


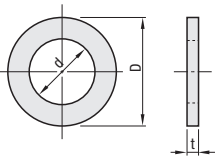
Flat Washers / Spring Washers / Metal Washers

Flat Washers




RoHS10

PWF
SPWF

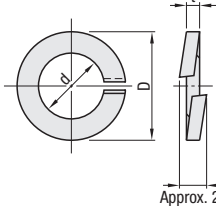


Type Material Surface Treatment
PWF Low Carbon Steel Equivalent Trivalent Chromate JIS B 1256
SPWF 304 Stainless Steel —

Spring Washers



SLW
SSLW




Approx. 2t

Type Material Surface Treatment
SLW SWRH Trivalent Chromate JIS B 1251
SSLW 304 Stainless Steel N1 —

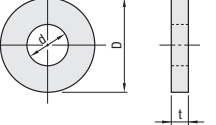
Part Number Example Part Number
PWF3

Washers for Slotted Holes




RoHS10

Type	Material	Surface Treatment
PACK-PWFN	Low Carbon Steel	Trivalent Chromate
PACK-SPWFN	304 Stainless Steel	—



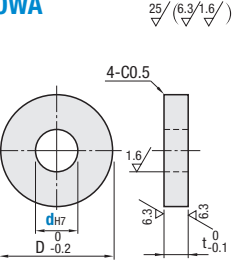
Features
Thicker flat washers than the standard type. Usable to prevent washers for Slotted Holes from falling.

Metal Washers



LOWA

RoHS10



Materials: 1018 Carbon Steel

	d_{H7}
3	+0.010 0
4	
5	+0.012 0
6	
8	+0.015 0
10	
12	+0.018 0
16	

Part Number Example Part Number
PACK-PWFN3
LOWA5

Part Number		d	D		t
Type	Nominal		PWF	SPWF	
PWF SPWF	2	2.2	4.3	5	0.3
	2.5	2.7			
	2.6	2.8	5	6.5	0.5
	3	3.2	6.0	7.0	0.5
	4	4.3	8.0	9.0	0.8
	5	5.3	10.0	10.0	1.0
	6	6.4	12.5	12.5	1.6
	8	8.4	15.5	17.0	
	10	10.5	18.0	21.0	2.0
	12	13.0	21.0	24.0	2.5
	16	17.0	28.0	30.0	3.0
	20	21.0	34.0	37.0	
	24	25.0	39.0	44.0	4.0

Part Number		d	D	t
Type	Nominal			
SLW SSLW	2	2.1	4.4	0.5
	2.5	2.6	5.2	0.6
	2.6	2.7	5.3	
	3	3.1	5.9	0.7
	4	4.1	7.6	1.0
	5	5.1	9.2	1.3
	6	6.1	12.2	1.5
	8	8.2	15.4	2.0
	10	10.2	18.4	2.5
	12	12.2	21.5	3.0
	16	16.2	28.0	4.0
	20	20.2	33.8	5.1
	24	24.5	40.3	5.9

Part Number		PACK-PWFN			PACK-SPWFN			No. of Pieces
Type	Nominal	d	D	T	d	D	T	
PACK-PWFN PACK-SPWFN	3	3.4	8	1	3.3	8	1	50
	4	4.5	10	1.6	4.5	10	1.5	50
	5	5.5	16	2	5.5	12	2	20
	6	6.5	16	3.2	6.5	13	3	20
	8	8.5	20	3	8.5	22	3	20

Part Number		d	D	t
Type				
LOWA	3		6	5
	4		10	
	5			
	6		14	8
	8		18	
	10		22	
	12		25	10
	16		32	

Lock Washers (Nord-Lock) / Tab Washers / Serrated Conical Disc Spring Washers / Disc Spring Washers

Lock Washers – Nord-Lock



RoHS10

NLDF



Material: 316 Stainless Steel or Equivalent
Hardness: 51 HRC min.

This product is to be used in pairs.

Part Number Example Part Number
NLDF3

Principle of Lock Washers

A pair of washers with wedge cams on one side and radial ribs on the other side each to compose a self-locking arrangement. Cam angle (ϕ) is set to be larger than the thread lead angle (β). When the screw attempts to rotate loose, a force is generated by a cam member to push up and separate from the opposite cam member. The rotation is blocked by the wedge effect and the cams will not be separate by more than one thread pitch.

Proper Installation

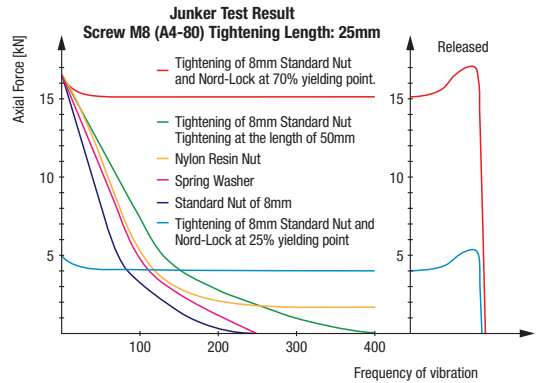
The washers come pre-assembled in pairs (glued). Upon reusing, please confirm the cams are not worn or cracked, and follow the installation instruction on the right. Do not use together with other washers.

Cautions on Repeated Use

NLDF can be used repeatedly with a lubricant.

Allowable Temperature

Temperature limit for NLDF is 500°C. Do not use in an environment when it exceeds the temperature limit.

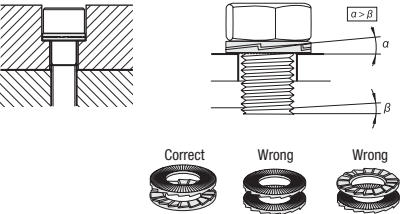


Application Example



Counterbore dia. does not need to be increased.

Part Number		Applicable Screw	D	d	t
Type	No.				
NLDF	3	M3	7	3.4	2.2
	4	M4	7.6	4.4	
	5	M5	9	5.4	
	6	M6	10.8	6.5	2.0
	8	M8	13.5	8.7	
	10	M10	16.6	10.7	
	12	M12	19.5	13	



About Mating Materials

On the surface of mating materials, there will be impression marks made by the radial teeth of the washers. The hardness of the mating surfaces should not exceed the hardness of the Nord-Lock Washers.

Recommended Tightening Torque and Tightening Force

Please refer to the values listed below as guidelines when securing a screw with a lock washer. There is no self-locking effect when the values are far below recommended values. If the tightened torque exceeds the recommended values, loosening the screws may become impossible or Nord-Lock may be broken.

Screw Tightening Torque and Recommended Tightening Force when Lock Washer is Used. (Lubricant GTP600)

NLDF	Applicable Screws M x P	Screw Strength Class A2-70, A4-70 G _s =0.65 μ _g =0.14, μ _w =0.14		Screw Strength Class A2-80, A4-80 G _s =0.65 μ _g =0.14, μ _w =0.14	
		Torque N·m	Tightening Force kN	Torque N·m	Tightening Force kN
3	3 x 0.5	0.9	1.5	1.2	2
4	4 x 0.7	2	2.6	2.7	3.4
5	5 x 0.8	3.9	4.1	5.3	5.5
6	6 x 1.0	6.9	5.9	9.2	7.8
8	8 x 1.25	17	11	22	14
10	10 x 1.5	33	17	43	23
12	12 x 1.75	56	25	75	33

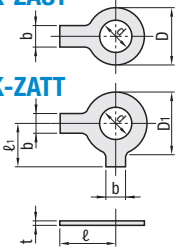
G_s: Coefficient at the Yield Point μ_g: Coefficient of Friction at Screw Thread μ_w: Coefficient of Friction in Washer

Tab Washers One-Tabbed Two-Tabbed

10/Pkg

RoHS10

PACK-ZAST
PACK-ZATT

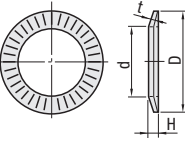


Material: 304 Stainless Steel

Serrated Conical Disc Spring Washers

GTS

RoHS10



Material: From 1049 Carbon Steel to S70C
Hardness: 40~48 HRC min.
Surface Treatment: Tempered Collar JIS B 1251

Part Number		d	D	D ₁	t	ℓ	ℓ ₁	b
Type	No.							
PACK-ZAST PACK-ZATT	3	3.2	12	7	0.29	13	5	4
	4	4.3	14	9		14	7	5
	5	5.3	17	10		8		
	6	6.5	18	13	0.5	15	9	6
	8	8.5	22	16		20	13	7
	10	10.5	26	20		22	14	9
	12	12.5	30	24	0.8	27	19	10
	16	17	38	30		32	24	12
	20	21	45	38	1.2	36	28	15
	24	25	52	44		44	35	17

Part Number		D	d	H	t
Type	No.				
GTS	3	5.5	3.2	0.6	0.45
	4	7	4.25	0.7	0.5
	5	8.5	5.25	0.85	0.6
	6	10	6.4	1.25	1.0
	8	13	8.4	1.55	1.2
	10	16	10.6	1.90	1.5
	12	18	12.6	2.20	1.8
	16	24	16.9	2.80	2.3
	20	30	20.9	3.55	2.8
	24	36	25.4	4.25	3.5

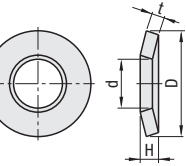
No.3 to 5, Light Load; No.6 to 24, Heavy Load

Part Number Example Part Number
PACK-ZAST3
GTS10
SSRBW8

Disc Spring Washers

SSRBW

RoHS10



Material: 304 Stainless Steel
Hardness: 37~46 HRC min.
JIS B 1251 Class 2 Equivalent

Part Number		D	d	H	t
Type	No.				
SSRBW	4	7.5	4.3	0.7	0.45
	5	9.0	5.3	0.85	0.55
	6	10.5	6.4	0.95	0.60
	8	13.5	8.4	1.3	0.90
	10	16.5	10.5	1.6	1.10
	12	19.0	13.0	1.75	1.20

Light Load