

Washers / Washers for Slotted Holes / Metal Washers

Single Item Sale- -Pkg. Sale

Flat washers and spring washers can be ordered by cost saving boxes. P236

Flat Washer

RoHS 10

PWF SPWF

Material SPCC Equivalent
Surface Treatment Trivalent Chromate
PWF SUS304
SPWF SUS304
JIS B 1256

Part Number		d	D		t	PWF				SPWF				
Type	Normal		PWF	SPWF		Unit Price	Volume	Discount	Rate	Unit Price	Volume	Discount	Rate	
						1 - 24 pcs	25 - 199 pcs	200 - 499 pcs	500 - 1000 pcs		1 - 24 pcs	25 - 199 pcs	200 - 499 pcs	500 - 1000 pcs
PWF	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									
SPWF	5	5.3	10.0	10.0	1.0									
	6	6.4	12.5	12.5										
	8	8.4	15.5	17.0	1.6									
	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										
	20	21.0	34.0	37.0	3.0									
	24	25.0	39.0	44.0	4.0									

Spring Washer

RoHS 10

SLW SSLW

Material SWRH
Surface Treatment Trivalent Chromate
SLW SUS304N1
SSLW SUS304N1
JIS B 1251

Part Number	d	D	t	SLW				SSLW				
				Unit Price	Volume	Discount	Rate	Unit Price	Volume	Discount	Rate	
Type	Normal			1 - 24 pc(s)	25 - 199 pcs.	200 - 499 pcs.	500 - 1000 pcs.	1 - 24 pc(s)	25 - 199 pcs.	200 - 499 pcs.	500 - 1000 pcs.	
SLW	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
SSLW	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								

Ordering Example **Part Number** PWF3

Washers for Slotted Holes

RoHS 10

PACK-PWFN PACK-SPWFN

Material SPCC
Surface Treatment Trivalent Chromate
PACK-PWFN SUS304
PACK-SPWFN -

Features

*Thicker flat washers than the standard type. Usable to prevent washers for slotted holes from falling.

Part Number	PACK-PWFN			PACK-SPWFN			Number of pieces	PACK-PWFN		PACK-SPWFN	
								Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate
Type	Normal	d	D	T	d	D	T	1 ~ 2 pks(g)	3 pks(g) or More	1 ~ 2 pks(g)	3 ~ 500 pks(g)
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				

For orders larger than indicated quantity, please check with WOS.

Metal Washers

RoHS 10

LOWA

Material Steel for General Structure
LOWA SUS304
JIS B 1251

Features

*Thicker flat washers than the standard type. Usable to prevent washers for slotted holes from falling.

Part Number	Type	d	D	t	Unit Price		Volume Discount Rate	
					1 ~ 49 pc(s)	50 ~ 99 pcs	100 ~ 200 pcs	201 ~ 300 pcs
LOWA	3	6						
	4							
	5	10						
	6							
	8	14						
	10							
	12	18						
	16							
	20	22						
	24							

For orders larger than indicated quantity, please check with WOS.

Ordering Example **Part Number** PACK-PWFN3 LOWA5

Lock Washers (Nord-Lock®) / Tab Washers / Disc Spring Washers

RoHS 10

NLDF

Material SUS316L Equivalent
Hardness 51HRC

This product is to be used in pairs.

Ordering 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 (α) is set to be larger than the thread lead angle (β).
When the screw begins 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 separated by more than one thread pitch.

Proper Installation

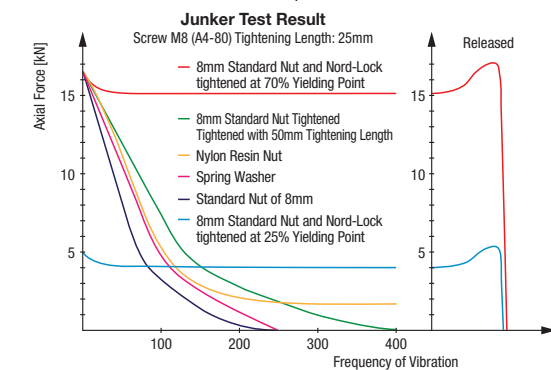
The washers come pre-assembled in pairs (glued).
Upon reusing, please confirm the cams are not worn or cracked, and follow the installation instruction on the right.
Do not use together with other washers.

Cautions on Repeated Use

NLDF can be used repeatedly with a lubricant. Use lubricant for repeated use.

Allowable Temperature

Temperature limit for NLDF is 500°C.
Do not use in an environment where the temperature limit is exceeded.



Tab Washers-One-Tabbed

RoHS 10

Tab Washers-Two-Tabbed

Material SUS304

Serrated Conical Disc Spring Washers

RoHS 10

GTS

Material From S50C to S70C
Hardness 40 to 48HRC
Surface Treatment Tempered Collar
JIS B 1251

Part Number	Type	No.	d	D	D1	t	ℓ	ℓ_1	b	Unit Price		Volume Discount Rate	
										1 ~ 9 pc(s)	10 ~ 30 pc(s)	31 ~ 100 pc(s)	101 ~ 300 pc(s)
PACK-ZAST	PACK-ZATT	3	3.2	12	7	0.25	13	5	4				
		4	4.3	14	9	0.25	14	7	5				
		5	5.3	17	10		15	8	6				
		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				

For orders larger than indicated quantity, please check with WOS.

Ordering Example **Part Number** PACK-ZAST3 GTS10 SSRBW8

Part Number	Type	No.	D	d	H	t	Unit Price		Volume Discount Rate		Quantity
							Less than	or More	1 ~ 49 pc(s)	50 ~ 99	
GTS		3	5.5	3.2	0.6	0.45					15000
		4	7	4.25	0.7	0.5					10000
		5	8.5	5.25	0.85	0.6					5000
		6	10	6.4	1.25	1.0					6000
		8	13	8.4	1.55	1.2					3000
		10	16	10.6	1.90	1.5					2000
		12	18	12.6	2.20	1.8					1000
		16	24	16.9	2.80	2.3					500
		20	30	20.9	3.55	2.8					250
		24	36	25.4	4.25	3.5					150

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

Part Number	Type	No.	Applicable Screw	D	d	t	Unit Price		Volume Discount Rate	
							1 ~ 9 pc(s)	10 ~ 200 pc(s)	201 ~ 500 pc(s)	501 ~ 1000 pc(s)
NLDF		3	M3	7	3.4					
		4	M4	7.6	4.4					
		5	M5	9	5.4					
		6	M6	10.8	6.5					
		8	M8	13.5	8.7					
		10	M10	16.6	10.7					
		12	M12	19.5	13					

For orders larger than indicated quantity, please check with WOS.

Example

Counterbore dia. does not need to be increased.

Correct

Incorrect

Incorrect

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 Screw MxP	Screw Strength Class: A2-70 / A4-70 Gf=0.65 $\mu g=0.14$ $\mu w=0.14$		Screw Strength Class: A2-80 / A4-80 Gf=0.65 $\mu g=0.14$ $\mu w=0.14$	
		Torque N·m	Tightening Force kN	Torque N·m	Tightening Force kN
3	3x0.5	0.9	1.5	1.2	2
4	4x0.7	2	2.6	2.7	3.4
5	5x0.8	3.9	4.1	5.3	5.5
6	6x1.0	6.9	5.9	9.2	7.8
8	8x1.25	17	11	22	14
10	10x1.5	33	17	43	23
12	12x1.75	56	25	75	33

Gf: Coefficient at the Yield Point μg : Coefficient of Friction at Screw Thread μw : Coefficient of Friction in Washer

Disc Spring Washers

RoHS 10

SSRBW

Material SUS304-CSP
Hardness 37 to 46HRC
Surface Treatment Tempered Collar
JIS B 1251 Class 2 Equivalent

Part Number		D	d	H	t	Unit Price	Volume	Discount Rate	
Type	No.					1 ~ 49 pcs	50~69	70~99	100~500
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				