

## FASTEKS® WEDGE LOCK WASHERS

# Unsurpassed safety

FASTEKS® Wedge lock washers are easy to assemble and provide maximum safety against loosening under heavy vibration and dynamic loads. They are a proven solution and worldwide in use for additional safety.

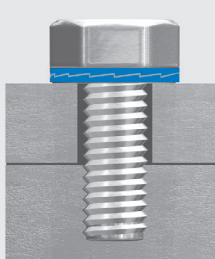
### Unsurpassed safety

The FASTEKS® paired wedge lock washers are a purely mechanical machine element which secures via a locking principle instead of friction and is thereby superior to conventional screw security methods. FASTEKS® Wedge lock washers provide reliable screw security even under conditions of extreme vibration or dynamic stress. Because of the extreme hardness of the washers, it is possible to utilize the washer with a screw in a property class up to 12.9.

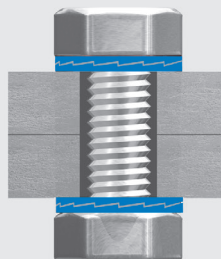
### Working principle

The wedge-shaped lock washers have wedge surfaces on the inside and radial ribs on the outside. The shape of the wedge is designed in a way that the angle of the wedge surfaces is always greater than the thread angle. When the screw or the nut is being tightened the radial ribs of the washers embed themselves in a locking fashion into the mating surface. The paired washers are firmly embedded in their position and movement is now only possible between the wedge surfaces. Even the smallest turn of the screw causes an increase in the pre-load force due to the wedge effect – the screw locks itself.

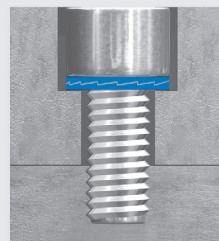
### Installation



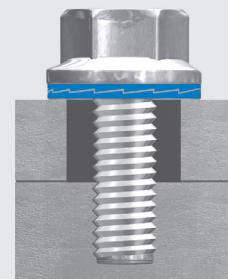
Tapped holes



Through holes



Counter bores



Large/Slotted holes

The pre-assembled washers are installed in pairs, wedge ramps need to face to wedge ramps. The washers need to be tightened with a standard tool according to the torque guidelines.

## Advantages:

- Maximum safety up to and including screw quality 12.9
- Simple assembly and dismantling
- Reliable security against loosening
- Same temperature deployment as the screw
- Re-usable
- Surface-friendly
- Reliable screw locking even under conditions of extreme vibration and dynamic stress



## Typical applications:

- General engineering
- Steel construction
- Agricultural and forestry machines
- Automobile manufacture
- Wind power machines
- Mining
- Rail vehicles
- Traffic management systems
- Bridges

## Important notes:

- Too low clamp load may lead to sliding of the two halves of the washer
- Too high clamp load may lead to deformation of bolts
- Surrounding condition to be taken into account (yield point %)
- Depending on application requirements, clamp load is being decided in the range of 60 to 90 % of proof load of respective fastening bolt
- Figures in the following tables are corresponding to 75 % of proof load

## Torque guidelines

### Strength Class 8.8 (ISO 898)

$\mu_t$  Oil (WD 40): Thread Coefficient of friction: (0.13)  
 $\mu_b$  Oil (WD 40): Bearing surface Coefficient of friction: (0.15)

$\mu_t$  Cu/G Paste : Thread Coefficient of friction: (0.12)  
 $\mu_b$  Cu/G Paste: Bearing surface Coefficient of friction: (0.14)

Bolt Clamping Condition:  
75 % of Yield Point

Sr. No.	Washer Name	Metric	Pitch (mm)	Lubrication : Oil (WD 40)		Lubrication : Cu/G Paste	
				Clamping Torque (Nm)	Clamp Load (KN)	Clamping Torque (Nm)	Clamp Load (KN)
1	WL8 STS	M8	1.25	23	16	22	16
2	WL10 STS	M10	1.50	45	25	43	25
3	WL12 STS	M12	1.75	78	36	74	36
4	WL14 STS	M14	2.00	125	50	119	50
5	WL16 STS	M16	2.00	192	68	182	68
6	WL18 STS	M18	2.50	267	86	254	86
7	WL20 STS	M20	2.50	377	110	357	110
8	WL22 STS	M22	2.50	517	136	490	136
9	WL24 STS	M24	3.00	649	159	616	159
10	WL27 STS	M27	3.00	954	206	904	206
11	WL30 STS	M30	3.50	1297	252	1230	252
12	WL33 STS	M33	3.50	1756	312	1663	312
13	WL36 STS	M36	4.00	2260	367	2142	367
14	WL39 STS	M39	4.00	2928	439	2772	439
15	WL42 STS	M42	4.50	3615	481	3424	481

## Strength Class 10.9 (ISO 898)

Bolt Specifications: Metric; Zink Plated Strength Class 10.9 (ISO 898)				Lubrication : Oil (WD 40)		Lubrication : Cu/G Paste	
Sr. No.	Washer Name	Metric	Pitch (mm)	Clamping Torque (Nm)	Clamp Load (KN)	Clamping Torque (Nm)	Clamp Load (KN)
1	WL8 STS	M8	1.25	32	22	31	22
2	WL10 STS	M10	1.50	64	35	61	35
3	WL12 STS	M12	1.75	110	51	105	51
4	WL14 STS	M14	2.00	176	69	167	69
5	WL16 STS	M16	2.00	270	97	260	97
6	WL18 STS	M18	2.50	376	116	357	116
7	WL20 STS	M20	2.50	529	150	503	150
8	WL22 STS	M22	2.50	726	185	688	185
9	WL24 STS	M24	3.00	913	214	866	214
10	WL27 STS	M27	3.00	1341	280	1271	280
11	WL30 STS	M30	3.50	1825	341	1730	341
12	WL33 STS	M33	3.50	2470	424	2339	424
13	WL36 STS	M36	4.00	3179	498	3012	498
14	WL39 STS	M39	4.00	4117	597	3898	597
15	WL42 STS	M42	4.50	5084	685	4815	685

μt Oil (WD 40): Thread Coefficient of friction: (0.13)  
μb Oil (WD 40): Bearing surface Coefficient of friction: (0.15)

μt Cu/G Paste : Thread Coefficient of friction: (0.12)  
μb Cu/G Paste: Bearing surface Coefficient of friction: (0.14)

Bolt Clamping  
Condition:  
75% of Yield Point

## Strength Class 12.9 (ISO 898)

Bolt Specifications: Metric; Zink Plated Strength Class 12.9 (ISO 898)				Lubrication : Oil (WD 40)		Lubrication : Cu/G Paste	
Sr. No.	Washer Name	Metric	Pitch (mm)	Clamping Torque (Nm)	Clamp Load (KN)	Clamping Torque (Nm)	Clamp Load (KN)
1	WL8 STS	M8	1.25	39	26	37	26
2	WL10 STS	M10	1.50	77	42	73	42
3	WL12 STS	M12	1.75	132	61	125	61
4	WL14 STS	M14	2.00	211	84	200	84
5	WL16 STS	M16	2.00	324	114	308	114
6	WL18 STS	M18	2.50	451	139	429	139
7	WL20 STS	M20	2.50	636	178	603	178
8	WL22 STS	M22	2.50	872	220	826	220
9	WL24 STS	M24	3.00	1095	256	1039	256
10	WL27 STS	M27	3.00	1609	334	1525	334
11	WL30 STS	M30	3.50	2189	408	2076	408
12	WL33 STS	M33	3.50	2964	505	2807	505
13	WL36 STS	M36	4.00	3815	594	3614	594
14	WL39 STS	M39	4.00	4941	710	4678	710
15	WL42 STS	M42	4.50	6101	821	5779	821

μt Oil (WD 40): Thread Coefficient of friction: (0.13)  
μb Oil (WD 40): Bearing surface Coefficient of friction: (0.15)

μt Cu/G Paste : Thread Coefficient of friction: (0.12)  
μb Cu/G Paste: Bearing surface Coefficient of friction: (0.14)

Bolt Clamping  
Condition:  
75% of Yield Point



**BN 65210 – FASTEKS®**  
Wedge lock washers,  
WLx STS for the small  
version in steel



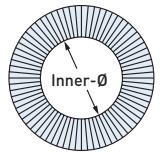
**BN 65211 – FASTEKS®**  
Wedge lock washers,  
WLx STL for the broad  
version in steel

## Dimension chart steel

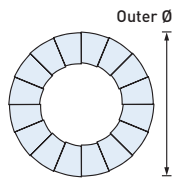
Bolt size			Inner Ø (mm)	Outer Ø (mm)	Thick-ness t (mm)
Washer Name	Metric	UNC			
WL3 STS	M3	#5	3.4	7.0	1.8
WL3.5 STS	M3.5	#6	3.9	7.6	1.8
WL3.5 STL	M3.5	#6	3.9	9.0	1.8
WL4 STS	M4	#8	4.4	7.6	1.8
WL4 STL	M4	#8	4.4	9.0	1.8
WL5 STS	M5	#10	5.4	9.0	1.8
WL5 STL	M5	#10	5.4	10.8	1.8
WL6 STS	M6		6.5	10.8	1.8
WL6 STL	M6		6.5	13.5	2.5
WL8 STS	M8	5/16"	8.7	13.5	2.5
WL8 STL	M8	5/16"	8.7	16.6	2.5
WL10 STS	M10		10.7	16.6	2.5
WL10 STL	M10		10.7	21.0	2.5
WL12 STS	M12		13.0	19.5	2.5
WL12 STL	M12		13.0	25.4	3.4
WL14 STS	M14	9/16"	15.2	23.0	3.4
WL14 STL	M14	9/16"	15.2	30.7	3.4
WL16 STS	M16	5/8"	17.0	25.4	3.4
WL16 STL	M16	5/8"	17.0	30.7	3.4

Bolt size			Inner Ø (mm)	Outer Ø (mm)	Thick-ness t (mm)
Washer Name	Metric	UNC			
WL18 STS	M18		19.5	29.0	3.4
WL18 STL	M18		19.5	34.5	3.4
WL20 STS	M20		21.4	30.7	3.4
WL20 STL	M20		21.4	39.0	3.4
WL22 STS	M22	7/8"	23.4	34.5	3.4
WL22 STL	M22	7/8"	23.4	42.0	4.6
WL24 STS	M24		25.3	39.0	3.4
WL24 STL	M24		25.3	48.5	4.6
WL27 STS	M27		28.4	42.0	5.8
WL27 STL	M27		28.4	48.5	5.8
WL30 STS	M30	1 1/8"	31.4	47.0	5.8
WL30 STL	M30	1 1/8"	31.4	58.5	6.6#
WL33 STS	M33	1 1/4"	34.4	48.5	5.8
WL33 STL	M33	1 1/4"	34.4	58.5	6.6#
WL36 STS	M36	1 3/8"	37.4	55.0	5.8
WL36 STL	M36	1 3/8"	37.4	63.0	6.6#
WL39 STS	M39	1 1/2"	40.4	58.5	5.8
WL42 STS	M42		43.2	63.0	5.8

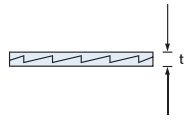
WL3 STS – WL8 STS  
Inner Ø: ±0.1 mm  
WL10 STS – WL42 STS  
Inner Ø: ±0.2 mm  
WL45 STS – WL52 STS  
Inner Ø: +0.5/-0.0 mm



WL3 STS – WL24 STS  
Outer Ø: ±0.2 mm  
WL27 STS – WL42 STS  
Outer Ø: ±0.3 mm  
WL45 STS – WL52 STS  
Outer Ø: +0.0/-2.0 mm



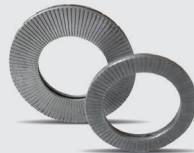
WL3 STS – WL42 STS  
t: ±0.25 mm  
WL45 STS – WL52 STS  
t: ±0.75 mm  
#: +0.0/-0.5 mm



**Materials:** Steel  
**Coating:** Zinc flake coating with salt spray life upto 1000 hours



**BN 64900 – FASTEKS®**  
Wedge lock washers,  
WLx SSS for the small  
version in stainless steel



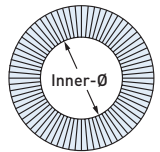
**BN 64901 – FASTEKS®**  
Wedge lock washers,  
WLx SSL for the broad  
version in stainless steel

## Dimension chart stainless steel

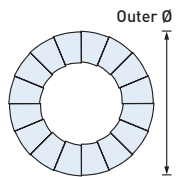
Bolt size			Inner Ø (mm)	Outer Ø (mm)	Thick-ness t (mm)
Washer Name	Metric	UNC			
WL3 SSS	M3	#5	3.4	7.0	2.2
WL3.5 SSS	M3.5	#6	3.9	7.6	2.2
WL3.5 SSL	M3.5	#6	3.9	9.0	2.2
WL4 SSS	M4	#8	4.4	7.6	2.2
WL4 SSL	M4	#8	4.4	9.0	2.2
WL5 SSS	M5	#10	5.4	9.0	2.2
WL5 SSL	M5	#10	5.4	10.8	2.2
WL6 SSS	M6		6.5	10.8	2.2
WL6 SSL	M6		6.5	13.5	2.0
WL8 SSS	M8	5/16"	8.7	13.5	2.0
WL8 SSL	M8	5/16"	8.7	16.6	2.0
WL10 SSS	M10		10.7	16.6	2.0
WL10 SSL	M10		10.7	21.0	2.0
WL12 SSS	M12		13.0	19.5	2.0
WL12 SSL	M12		13.0	25.4	3.0
WL14 SSS	M14	9/16"	15.2	23.0	3.0
WL14 SSL	M14	9/16"	15.2	30.7	3.2
WL16 SSS	M16	5/8"	17.0	25.4	3.0
WL16 SSL	M16	5/8"	17.0	30.7	3.2

Bolt size			Inner Ø (mm)	Outer Ø (mm)	Thick-ness t (mm)
Washer Name	Metric	UNC			
WL18 SSS	M18		19.5	29.0	3.2
WL18 SSL	M18		19.5	34.5	3.2
WL20 SSS	M20		21.4	30.7	3.0
WL20 SSL	M20		21.4	39.0	3.2
WL22 SSS	M22	7/8"	23.4	34.5	3.2
WL22 SSL	M22	7/8"	23.4	42.0	3.2
WL24 SSS	M24		25.3	39.0	3.2
WL24 SSL	M24		25.3	48.5	4.5
WL27 SSS	M27		28.4	42.0	6.8
WL27 SSL	M27		28.4	48.5	6.8
WL30 SSS	M30	1 1/8"	31.4	47.0	6.8
WL30 SSL	M30	1 1/8"	31.4	58.5	6.8
WL33 SSS	M33	1 1/4"	34.4	48.5	6.8
WL36 SSS	M36	1 3/8"	37.4	55.0	6.8
WL39 SSS	M39	1 1/2"	40.4	58.5	6.8
WL42 SSS	M42		43.2	63.0	6.8

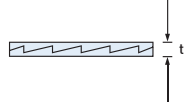
WL3 SSS – WL8 SSL  
Inner Ø: ±0.1 mm  
WL10 SSS – WL42 SSS  
Inner Ø: ±0.2 mm



WL3 SSS – WL24 SSL  
Outer Ø: ±0.2 mm  
WL27 SSS – WL42 SSS  
Outer Ø: ±0.3 mm



WL3 SSS – WL24 SSL  
t: ±0.25 mm  
WL27 SSS – WL42 SSS  
t: +0.0/-0.5 mm



**Material:** Stainless steel EN 1.4404 (AISI 316L)  
**Hardness:** Surface hardened ≥ 520HV0.05