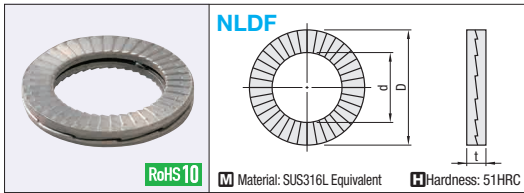


# Lock Washers (Nord-Lock®) / Tab Washers / Disc Spring Washers



Part Number Type	No.	Applicable Screw	D	d	t	Unit Price	Volume Discount Rate
						1 ~ 9 pc(s).	10 ~ 200 pcs.
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			

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

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

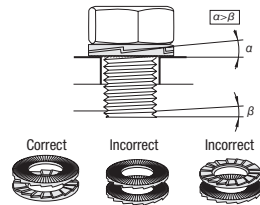
Ordering Example

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 ( $\alpha$ ) is set to be larger than the thread lead angle ( $\beta$ ). 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

Set up correctly as shown in the image to 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.

## 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.

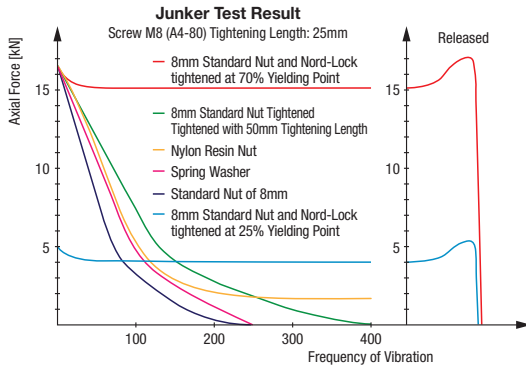
## Recommended Tightening Torque and Tightening Force

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  $\mu_g$ : Coefficient of Friction at Screw Thread  $\mu_w$ : Coefficient of Friction in Washer



Tab Washers-One-Tabbed  
Tab Washers-Two-Tabbed

**PACK-ZAST**

**PACK-ZATT**

10 pcs. per pkg.

RoHS10

Material: SUS304

Serrated Conical Disc Spring Washers

**GTS**

RoHS10

Material: From S50C to S70C

Hardness: 40 to 48HRC

Surface Treatment: Tempered Collar JIS B 1251

Disc Spring Washers

**SSRBW**

RoHS10

Material: SUS304-CSP

Hardness: 37 to 46HRC

JIS B 1251 Class 2 Equivalent

Part Number Type	No.	d	D	D1	t	$\ell$	$\ell_1$	b	Unit Price	Volume Discount Rate
									1 - 9 pc(s).	10 - 30 pc(s).
PACK-ZAST PACK-ZATT	3	3.2	12	7	0.23	13	5	4		
	4	4.3	14	9		14	7	5		
	5	5.3	17	10		15	8	6		
	6	6.5	18	13	0.5	9				
	8	8.5	22	16		20	13	7		
	10	10.5	26	20	0.8	22	14	9		
	12	12.5	30	24		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 Type	No.	D	d	t	Unit Price	Volume Discount Rate	Quantity
					Less than * or More		
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	

Part Number Type	No.	D	d	t	Unit Price	Volume Discount Rate
					1 - 49 pc(s).	50 - 99 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		

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

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

Light Load

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

Ordering Example

Part Number  
**PACK-ZAST3  
GTS10  
SSRBW8**