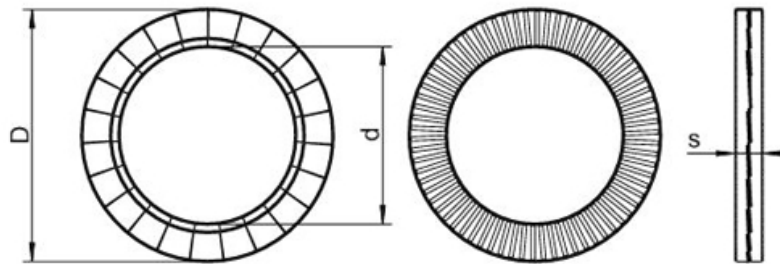


## NORD-LOCK® WASHERS

Nord-Lock® washers are anti-vibration washers which secure bolt joint with tension instead of friction. The system is comprised of a pair of washers that have cams on one side and radial teeth on the opposite side. Since the cam angle is greater than the thread pitch a wedge effect is created by the cams, preventing the bolt from rotating loose. Available as standard in steel EN 1.7182 or equivalent, through hardened and Delta-Protekt® base coat (KL100) and top coat (VH302GZ) and Stainless Steel EN 1.4404 or equivalent. Special material grades of 254SMO (EN 1.4547 or equivalent), Inconel®/Hastelloy® C-276 and Inconel® 718 are available to order.



NORD-LOCK® STEEL WASHERS EN 1.7182 ZINC FLAKE COATING(Delta Protekt®)								
washer Size	Bolt size		d I/D	Tolerance	D O/D	Tolerance	s	tolerance
	Metric	Unc						
NL3	M3	#5	3.40	± 0.10	7.00	± 0.20	1.80	± 0.25
NL3.5	M3.5	#6	3.90	± 0.10	7.60	± 0.20	1.80	± 0.25
NL3.5SP	M3.5	#6	3.90	± 0.10	9.00	± 0.20	1.80	± 0.25
NL4	M4	#8	4.40	± 0.10	7.60	± 0.20	1.80	± 0.25
NL4SP	M4	#8	4.40	± 0.10	9.00	± 0.20	1.80	± 0.25
NL5	M5	#10	5.40	± 0.10	9.00	± 0.20	1.80	± 0.25
NL5SP	M5	#10	5.40	± 0.10	10.80	± 0.20	1.80	± 0.25
NL6	M6		6.50	± 0.10	10.80	± 0.20	1.80	± 0.25
NL6SP	M6		6.50	± 0.10	13.50	± 0.20	2.50	± 0.25
NL1/4"		1/4"	7.20	± 0.10	11.50	± 0.20	1.80	± 0.25
NL1/4"SP		1/4"	7.20	± 0.10	13.50	± 0.20	2.50	± 0.25
NL8	M8	5/16"	8.70	± 0.10	13.50	± 0.20	2.50	± 0.25
NL8SP	M8	5/16"	8.70	± 0.10	16.60	± 0.20	2.50	± 0.25
NL3/8"		3/8"	10.30	± 0.20	16.60	± 0.20	2.50	± 0.25
NL3/8"SP		3/8"	10.30	± 0.20	21.00	± 0.20	2.50	± 0.25
NL10	M10		10.70	± 0.20	16.60	± 0.20	2.50	± 0.25
NL10SP	M10		10.70	± 0.20	21.00	± 0.20	2.50	± 0.25
NL11	M11		11.40	± 0.20	18.50	± 0.20	2.50	± 0.25
NL12	M12		13.00	± 0.20	19.50	± 0.20	2.50	± 0.25
NL12SP	M12		13.00	± 0.20	25.40	± 0.20	3.40	± 0.25
NL1/2"		1/2"	13.50	± 0.20	19.50	± 0.20	2.50	± 0.25
NL1/2"SP		1/2"	13.50	± 0.20	25.40	± 0.20	3.40	± 0.25

**NORD-LOCK® STEEL WASHERS EN 1.7182 ZINC FLAKE COATING(Delta PROTEKT®)**

washer Size	Bolt size		d I/D	Tolerance	D O/D	Tolerance	s	tolerance
	Metric	Unc						
NL14	M14	9/16"	15.20	± 0.20	23.00	± 0.20	3.40	± 0.25
NL14SP	M14	9/16"	15.20	± 0.20	30.70	± 0.20	3.40	± 0.25
NL16	M16	5/8"	17.00	± 0.20	25.40	± 0.20	3.40	± 0.25
NL16SP	M16	5/8"	17.00	± 0.20	30.70	± 0.20	3.40	± 0.25
NL18	M18		19.50	± 0.20	29.00	± 0.20	3.40	± 0.25
NL18SP	M18		19.50	± 0.20	34.50	± 0.20	3.40	± 0.25
NL3/4"		3/4"	20.00	± 0.20	30.70	± 0.20	3.40	± 0.25
NL3/4"SP		3/4"	20.00	± 0.20	39.00	± 0.20	3.40	± 0.25
NL20	M20		21.40	± 0.20	30.70	± 0.20	3.40	± 0.25
NL20SP	M20		21.40	± 0.20	39.00	± 0.20	3.40	± 0.25
NL22	M22	7/8"	23.40	± 0.20	34.50	± 0.20	3.40	± 0.25
NL22SP	M22	7/8"	23.40	± 0.20	42.00	± 0.20	4.60	± 0.25
NL24	M24		25.30	± 0.20	39.00	± 0.20	3.40	± 0.25
NL24SP	M24		25.30	± 0.20	48.50	± 0.20	4.60	± 0.25
NL1"		1"	27.90	± 0.20	39.00	± 0.20	4.60	± 0.25
NL1"SP		1"	27.90	± 0.20	48.50	± 0.20	5.80	± 0.25
NL27	M27		28.40	± 0.20	42.00	± 0.30	5.80	± 0.25
NL27SP	M27		28.40	± 0.20	48.50	± 0.30	5.80	± 0.25
NL30	M30	1 1/8"	31.40	± 0.20	47.00	± 0.30	6.60	+0.00/-0.50
NL30SP	M30	1 1/8"	31.40	± 0.20	58.50	± 0.30	5.80	± 0.25
NL33	M33	1 1/4"	34.40	± 0.20	48.50	± 0.30	6.60	+0.00/-0.50
NL33SP	M33	1 1/4"	34.40	± 0.20	58.50	± 0.30	6.60	+0.00/-0.50
NL36	M36	1 3/8"	37.40	± 0.20	55.00	± 0.30	6.60	+0.00/-0.50
NL36SP	M36	1 3/8"	37.40	± 0.20	63.00	± 0.30	6.60	+0.00/-0.50
NL39	M39	1 1/2"	40.40	± 0.20	58.50	± 0.30	6.60	+0.00/-0.50
NL42	M42		43.20	± 0.20	63.00	± 0.30	6.60	+0.00/-0.50
NL45	M45	1 3/4"	46.20	+0.50/-0.00	70.00	+0.00/-2.00	7.00	± 0.75
NL48	M48		49.60	+0.50/-0.00	75.00	+0.00/-2.00	7.00	± 0.75
NL52	M52	2"	53.60	+0.50/-0.00	80.00	+0.00/-2.00	7.00	± 0.75
NL56	M56	2 1/4"	59.10	+0.50/-0.00	85.00	+0.00/-2.00	7.00	± 0.75
NL60	M60		63.10	+0.50/-0.00	90.00	+0.00/-2.00	7.00	± 0.75
NL64	M64	2 1/2"	67.10	+0.50/-0.00	95.00	+0.00/-2.00	7.00	± 0.75
NL68	M68		71.10	+0.50/-0.00	100.00	+0.00/-2.00	9.50	± 0.75
NL72	M72		75.10	+0.50/-0.00	105.00	+0.00/-2.00	9.50	± 0.75
NL76	M76	3"	79.10	+0.50/-0.00	110.00	+0.00/-2.00	9.50	± 0.75
NL80	M80		83.10	+0.50/-0.00	115.00	+0.00/-2.00	9.50	± 0.75
NL85	M85		88.10	+0.50/-0.00	120.00	+0.00/-2.00	9.50	± 0.75
NL90	M90		92.40	+0.50/-0.00	130.00	+0.00/-2.00	9.50	± 0.75
NL95	M95		97.40	+0.50/-0.00	135.00	+0.00/-2.00	9.50	± 0.75
NL100	M100	4"	103.40	+0.50/-0.00	145.00	+0.00/-2.00	9.50	± 0.75
NL105	M105		108.40	+0.50/-0.00	150.00	+0.00/-2.00	9.50	± 0.75
NL110	M110		113.40	+0.50/-0.00	155.00	+0.00/-2.00	9.50	± 0.75
NL115	M115		118.40	+0.50/-0.00	165.00	+0.00/-2.00	9.50	± 0.75
NL120	M120		123.40	+0.50/-0.00	170.00	+0.00/-2.00	9.50	± 0.75
NL125	M125		128.40	+0.50/-0.00	173.00	+0.00/-2.00	9.50	± 0.75
NL130	M130	5"	133.40	+0.50/-0.00	178.00	+0.00/-2.00	9.50	± 0.75

All dimension's in mm

**NORD-LOCK® STAINLESS STEEL EN 1.4404(AISI 316L) OR EQUIVALENT**

washer Size	Bolt size		d I/D	Tolerance	D O/D	Tolerance	s	tolerance
	Metric	Unc						
NL3SS	M3	#5	3.40	± 0.10	7.00	± 0.20	2.20	± 0.25
NL3.5SS	M3.5	#6	3.90	± 0.10	7.60	± 0.20	2.20	± 0.25
NL3.5SPSS	M3.5	#6	3.90	± 0.10	9.00	± 0.20	2.20	± 0.25
NL4SS	M4	#8	4.40	± 0.10	7.60	± 0.20	2.20	± 0.25
NL4SPSS	M4	#8	4.40	± 0.10	9.00	± 0.20	2.20	± 0.25
NL5SS	M5	#10	5.40	± 0.10	9.00	± 0.20	2.20	± 0.25
NL5SPSS	M5	#10	5.40	± 0.10	10.80	± 0.20	2.20	± 0.25
NL6SS	M6		6.50	± 0.10	10.80	± 0.20	2.20	± 0.25
NP6SPSS	M6		6.50	± 0.10	13.50	± 0.20	2.00	± 0.25
NL1/4SS		1/4	7.20	± 0.10	11.50	± 0.20	2.20	± 0.25
NL1/4SPSS		1/4	7.20	± 0.10	13.50	± 0.20	2.20	± 0.25
NL8SS	M8	5/16	8.70	± 0.10	13.50	± 0.20	2.00	± 0.25
NL8SPSS	M8	5/16	8.70	± 0.10	16.60	± 0.20	2.00	± 0.25
NL3/8SP		3/8	10.30	± 0.20	16.60	± 0.20	2.00	± 0.25
NL3/8SPSS		3/8	10.30	± 0.20	21.00	± 0.20	2.00	± 0.25
NL10SS	M10		10.70	± 0.20	16.60	± 0.20	2.00	± 0.25
NL10SPSS	M10		10.70	± 0.20	21.00	± 0.20	2.00	± 0.25
NL11SS	M11	7/16	11.40	± 0.20	18.50	± 0.20	2.20	± 0.25
NL12SS	M12		13.00	± 0.20	19.50	± 0.20	2.00	± 0.25
NL12SPSS	M12		13.00	± 0.20	25.40	± 0.20	3.00	± 0.25
NL1/2SS		1/2	13.50	± 0.20	19.50	± 0.20	2.00	± 0.25
NL1/2SPSS		1/2	13.50	± 0.20	25.40	± 0.20	3.20	± 0.25
NL14SS	M14	9/16	15.20	± 0.20	23.00	± 0.20	3.00	± 0.25
NL14SPSS	M14	9/16	15.20	± 0.20	30.70	± 0.20	3.20	± 0.25
NL16SS	M16	5/8	17.00	± 0.20	25.40	± 0.20	3.00	± 0.25
NL16SPSS	M16	5/8	17.00	± 0.20	30.70	± 0.20	3.20	± 0.25
NL18SS	M18		19.50	± 0.20	29.00	± 0.20	3.20	± 0.25
NL18SPSS	M18		19.50	± 0.20	34.50	± 0.20	3.20	± 0.25
NL3/4SS		3/4	20.00	± 0.20	30.70	± 0.20	3.20	± 0.25
NL3/4SPSS		3/4	20.00	± 0.20	39.00	± 0.20	3.20	± 0.25
NL20SS	M20		21.40	± 0.20	30.70	± 0.20	3.00	± 0.25
NL20SPSS	M20		21.40	± 0.20	39.00	± 0.20	3.20	± 0.25
NL22SS	M22	7/8	23.40	± 0.20	34.50	± 0.20	3.20	± 0.25
NL22SPSS	M22	7/8	23.40	± 0.20	42.00	± 0.20	3.20	± 0.25
NL24SS	M24		25.30	± 0.20	39.00	± 0.20	3.20	± 0.25
NL24SPSS	M24		25.30	± 0.20	48.50	± 0.20	3.20	± 0.25
NL1SS		1	27.90	± 0.20	39.00	± 0.20	3.20	± 0.25
NL1SPSS		1	27.90	± 0.20	48.50	± 0.20	3.20	± 0.25
NL27SS	M27		28.40	± 0.20	42.00	± 0.30	6.80	+0.00/-0.50
NL27SPSS	M27		28.40	± 0.20	48.50	± 0.30	6.80	+0.00/-0.50
NL30SS	M30	11/8	31.40	± 0.20	47.00	± 0.30	6.80	+0.00/-0.50
NL30SPSS	M30	11/8	31.40	± 0.20	58.50	± 0.30	6.80	+0.00/-0.50
NL33SS	M33	11/4	34.40	± 0.20	48.50	± 0.30	6.80	+0.00/-0.50
NL36SS	M36	13/8	37.40	± 0.20	55.00	± 0.30	6.80	+0.00/-0.50
NL39SS	M39	11/2	40.40	± 0.20	58.50	± 0.30	6.80	+0.00/-0.50
NL42SS	M42		43.20	± 0.20	63.00	± 0.30	6.80	+0.00/-0.50
NL45SS	M45	13/4	46.20	+0.50/-0.00	70.00	+0.00/-2.00	6.80	± 0.75
NL48SS	M48		49.60	+0.50/-0.00	75.00	+0.00/-2.00	6.80	± 0.75
NL52SS	M52	2	53.60	+0.50/-0.00	80.00	+0.00/-2.00	9.00	± 0.75
NL56SS	M56	21/4	59.10	+0.50/-0.00	85.00	+0.00/-2.00	9.00	± 0.75
NL60SS	M60		63.10	+0.50/-0.00	90.00	+0.00/-2.00	9.00	± 0.75
NL64SS	M64	21/2	67.10	+0.50/-0.00	95.00	+0.00/-2.00	9.00	± 0.75
NL68SS	M68		71.10	+0.50/-0.00	100.00	+0.00/-2.00	9.00	± 0.75
NL72SS	M72		75.10	+0.50/-0.00	105.00	+0.00/-2.00	9.00	± 0.75
NL76SS	M76	3	79.10	+0.50/-0.00	110.00	+0.00/-2.00	9.00	± 0.75
NL80SS	M80	31/8	83.10	+0.50/-0.00	115.00	+0.00/-2.00	9.00	± 0.75

# TORQUE GUIDES FOR NORD-LOCK® WASHERS

Cu/C paste = Copper/Graphite Paste (Molykote®1000)

Gf = ratio Of Yield Point

$\mu_{th}$  = Thread Friction

$\mu_b$  = washer Friction

1N = 0.225IB

1Nm = 0.738 ft-lb

NORD-LOCK® STEEL WASHER WITH ELECTRO ZINC PLATED GRADE 8.8 BOLT								
washer Size	Bolt size		Oil, Gf=75% $\mu_{th}=0.10$ , $\mu_b=0.16$		Cu/C paste, Gf=75% $\mu_{th}=0.11$ , $\mu_b=0.16$		Dry, Gf=62% $\mu_{th}=0.15$ , $\mu_b=0.18$	
	Metric	Pitch	Torque (Nm)	Clamp load (kN)	Torque (Nm)	Clamp load (kN)	Torque (Nm)	Clamp load (kN)
NL3	M3	0.50	1.3	2.4	2.1	2.4	1.3	2.0
NL4	M4	0.70	3.1	4.2	4.4	4.2	3.1	3.5
NL5	M5	0.80	6.0	6.8	8.0	6.8	6.0	5.6
NL6	M6	1.00	10.5	9.7	13.2	9.7	10.5	8.0
NL8	M8	1.25	25	18	30	18	25	15
NL10	M10	1.50	49	28	49	28	50	23
NL10	M12	1.75	85	40	83	40	85	33
NL14	M14	2.00	135	55	131	55	136	46
NL16	M16	2.00	205	75	197	75	208	62
NL18	M18	2.50	288	92	275	92	291	76
NL20	M20	2.50	402	118	382	118	408	97
NL22	M22	2.50	548	146	517	146	557	120
NL24	M24	3.00	693	169	652	169	703	140
NL27	M27	3.00	1010	221	945	221	1028	182
NL30	M30	3.50	1379	269	1286	269	1401	222
NL33	M33	3.50	1855	333	1722	333	1889	275
NL36	M36	4.00	2394	392	2219	392	2436	324
NL39	M39	4.00	3087	468	2852	468	3145	387
NL42	M42	4.50	3820	538	3525	538	3890	445

NORD-LOCK® STEEL WASHER WITH NON-PLATED GRADE 10.9 BOLT						
washer Size	Bolt size		Oil, Gf=71% $\mu_{th}=0.13$ , $\mu_b=0.14$		Cu/C paste, Gf=75% $\mu_{th}=0.11$ , $\mu_b=0.15$	
	Metric	Pitch	Torque (Nm)	Clamp load (kN)	Torque (Nm)	Clamp load (kN)
NL3	M3	0.50	1.8	3.2	3.5	3.4
NL4	M4	0.70	4.1	5.6	7.0	5.9
NL5	M5	0.80	8.1	9.1	12.5	9.6
NL6	M6	1.00	14.1	12.9	20.1	13.6
NL8	M8	1.25	34	23	44	25
NL10	M10	1.50	67	37	73	39
NL10	M12	1.75	115	54	121	57
NL14	M14	2.00	183	74	188	78
NL16	M16	2.00	279	100	281	106
NL18	M18	2.50	391	123	388	130
NL20	M20	2.50	547	156	534	165
NL22	M22	2.50	745	194	719	205
NL24	M24	3.00	942	225	902	238
NL27	M27	3.00	1375	294	1297	310
NL30	M30	3.50	1875	358	1755	378
NL33	M33	3.50	2526	443	2340	468
NL36	M36	4.00	3259	522	3003	551
NL39	M39	4.00	4203	624	3845	659
NL42	M42	4.50	5202	716	4740	757

<b>NORD-LOCK® STEEL WASHER WITH NON-PLATED GRADE 12.9 BOLT</b>						
washer Size	Bolt size		Oil, Gf=71% $\mu_{th}=0.13$ , $\mu_b=0.12$		Cu/C paste, Gf=75% $\mu_{th}=0.11$ , $\mu_b=0.15$	
	Metric	Pitch	Torque (Nm)	Clamp load (kN)	Torque (Nm)	Clamp load (kN)
NL3	M3	0.50	2.0	3.9	3.8	4.1
NL4	M4	0.70	4.6	6.7	7.6	7.1
NL5	M5	0.80	9.1	10.9	13.6	11.5
NL6	M6	1.00	15.8	15.4	21.8	16.3
NL8	M8	1.25	38	28	47	30
NL10	M10	1.50	75	44	93	47
NL10	M12	1.75	128	65	151	68
NL14	M14	2.00	204	89	232	94
NL16	M16	2.00	311	120	342	127
NL18	M18	2.50	437	148	467	156
NL20	M20	2.50	610	188	638	198
NL22	M22	2.50	831	233	852	246
NL24	M24	3.00	1052	270	1064	286
NL27	M27	3.00	1533	352	1519	372
NL30	M30	3.50	2091	430	2042	454
NL33	M33	3.50	2815	532	2710	562
NL36	M36	4.00	3633	626	3463	662
NL39	M39	4.00	4683	748	4415	790
NL42	M42	4.50	5799	860	5429	908

<b>NORD-LOCK® STAINLESS EN1.4404 WASHER WITH STAINLESS STEEL BOLT LUBRICATED WITH COPPER/GRAPHITE PASTE(MOLYKOTE®1000)</b>						
washer Size	Bolt size		A4-70 Cu/C paste, Gf=65% $\mu_{th}=0.12$ , $\mu_b=0.14$		A4-80 Cu/C paste, Gf=65% $\mu_{th}=0.12$ , $\mu_b=0.14$	
	Metric	Pitch	Torque (Nm)	Clamp load (kN)	Torque (Nm)	Clamp load (kN)
NL3	M3	0.50	1.5	1.5	1.7	2.0
NL4	M4	0.70	3.0	2.6	3.6	3.4
NL5	M5	0.80	5.5	4.1	6.7	5.5
NL6	M6	1.00	8.1	5.9	11.2	7.8
NL8	M8	1.25	18	11	21	14
NL10	M10	1.50	26	17	34	23
NL12	M12	1.75	41	25	62	33
NL14	M14	2.00	68	34	101	45
NL16	M16	2.00	108	46	157	61
NL18	M18	2.50	157	56	224	75
NL20	M20	2.50	223	72	318	95
NL22	M22	2.50	310	89	438	118
NL24	M24	3.00	397	103	558	137
NL27	M27	3.00	589	134	823	179
NL30	M30	3.50	815	164	1132	219
NL36	M36	4.00	1445	239	1993	319