References



Mowing machine



Safety washer



Heavy-duty crane



Safety washer



Motorbike



Safety washer



Phtotovoltaics



Safety washer

Original SCHNORR® safety washers.

The original SCHNORR® safety washers were developed as a reliable and economic bolt locking device with the basic principle of a disc spring. This ingenious form combines the advantage of security through friction and mechanical locking.

Original SCHNORR® safety washers are now used world wide where secure fastening connections to counter the effect of vibration are required.

Applications are manifold, from automotive engineering to machine, aggregate and plant engineering.
SCHNORR® safety washers are used, for example, in mowing machines, textile machines, machine tools and a lot of other applications..

Die original SCHNORR® safety washer

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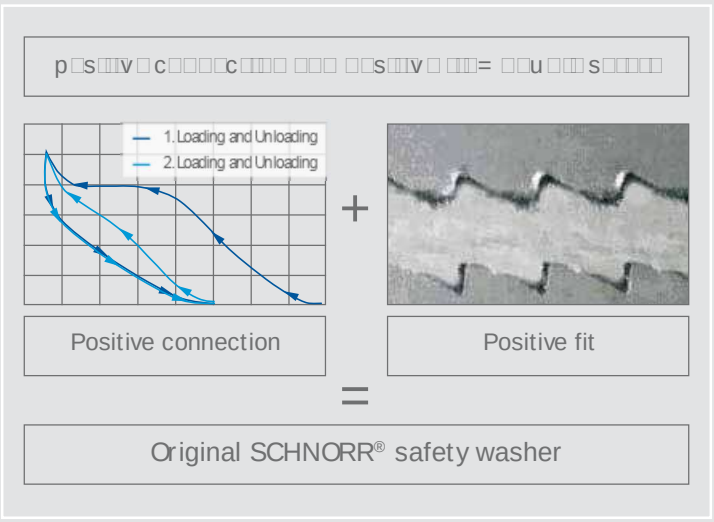
- High resistance to vibration due to po□ sitive locking of the serrations..
- Concentrical force transmission and uniform axial load eliminate bending torques and deformation of the bolt stem..
- The design of the serrations prevents friction and damage to components when tightening.
- Extremely high safety against loss of pretension force and loosening.
- Wide variety for materials and di□erent □nishes.
- The closed ring form results in high degree of pretensioning, while avoi□ ding burst□open e□ect.
- Development and design of the washers take place on the basis of the screw geometrics, tightening torque as well as the constructive circum□ stances..



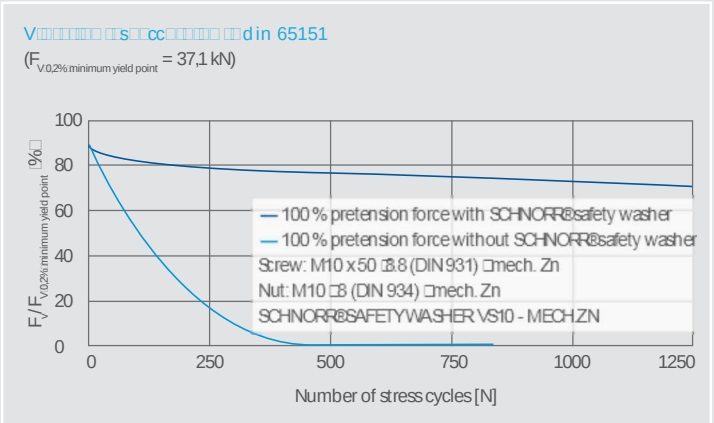
The original SCHNORR®safety washers are in the form of a disc spring but with a trapezoidal cross□section and serrations on both sides. The outer diameter is matched to the head diameter of the pan head and socket head cap screws.

SCHNORR®safety washers are available in two versions:
The standard safety washer type "S" is available for screws of sizes M1.6 to M36 and of the property classes up to 8.8.
For screws of property classes 8.8 and 10.9, higher pretension forces might be necessary. These are covered by our reinforced washers type "VS".

Due to the conical form, optimal traction is achieved at highest positive locking due to the helical gearing.



V□□□□□□□□ □□s□□cc□□□□□□□ □□din 65151



Extensive test series carried out at independent public material research laboratories prove that the original SCHNORR®safety washer brings about a clear improvement of the safety properties

C□□c□us□□□s

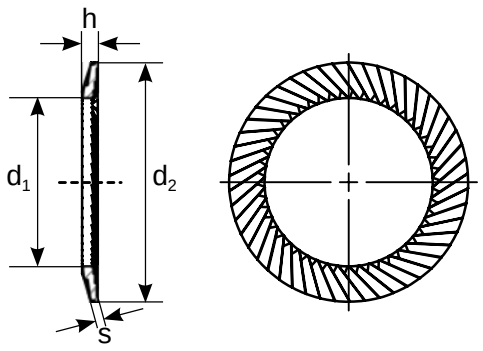
- Connections secured using a SCHNORR®safety washer maintains the pre□ tension force also after 1,500 cycles.
- An unsecured screw connection has lost its pretension already after less than 500 cycles.

Original SCHNORR® safety washer type „S“

The Original SCHNORR® safety washer „S“ is suitable for normal requirements and available for bolt sizes from M 1,6 to M 36 in grades up to 8.8. Please enquire should you require an item with different dimensions, material or surface treatment.

example of ordering:

Article-no.:	applies to the normal version made of spring steel, hardened, blackened; mechanically plate
h max.:	maximum dimension as delivered
h min.:	minimum dimension after load test
Available material gra.:	spring steel acc. to DIN EN 10132-4; corrosion resistant steel 1.4301; Phosphorus Bronze CuSn8; nickel cobalt alloy; creep resistant steel 1.4122; Inconel
Surface treatments:	blackened (standard), bronzed, phosphated, zinc coated, zinc lamellar coatings



Sketch dimensions

Schnorr® safety washer type „S“:
Size 8 made of spring steel = safety washer S8 FSt.

other Schnorr® safety washers type „S“ material C60S (1.1211)

Article-number/ Order reference	Finish	Size		Ordering dimensions					Packaging	
		Nominal size		d_1	d_2	s	$h_{min.}$	$h_{max.}$	Unit	Weight per 1000 pieces
		mm	Inch	mm	mm	mm	mm	mm	pcs.	kg
402300 450 000	blackened Gal.Zn8 + passivation	1,6		1,7	3,2	0,35	0,4	0,6	2000	0,013
404 400 450 100	blackened Gal.Zn8 + passivation	2,0		2,2	4,0	0,35	0,40	0,6	2000	0,021
406 800 450 200	blackened Gal.Zn8 + passivation	2,5		2,7	4,8	0,45	0,50	0,9	2000	0,039
409 400 450 300	blackened Gal.Zn8 + passivation	3,0	1/8”	3,2	5,5	0,45	0,50	0,9	2000	0,049
411 200 450 400	blackened Gal.Zn8 + passivation	3,5		3,7	6,0	0,50	0,55	0,9	2000	0,055
412 700 450 500	blackened Zn8M + passivation	4,0	5/32”	4,3	7,0	0,50	0,55	1,0	1000	0,085
414 500 450 600	blackened Zn8M + passivation	5,0	3/16”	5,3	9,0	0,60	0,60	1,1	1000	0,167
416 300 450 700	blackened Zn8M + passivation	6,0		6,4	10,0	0,60	0,70	1,2	1000	0,200
418 100 450 800	blackened Zn8M + passivation	6,35	1/4”	6,7	9,5	0,60	0,65	1,2	1000	0,150
419 200 450 900	blackened Zn8M + passivation	7,0		7,4	12,0	0,70	0,80	1,3	1000	0,355
420 400 451 000	blackened Zn8M + passivation	8,0	5/16”	8,4	13,0	0,70	0,90	1,4	1000	0,392
423 000 451 100	blackened Zn8M + passivation	10,0	3/8”	10,5	16,0	0,90	1,10	1,6	1000	0,750
425 100 451 200	blackened Zn8M + passivation	11,1	7/16”	11,6	15,9	0,90	1,05	1,6	500	0,595
426 200 451 300	blackened Zn8M + passivation	12,0		13,0	18,0	1,00	1,15	1,7	500	0,879
427 900 451 400	blackened Zn8M + passivation	12,7	1/2”	13,7	19,0	1,00	1,25	1,8	500	0,976
429 100 451 500	blackened Zn8M + passivation	14,0		15,0	22,0	1,10	1,35	2,0	500	1,641
430 700 451 600	blackened Zn8M + passivation	16,0	5/8”	17,0	24,0	1,20	1,55	2,1	500	1,984

o SChnorr ®s s "S" m C60S (1.1211)

Article-number/ Order reference	Finish	Size		Ordering dimensions					Packaging	
		Nominal size		d_1	d_2	s	$h_{min.}$	$h_{max.}$	Unit	Weight per 1000 pieces
		mm	Inch	mm	mm	mm	mm	mm	pcs.	kg
432 400 451 700	blackened Zn8M + passivation	18		19,0	27	1,40	1,75	2,3	250	2,970
433 800 451 800	blackened Zn8M + passivation	19	3/4"	20,0	30	1,4	1,90	2,5	250	4,100
435 100 451 900	blackened Zn8M + passivation	20		21,0	30	1,4	1,85	2,5	250	3,742
436 600 452 000	blackened Zn8M + passivation	22	7/8"	23,0	33	1,4	1,95	2,7	100	4,507
437 900 452 100	blackened Zn8M + passivation	24		25,6	36	1,6	2,15	2,9	100	5,910
439 200 452 200	blackened Zn8M + passivation	25,4	1"	27,0	38	1,8	2,35	3,1	100	7,449
440 300 452 300	blackened Zn8M + passivation	27		28,6	39	1,8	2,35	3,1	100	7,369
441 500 452 400	blackened Zn8M + passivation	30	1 1/8"	31,6	45	1,8	2,60	3,6	100	10,780
442 730 452 500	blackened Zn8M + passivation	36	1 3/8"	38,0	54	2,5	3,20	4,2	50	21,280

We would be glad to o er you safety washers type "S" with di erent nish on request.
Our surfaces are Cr 6 free and comply with the ELV "Old Car" (2000/53/EG) RoHS (2002/95/CE) Directive as well as the WEEE Directive (2002/96/EC)

o SChnorr ®s s "S" m X5CrNi 18-10 (1.4301)

Article-number/ Order reference	Size		Ordering dimensions					Packaging	
	Nominal size		d_1	d_2	s	$h_{min.}$	$h_{max.}$	Unit	Weight per 1000 pieces
	mm	Inch	mm	mm	mm	mm	mm	pcs.	kg
403 221	1,6		1,7	3,2	0,5	0,55	0,75	1000	0,019
405 420	2		2,2	4,0	0,5	0,55	0,75	2000	0,029
407 660	2,5		2,7	4,8	0,5	0,55	0,95	2000	0,042
410 750	3	1/8"	3,2	5,5	0,5	0,55	0,95	2000	0,042
412 500	3,5		3,7	6,0	0,7	0,75	1,15	2000	0,084
414 200	4	5/32"	4,3	7,0	0,7	0,75	1,20	1000	0,081
416 100	5	3/16"	5,3	9,0	0,7	0,75	1,20	1000	0,209
417 900	6		6,4	10,0	0,7	0,75	1,20	1000	0,193
418 104	6,35	1/4"	6,7	9,5	0,7	0,75	1,20	1000	0,172
422 700	8	5/16"	8,4	13,0	1,0	1,20	1,60	1000	0,557
424 900	10	3/8"	10,5	16,0	1,0	1,10	1,60	1000	0,731
425 110	11,1	7/16"	11,6	15,9	1,3	1,30	1,85	500	0,825
427 600	12		13,0	18,0	1,3	1,30	1,85	500	1,099
428 950	12,7	1/2"	13,7	19,0	1,3	1,40	1,95	500	1,222
430 500	14		15,0	22,0	1,5	1,65	2,30	500	2,244
432 200	16	5/8"	17,0	24,0	1,5	1,75	2,30	500	2,487
433 650	18		19,0	27,0	1,8	2,05	2,60	250	3,843
433 821	19	3/4"	20,0	30,0	1,8	2,20	2,60	250	5,294
436 400	20		21,0	30,0	1,8	2,15	2,80	250	3,923
437 810	22	7/8"	23,0	33,0	1,8	2,30	3,00	100	5,893
439 091	24		25,6	36,0	2,0	2,35	3,10	100	7,508
439 170	25,4	1"	27,0	38,0	2,5	2,85	3,60	100	10,508
441 410	27		28,6	39,0	2,5	2,85	3,60	100	10,300
442 711	30	1 1/8"	31,6	45,0	2,5	3,10	4,10	100	15,185
442 790	36	1 3/8"	38,0	54,0	3,0	3,70	4,70	100	26,218

We would be glad to o er you safety washers type "S" in further special material grades on request.