.53	22.00	100	400
M 20.0	21.20-21.60	38.80-39.20	3.15-3.53	20.40	100	500

Dimensions in mm

Technical details:

Hardness: 485 - 540 Hv10.

 Chemical analysis of raw material:
 see table.

General applications in non aggressive environments and with low temperature.

Anticorrosion surface treatment:

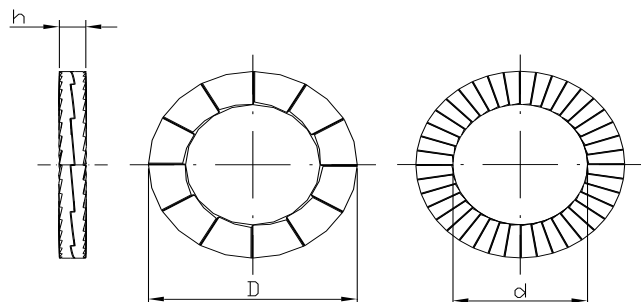
Delta Protekt® KL100+VH302 GZ.

Features and specific use:

Securing system ideal in the presence of vibrations or dynamic loads.

These washers are supplied glued in pairs.

The large series is ideal for varnished surfaces and soft materials.


GROWER TWIN-LOCK® LARGE SERIES
STAINLESS STEEL AISI 316L EN 10088-2

DIMENSIONS AND FEATURES					PACKAGING	
For screws of	d min.-max.	D min.-max.	h pair min.-max.	Kg/1000 pieces	N° of pcs standard packaging	N° of pcs bulk packaging
M 6.0	6.40-6.60	13.30-13.70	1.75-2.25	1.65	200	5.500
1/4"	7.10-7.30	13.30-13.70	1.75-2.25	1.55	200	6.000
M 8.0	8.60-8.80	16.40-16.80	1.75-2.25	2.35	200	4.000
3/8"	10.20-10.40	20.80-21.20	1.75-2.25	3.95	200	2.250
M 10.0	10.50-10.90	20.80-21.20	1.75-2.25	3.85	200	2.500
M 12.0	12.80-13.20	25.20-25.60	2.75-3.25	8.70	100	1.100
1/2"	13.30-13.70	25.20-25.60	2.75-3.25	8.40	100	1.100
M 14.0	15.00-15.40	30.50-30.90	2.75-3.25	13.30	100	650
M 16.0	16.80-17.20	30.50-30.90	2.75-3.25	11.90	100	700
M 18.0	19.30-19.70	34.30-34.70	2.75-3.25	15.30	100	500
3/4"	19.80-20.20	38.80-39.20	2.75-3.25	21.00	100	400
M 20.0	21.20-21.60	38.80-39.20	2.75-3.25	20.50	100	450

Dimensions in mm

Technical details:

Hardness: minimum 530 Hv0.05 after surface hardening treatment.

Chemical analysis of raw material: see table.

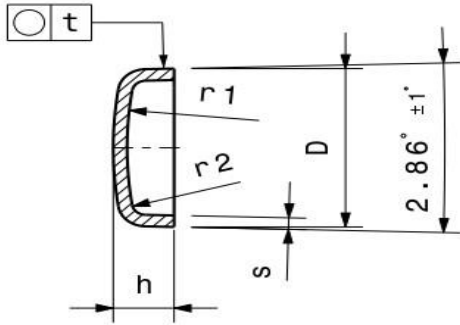
For aggressive environments, non acid/chloride environments, no acid chlorine, fluoride, sulphuric.

Features and specific use:

Securing system ideal in the presence of vibrations or dynamic loads.

These washers are supplied glued in pairs.

The large series is ideal for varnished surfaces and soft materials.



DIMENSIONS AND FEATURES							PACKAGING	
D min.-max.	h min.-max.	r1	r2	s min.-max.	t	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
8.10-8.15	2.70-3.30	20	1	0.60-0.90	0.05	0.460		18000
10.10-10.15	2.70-3.30	25	1	0.60-0.90	0.05	0.700		14000
12.13-12.20	3.63-4.37	30	1	0.85-1.15	0.05	1.430		6000
14.13-14.20	4.63-5.37	35	1	0.85-1.15	0.05	2.130		4500
15.15-15.22	4.63-5.37	38	1	0.85-1.15	0.05	2.370		4000
16.15-16.22	4.63-5.37	40	1	0.85-1.15	0.05	2.620		3750
18.15-18.22	5.63-6.37	45	1	0.85-1.15	0.05	3.320		2750
20.19-20.27	5.63-6.37	50	1	0.85-1.15	0.05	4.160		2500
22.19-22.27	6.55-7.45	55	1.6	1.45-1.75	0.05	7.250		1250
24.19-24.27	6.55-7.45	60	1.6	1.45-1.75	0.05	8.860		1000
25.22-25.30	7.55-8.45	60	1.6	1.45-1.75	0.05	9.600		900
28.22-28.30	8.55-9.45	70	1.6	1.45-1.75	0.05	13.320		750
30.22-30.30	8.55-9.45	75	1.6	1.45-1.75	0.05	14.790		650
36.28-36.37	10.45-11.55	90	1.6	1.45-1.75	0.06	22.230		450
40.28-40.37	11.45-12.55	100	1.6	1.45-1.75	0.06	27.530		350
42.33-42.42	12.45-13.55	105	1.6	1.45-1.75	0.06	31.160		320
45.33-45.42	13.45-14.55	110	1.6	1.45-1.75	0.06	36.130		250
50.33-50.42	14.45-15.55	125	1.6	1.45-1.75	0.06	44.180		200
56.41-56.52	16.45-17.55	140	2.5	1.85-2.15	0.08	68.570		150
63.41-63.52	18.35-19.65	160	2.5	1.85-2.15	0.08	87.720		100

Dimensions in mm

Technical details:

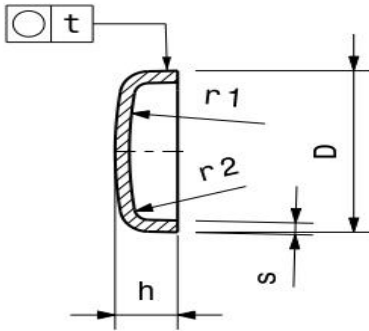
Chemical analysis of raw material:
see table.

Anticorrosion surface treatment:

Dry and clean surface.
Electrozinc plating 6-8 my cr6 free.
Other coatings upon customer request.

Features and specific use:

Sealing push-in caps are used in several industrial applications when holes have to be sealed in order to prevent the entry of foreign parts and liquids.



DIMENSIONS AND FEATURES							PACKAGING	
D min.-max.	h min.-max.	r1	r2	s min.-max.	t	Kg/1000 pieces	No. of pcs standard packaging	No. of pcs bulk packaging
8.10-8.15	2.70-3.30	20	1	0.60-0.90	0.05	0.460		18000
10.10-10.15	2.70-3.30	25	1	0.60-0.90	0.05	0.700		14000
12.13-12.20	3.63-4.37	30	1	0.85-1.15	0.05	1.430		6000
14.13-14.20	4.63-5.37	35	1	0.85-1.15	0.05	2.130		4500
15.15-15.22	4.63-5.37	38	1	0.85-1.15	0.05	2.370		4000
16.15-16.22	4.63-5.37	40	1	0.85-1.15	0.05	2.620		3750
18.15-18.22	5.63-6.37	45	1	0.85-1.15	0.05	3.320		2750
20.19-20.27	5.63-6.37	50	1	0.85-1.15	0.05	4.160		2500
22.19-22.27	6.55-7.45	55	1.6	1.45-1.75	0.05	7.250		1250
24.19-24.27	6.55-7.45	60	1.6	1.45-1.75	0.05	8.860		1000
25.22-25.30	7.55-8.45	60	1.6	1.45-1.75	0.05	9.600		900
28.22-28.30	8.55-9.45	70	1.6	1.45-1.75	0.05	13.320		750
30.22-30.30	8.55-9.45	75	1.6	1.45-1.75	0.05	14.790		650
36.28-36.37	10.45-11.55	90	1.6	1.45-1.75	0.06	22.230		450
40.28-40.37	11.45-12.55	100	1.6	1.45-1.75	0.06	27.530		350
42.33-42.42	12.45-13.55	105	1.6	1.45-1.75	0.06	31.160		320
45.33-45.42	13.45-14.55	110	1.6	1.45-1.75	0.06	36.130		250
50.33-50.42	14.45-15.55	125	1.6	1.45-1.75	0.06	44.180		200
56.41-56.52	16.45-17.55	140	2.5	1.85-2.15	0.08	68.570		150
63.41-63.52	18.35-19.65	160	2.5	1.85-2.15	0.08	87.720		100

Dimensions in mm

Technical details:

Chemical analysis of raw material:
see table.

Anticorrosion surface treatment:

Dry and clean surface.
Electrozinc plating 6-8 my cr6 free.
Other coatings upon customer request.

Features and specific use:

Sealing push-in caps are used in several industrial applications when holes have to be sealed in order to prevent the entry of foreign parts and liquids.

Surface treatments table

TYPE OF SURFACE TREATMENT	WHITE CORROSION RESISTANCE*** [minimum hours]	RED CORROSION RESISTANCE*** [minimum hours]	ASPECT
*Electrolytical zinc plating 2-3 my Cr VI-free	6	12	Brilliant gray with blue-coloured reflexes Gray with weak blue-coloured reflexes
*Electrolytical zinc plating 6-8 my Cr VI-free	24	72	
*Electrolytical zinc plating 11-13 my Cr VI-free	24	96	
White mechanical zinc plating 11-13 my Cr VI-free	72	168	
White mechanical zinc plating 20-25 my Cr VI-free	72	216	
White mechanical zinc plating 40-42 my Cr VI-free	72	288	
Yellow mechanical zinc plating 11-13 my Cr VI-free	72	168	Iridescent yellow
Yellow mechanical zinc plating 20-25 my Cr VI-free	72	216	
Yellow mechanical zinc plating 40-42 my Cr VI-free	72	288	
**Geomet® 321 type A 5-7 my Cr VI-free	-	600	Gray with satin surface
**Geomet® 321 type B 8-10 my Cr VI-free	-	1000	
**Geomet® 500 type A 5-7 my Cr VI-free	-	600	
**Geomet® 500 type B 8-10 my Cr VI-free	-	1000	
Phosphating zinc-iron 5-8 my	-	16	Matt black
**Hot dip galvanising 50-60 my	-	-	Matt gray
Zinc-nickel 8 my + sealing	200	600	Matt gray
Black zinc-nickel 8 my + sealing	120	720	Matt black
**Delta Protekt® KL100	-	720	Gray with satin surface
**Delta Protekt® KL105	-	720	Gray with satin surface
**Delta Protekt® KL100 + VH301 GZ	-	1000	Gray with satin surface
**Delta Protekt® KL100 + VH302 GZ	-	1000	Gray with satin surface
**Delta Protekt® KL100 + VH315 GZ	-	1000	Gray with satin surface
**Delta Protekt® KL120	-	1000	Gray with satin surface
Nickel-Plating	-	-	Brilliant gray

* During the electroplating process the pieces absorb hydrogen that can cause breaks and cracks on the pieces. According to ISO 4042 standard, in order to get rid of this embrittlement, Growermetal bakes all the items manufactured with spring steel. Such heat treatment is duly made within two hours after the plating and before the passivation.

** Treatment not recommended for products with internal diameter inferior to 6 mm. The pieces of smaller dimensions usually stick together during the coating process.

*** Neutral salt spray test according to ISO 9227 standard.

Chemical analysis of raw materials table

* N = Raw material from strip

* F = Raw material from wire

MATERIAL	Type*	REFERENCE NORM	CHEMICAL COMPOSITION									
			C	Si	Mn	P	S	Sn	Cr	Ni	Mo	Other elements
STEEL C 35E	N	EN 10132-3 N. 1.1181	0,32-0,39	0,10-0,40	0,50-0,80	≤ 0,035	≤ 0,035		≤ 0,40	≤ 0,40	≤ 0,10	
STEEL C 60	N	EN 10132-3 N. 1.1221	0,57-0,65	0,15-0,35	0,60-0,90	≤ 0,025	≤ 0,025		≤ 0,40	≤ 0,40	≤ 0,10	
STEEL C 60D	F	EN 10016-2 N. 1.0610	0,58-0,63	0,10-0,30	0,50-0,80	≤ 0,035	≤ 0,035		≤ 0,15	≤ 0,20	≤ 0,05	Cu ≤ 0,25; Al ≤ 0,01
STEEL C 67	N	EN 10132-4 N. 1.1231	0,65-0,73	0,15-0,35	0,60-0,90	≤ 0,025	≤ 0,025		≤ 0,40	≤ 0,40	≤ 0,10	
STEEL 38 Si 7	F	EN 10089 N. 1.5023	0,35-0,42	1,50-1,80	0,50-0,80	≤ 0,025	≤ 0,025					
STEEL 51 Cr V4	N	DIN 10132-4 N. 1.8159	0,47-0,55	≤ 0,40	0,70-1,10	≤ 0,025	≤ 0,025		0,90-1,20	≤ 0,40	≤ 0,10	V 0,10-0,25
STEEL 27MnCrB5-2	N	EN 683-2 N. 1.7182	0,24-0,30	≤ 0,40	1,10-1,40	≤ 0,025	≤ 0,035		0,30-0,60			B 0,0008-0,0050; Cu ≤ 0,40
STEEL 30MnCrB5-2	N	EN 683-2 N. 1.5531	0,27-0,33	≤ 0,40	1,15-1,45	≤ 0,025	≤ 0,035					B 0,0008-0,0050; Cu ≤ 0,40
STAINLESS STEEL AISI 304 (A2)	N	EN 10088-2 N. 1.4301	≤ 0,07	≤ 1,00	≤ 2,00	≤ 0,045	≤ 0,015		17,50-19,50	8,00-10,50		N ≤ 0,11
STAINLESS STEEL AISI 304 (A2)	F	EN 10088-3 N. 1.4301	≤ 0,07	≤ 1,00	≤ 2,00	≤ 0,045	≤ 0,030		17,50-19,50	8,00-10,50		N ≤ 0,10
STAINLESS STEEL AISI 316 (A4)	N	EN 10088-2 N. 1.4401	≤ 0,07	≤ 1,00	≤ 2,00	≤ 0,045	≤ 0,015		16,50-18,50	10,00-13,00	2,00-2,50	N ≤ 0,10
STAINLESS STEEL AISI 316 (A4)	F	EN 10088-3 N. 1.4401	≤ 0,07	≤ 1,00	≤ 2,00	≤ 0,045	≤ 0,030		16,50-18,50	10,00-13,00	2,00-2,50	N ≤ 0,10
STAINLESS STEEL AISI 420	N	EN 10088-2 N. 1.4028	0,26-0,35	≤ 1,00	≤ 1,50	≤ 0,040	≤ 0,015		12,00-14,00			
STAINLESS STEEL AISI 420	F	EN 10088-3 N. 1.4028	0,26-0,35	≤ 1,00	≤ 1,50	≤ 0,040	≤ 0,030		12,00-14,00			
IRON DC01 C390	N	EN 10139 N. 1.0330	≤ 0,12		≤ 0,60	≤ 0,045	≤ 0,045					
IRON DC01 C490	N	EN 10139 N. 1.0330	≤ 0,12		≤ 0,60	≤ 0,045	≤ 0,045					
IRON DC01 C590	N	EN 10139 N. 1.0330	≤ 0,12		≤ 0,60	≤ 0,045	≤ 0,045					
IRON DC01 C690	N	EN 10139 N. 1.0330				≤ 0,045	≤ 0,045					
IRON DC03 C490	N	EN 10139 N. 1.0347	≤ 0,10		≤ 0,45	≤ 0,035	≤ 0,035					
BRONZE Cu Sn 8	N	CW453K - EN 1652				0,01-0,40		7,50-8,50		≤ 0,20		Fe ≤ 0,10; Pb ≤ 0,02; Zn ≤ 0,20
BRONZE Cu Sn 8	F	CW453K - EN 12166				0,01-0,40		7,50-8,50		≤ 0,20		Fe ≤ 0,10; Pb ≤ 0,02; Zn ≤ 0,20
SILICON BRONZE	N	CDA 65100 - ASTM B96-20		0,80-2,00	≤ 0,70							Cu ≥ 96,00; Fe ≤ 0,80; Zn ≤ 1,50; Pb ≤ 0,05
SILICON BRONZE	F	CDA 65100 - ASTM B98-13		0,80-2,00	≤ 0,70							Cu ≥ 96,00; Fe ≤ 0,80; Zn ≤ 1,50; Pb ≤ 0,05
INCONEL® 718	N	DIN 17744 N. 2.4668	0,02-0,08	≤ 0,35	≤ 0,35	≤ 0,015	≤ 0,015		17,00-21,00	50,00-55,00	2,80-3,30	Al 0,30-0,70; Cu ≤ 0,30 Nb 4,70-5,50; Ti 0,60-1,20 B0 ≤ 0,006; Co ≤ 1,00
ALUMINUM AW-6082	N	EN 573-3 N. 3.2315		0,70-1,30	0,40-1,00				≤ 0,025			Mg 0,60-1,20
ALUMINUM AW-7075	F	EN 573-3 N. 3.4365		≤ 0,40	≤ 0,30				0,18-0,28			Fe ≤ 0,50; Cu 1,20-2,00; Mg 2,10-2,90; Zn 5,10-6,10; Ti ≤ 0,20
BRASS CuZn37	N	EN 1652 N.CW508L N. 2.0321								≤ 0,30		Fe ≤ 0,10; Pb ≤ 0,10; Sn ≤ 0,10; Cu ≥ 62,00-64,00; Al ≤ 0,050
COPPER CW024A	N	EN 1652 N.CW024A N. 2.0090				0,015-0,040						Cu ≥ 99,90

Tightening torque bolt-washer table

BOLT RANGE IN CONFORMITY WITH UNI 3740 - ISO 898 COARSE PITCH				
	8,8 (8G)		10,9 (10K)	
	Preload	Tightening couples	Preload	Tightening couples
Screw of	[N]	[Nm]	[N]	[Nm]
M 4	3.830	3,07	5.386	4,32
M 5	6.269	6,03	8.816	8,49
M 6	8.844	10,38	12.438	14,59
M 7	12.941	17,1	18.198	24,05
M 8	16.234	25,16	22.829	35,38
M 10	25.850	50,53	36.352	71,06
M 12	37.693	87,08	53.006	122,5
M 14	51.763	138,5	72.792	195
M 16	71.253	212	100.199	298,3
M 18	86.582	291,7	121.756	410,3
M 20	111.333	413	156.562	581
M 22	139.187	558	195.731	784
M 24	160.319	710	225.449	999
M 27	211.155	1.053	296.936	1.481
M 30	256.587	1.429	360.826	2.010
M 33	319.967	1.939	449.954	2.726
M 36	375.386	2.491	527.887	3.503
M 39	451.310	3.233	634.655	4.547
M 42	516.715	4.002	726.630	5.628

Conversion table Hrc-Hv-Hrb-N/mm² - Kg/mm²

N/mm ²	Kgf/mm ²	HV	HRC	HRB	N/mm ²	Kgf/mm ²	HV	HRC	HRB
255	26	80	-	-	900	91,8	280	27,1	-
270	27,5	85	-	41	915	93,3	285	27,8	-
285	29,1	90	-	48	930	94,9	290	28,5	-
305	31,1	95	-	52	950	96,9	295	29,2	-
320	32,6	100	-	56	965	98,4	300	29,8	-
335	34,2	105	-	59	995	101,5	310	31	-
350	35,7	110	-	62	1030	105,1	320	32,2	-
370	37,7	115	-	65	1060	108,1	330	33,3	-
385	39,3	120	-	67	1095	111,7	340	34,4	-
400	40,8	125	-	70	1125	114,8	350	35,5	-
415	42,3	130	-	71	1155	117,8	360	36,6	-
430	43,9	135	-	73	1190	121,4	370	37,7	-
450	45,9	140	-	75	1220	124,5	380	38,8	-
465	47,4	145	-	77	1255	128	390	39,8	-
480	49	150	-	79	1290	131,6	400	40,8	-
495	50,5	155	-	80	1320	134,7	410	41,8	-
510	52	160	-	82	1350	137,7	420	42,7	-
530	54,1	165	-	83	1385	141,3	430	43,6	-
545	55,6	170	-	85	1420	144,9	440	44,5	-
560	57,1	175	-	86	1455	148,4	450	45,3	-
575	58,7	180	-	87	1485	151,5	460	46,1	-
595	60,7	185	-	88	1520	155,1	470	46,9	-
610	62,2	190	-	90	1555	158,6	480	47,7	-
625	63,8	195	-	91	1595	162,7	490	48,4	-
640	65,3	200	-	92	1630	166,3	500	49,1	-
660	67,3	205	-	93	1665	169,9	510	49,8	-
675	68,9	210	-	94	1700	173,4	520	50,5	-
690	70,4	215	-	94	1740	177,5	530	51,1	-
705	71,9	220	-	95	1775	181,1	540	51,7	-
720	73,5	225	-	96	1810	184,7	550	52,3	-
740	75,5	230	-	97	1845	188,2	560	53	-
755	77	235	-	97	1880	191,8	570	53,6	-
770	78,6	240	20,3	98	1920	195,9	580	54,1	-
785	80,1	245	21,3	99	1955	199,4	590	54,7	-
800	81,6	250	22,2	100	1995	203,5	600	55,2	-
820	83,7	255	23,1	-	2030	207,1	610	55,7	-
835	85,2	260	24	-	2070	211,2	620	56,3	-
850	86,7	265	24,8	-	2105	214,8	630	56,8	-
865	88,2	270	25,6	-	2145	218,8	640	57,3	-
880	89,8	275	26,4	-	2180	222,4	650	57,8	-