

Product information

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Product information

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ABC SPAX®-S Wave toothed wood screw

General information:

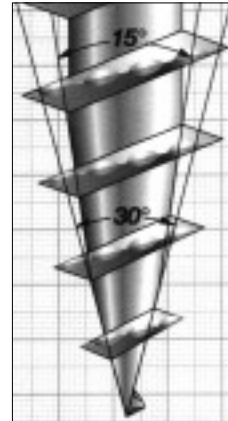
The most significant characteristic of SPAX®-S is the patented tothing that has become renowned throughout the world, both with craftsmen and industrial manufacturers.

The patented wave tothing has the following advantages:

- Considerably lower torque up to 50% less, required to fasten the screw.
- Shorter time to fasten the screw when pre-drilling is not required.
- Protection against hydrogen embrittlement gives high user safety.
- Faster grip in different materials.

Fields of application:

- Hard and soft kinds of wood.
- Gypsum and particle boards.
- Plastic.
- Thin sheet metal plates or profiles.



Performance:

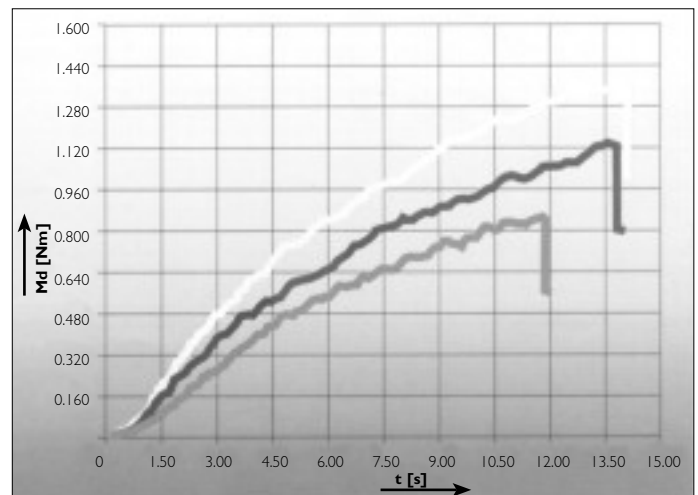
ABC SPAX®-S is available in the following performances:

Countersunk head screw/Pan head screw/Raised countersunk head screw.

Torque in Nm required to fasten the screw

Screw type TFX 4 x 40
Full thread
Material Multiplex/board
Compressing strain 4 kg
Screw installation depth 30 mm
Number/test n = 150 pieces

The graphical curve shows the results for different types of screws.



Pentaflow screw

General information:

Hole and threadforming screw for thin sheet metal.
Suitable for automatic assembly.

Material:

Case-hardened steel.

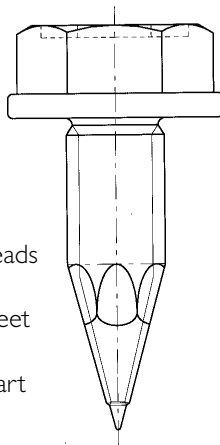
Pentaflow form C

Performance:

The conical point of the pentaflow screw leads to quick hole forming.

For unstamped, grained or stamped thin sheet metal.

Special flanks of the thread in the conical part of the shank form the rim of the hole.



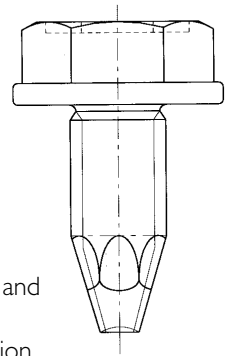
Pentaflow form F

Performance:

For stamped thin sheet metal.

Conical shank end for easy finding and positioning.

Truncated point for better protection of sensitive components such as cables.



Source: Betzer.

Pentaform screw

General information:

Threadforming screw with shank end to center the screw and to form the thread in the metal.

Field of application:

Threadforming screw for metals.

Performance:

The Pentaform screw is available in several different head shapes. For example, cross recessed, sixpoint socket grip and hexagon head. Special head shapes are possible. Locking devices under the head.

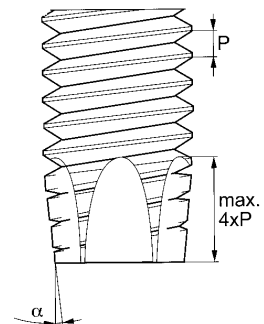
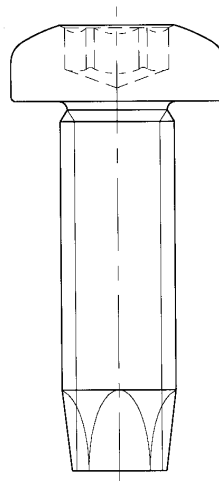
Material:

Case-hardened steel.

Advantages:

- Threadforming without chips, no loss of material.
- Low tapping torques.
- High tightening torques are possible.
- High tensile strength.

Source: Betzer.



Screws for plastic materials and light metal

There are many different screws for the application areas mentioned above. On the following pages we are going to present a selection of these.

Plastite®

Thread rolling screw for plastic materials.

Table 135 Characteristics and advantages

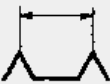


PLASTITE's characteristics		Advantages
	Large pitch of thread.	A. Large shearing area in plastics. B. Big difference between thread rolling torque and breaking torque. C. Fast assembled.
	Large thread height.	A. Large contact between thread and material. B. Small affection by hole variations.
	Unique shape.	A. Low thread rolling torque. B. Locking due to the elasticity of the material.

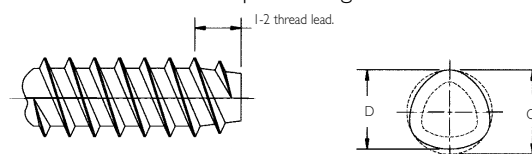
Table 75 Thread tolerances and hole diameters for Plastite 48-2 and Plastite 60-I

Dimension No. threads per inch	Thread tolerance				Target values for hole- diameters ¹
	C		D		
	min.	max.	min.	max.	
2-28	2,18	2,34	2,11	2,26	1,93-2,03
4-20	3,07	3,23	2,97	3,12	2,54-2,69
6-19	3,58	3,73	3,48	3,63	3,10-3,25
8-16	4,05	4,70	4,39	4,55	3,78-4,01
10-14	5,23	5,38	5,13	5,28	4,44-4,70
12-11	5,82	5,97	5,69	5,84	4,95-5,23
14-10	6,86	7,01	6,65	6,81	5,69-6,10

¹ Lower limit for non-rigid plastics (Amide, Ethylene, Propylene etc.).

Upper limit for hard or medium hard thermoplastics (Acetal, Acryl, Carbonate, Polystyrene etc. and thermoset plastics like Amino, Ester, Pheno, Urethan).

Plastite 48-2 - 48° profile angle.



Plastite 60 - 60° profile angle.



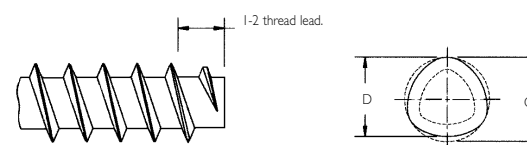
Table 76 Thread tolerances and hole diameters for Plastite 45

Thread mm	Thread tolerance				Target values for hole diameters ¹
	C		D		
	min.	max.	min.	max.	
2,5x1,4	2,41	2,53	2,37	2,49	1,85-2,05
3 x1,5	2,92	3,04	2,87	2,99	2,30-2,50
3,5x1,65	3,42	3,54	3,34	3,46	2,75-3,00
4 x1,75	3,89	4,04	3,79	3,94	3,20-3,45
5 x2,2	4,89	5,04	4,79	4,94	3,70-4,10
6 x2,5	5,89	6,04	5,78	5,93	4,70-5,10
8 x3	7,86	8,04	7,71	7,89	6,50-7,10

¹ Lower limit for non-rigid plastics (Amide, Ethylene, Propylene etc.).

Upper limit for hard or medium hard thermoplastics (Acetal, Acryl, Carbonate, Polystyrene etc. and thermoset plastics like Amino, Ester, Pheno, Urethan).

Plastite 45 - 45° profile angle and larger pitch of thread than Plastite 60. It is mainly meant for harder, so called structural, plastics.



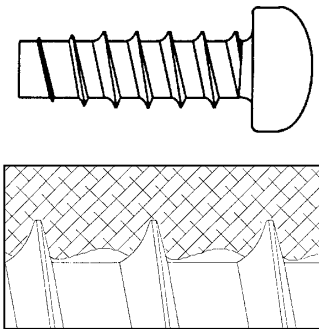
PR-screw REMFORM®

The PR-screw is a thread shaping screw with a unique thread shape especially designed for the great variety of today's thermoplastic materials.

The same principals that make the PR-screw perfect for structural plastics makes it just as suitable for other ductile materials, like for example wood and soft metals.

Table 71 Thread dimensions

Thread diameter	Pitch	Outer diameter		Core diameter min
		max	min	
2	1	2,1	2	1,17
2,5	1,15	2,6	2,5	1,47
3	1,35	3,1	3	1,9
3,5	1,55	3,6	3,5	2,22
4	1,75	4,1	4	2,55
4,5	2	4,65	4,5	2,87
5	2,25	5,15	5	3,19
6	2,65	6,15	6	3,84
7	3,1	7,15	7	4,48
8	3,5	8,15	8	5,12
10	4,5	10,15	10	6,4

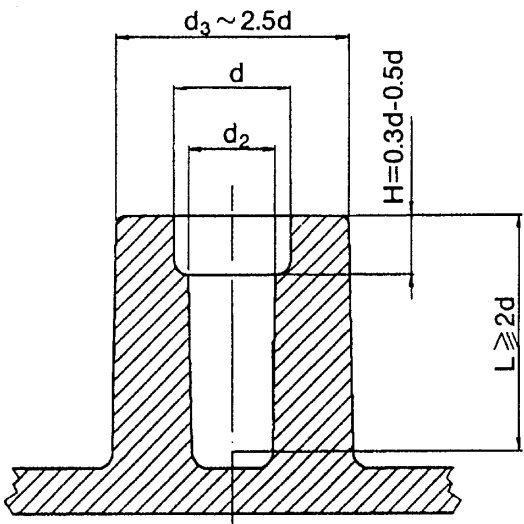


Thread profile.

Table 72 Recommendations for holes

Material	Hole diameter ¹⁾
PA 6 - 30GV	0,85 × d _{max}
PA 6	0,83 × d _{max}
PA 6.6	0,8 × d _{max}
PP	0,8 × d _{max}
PPO	0,85 × d _{max}
PS	0,8 × d _{max}
PE	0,8 × d _{max}
ABS	0,78 × d _{max}
PC	0,85 × d _{max}

¹⁾ Above stated hole recommendations are given as guide-lines. They are based on theoretical calculations for an insert depth corresponding to two thread diameters.



Application testing is essential to determine a suitable hole diameter; installation depth, assembly torque and other relevant factors.

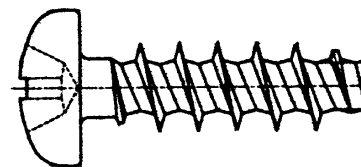
Table 73 Remform® Metallurgical and mechanical characteristics

Hardened and tempered property class 10.9	Nominal diameter									
	2,5	3,0	3,5	4,0	4,5	5,0	6,0	7,0	8,0	10,0
Min. torsional strength (Nm)	0,68	1,31	2,14	3,17	4,47	6,37	11,13	18,00	27,00	53,00

PT®-screw thermoplastic screw

General information:

PT is the ideal special screw for thermoplastic and stands up to the industry's demands on quality, function and economy. The design of the PT-screw with 30° thread angle, 8° thread pitch and concave thread bottom is a design that guarantees low tightening torque, a large margin against overtightening and vibration resistance. The screw is very easy to assemble and perfect for automatic assembly.



Material:

10.9 hardened.
Stainless steel A2-A4.

Assembly instruction:

In the table below recommendations are given for all normally occurring plastic materials and qualities.

Performance:

Pan head with Torx® as standard. Other performances, head shapes, dimensions, surface treatments which are parts of the manufacturing standard, are available on request.

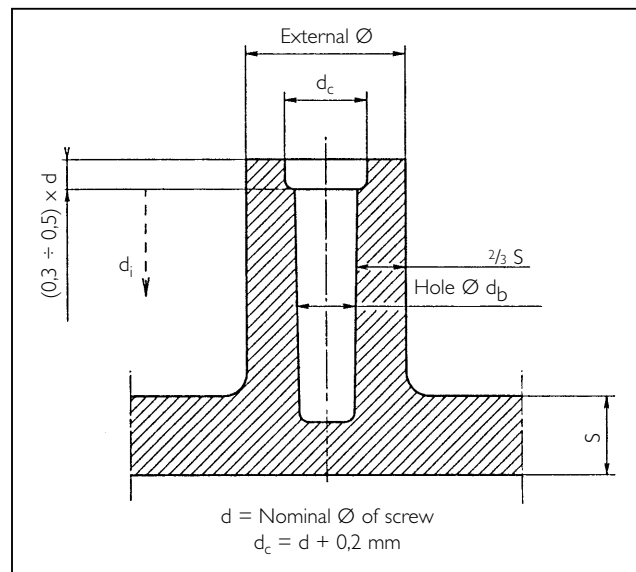


Table 134

Material	Hole Ø d_b	External Ø	Insertion, depth d_i
ABS	$0.80 \times d$	$2.00 \times d$	$2.00 \times d$
ABS PC Blend	$0.80 \times d$	$2.00 \times d$	$2.00 \times d$
ASA	$0.78 \times d$	$2.00 \times d$	$2.00 \times d$
PA 4.6	$0.73 \times d$	$1.85 \times d$	$1.80 \times d$
PA 4.6 - GF 30	$0.78 \times d$	$1.85 \times d$	$1.80 \times d$
PA 6	$0.75 \times d$	$1.85 \times d$	$1.70 \times d$
PA 6 - GF 30	$0.80 \times d$	$2.00 \times d$	$1.90 \times d$
PA 6.6	$0.75 \times d$	$1.85 \times d$	$1.70 \times d$
PA 6.6 - GF 30	$0.82 \times d$	$2.00 \times d$	$1.80 \times d$
PBT	$0.75 \times d$	$1.85 \times d$	$1.70 \times d$
PBT - GF 30	$0.80 \times d$	$1.80 \times d$	$1.70 \times d$
PC	$0.85 \times d$	$2.50 \times d$	$2.20 \times d$
PC - GF 30	$0.85 \times d$	$2.20 \times d$	$2.00 \times d$
PE-LD	$0.70 \times d$	$2.00 \times d$	$2.00 \times d$
PE-HD	$0.75 \times d$	$1.80 \times d$	$1.80 \times d$
PET	$0.75 \times d$	$1.85 \times d$	$1.70 \times d$
PET - GF 30	$0.80 \times d$	$1.80 \times d$	$1.70 \times d$
PMMA	$0.85 \times d$	$2.00 \times d$	$2.00 \times d$
POM	$0.75 \times d$	$1.95 \times d$	$2.00 \times d$
PP	$0.70 \times d$	$2.00 \times d$	$2.00 \times d$
PP - GF 30	$0.72 \times d$	$2.00 \times d$	$2.00 \times d$
PP - TF 20	$0.72 \times d$	$2.00 \times d$	$2.00 \times d$
PPO	$0.85 \times d$	$2.50 \times d$	$2.20 \times d$
PS	$0.80 \times d$	$2.00 \times d$	$2.00 \times d$
PVC (hard)	$0.80 \times d$	$2.00 \times d$	$2.00 \times d$
PEEK	$0.85 \times d$	$2.00 \times d$	$2.00 \times d$
SAN	$0.77 \times d$	$2.00 \times d$	$1.90 \times d$

Duro-PT® screw

Duro-PT® is a special screw for thermoset plastic. The screw has been designed especially to give a low fastening torque and a high removal torque.

Advantages:

- The screw can be assembled directly into the plastic without the risk of creating cracks.
- It eliminates thread inserts.
- It has chip collection through special bottom tap geometry.
- Vibration resistant.

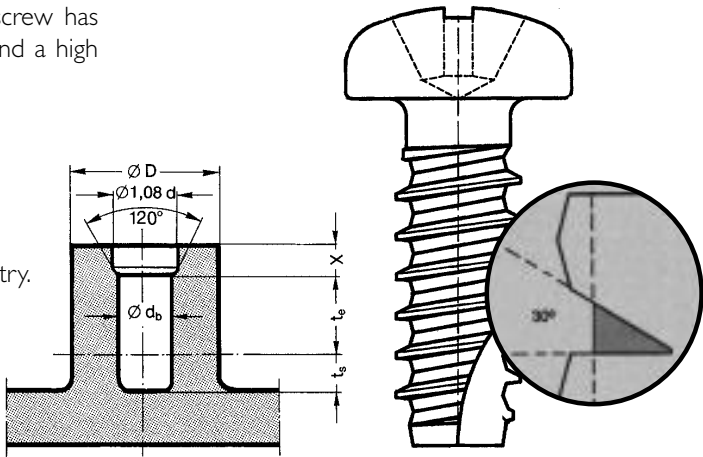


Table I37

Nominal diameter (mm)	2.2	2.5	3.0	3.5	4.0	5.0	6.0	8.0
Torsional strength (Nm)	1.0	1.5	2.0	3.0	5.0	10.0	15.0	25.0

Table I38

Hole diameter d_b (mm)	Boss diameter D (mm)	Installation depth t_e (mm)	Chip space depth t_s (mm)	Counterbore depth x (mm)
0.88 d	$(8.567 d)-(6.667 d_b)$	$2d \leq t_e$ to $t_e \leq 3d$	0.8 d to 1.2 d	$\frac{\tan 30^\circ}{2} \cdot (D-1.08 d)$

RS-Duroplast screw

General information:

Thread forming screw for thermoset materials.

Installation advantages:

- Optimized thread pitch for quick mounting.
- Minimized penetration torque due to low material displacement.
- Large overlap of thread flanks for high overturning torques.

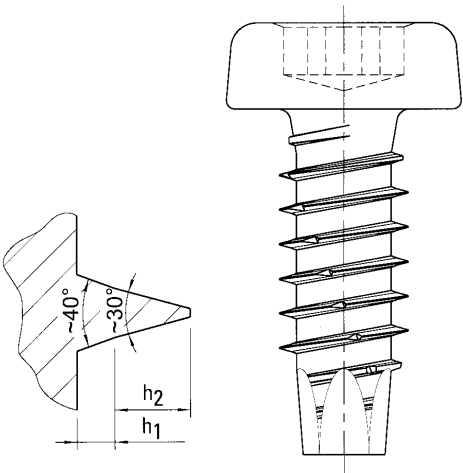
Performance:

The RS-Duroplast screw is available in several different head shapes. For example, cross recessed and sixpoint socket grip head. Special head shapes are possible. Locking devices under the head.

Material:

Steel 10.9.

Source: Betzer.



DG®-screw for light metals

The DG®-screw is developed for light metal castings, particular aluminium, zinc and magnesium alloys. It is also suitable for reinforced thermoplastic materials.

Advantages:

- High buckling safety.
- High resistance against upsetting.
- No chips.

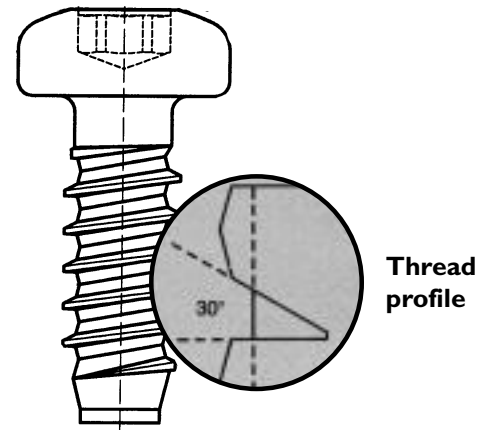

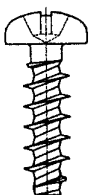
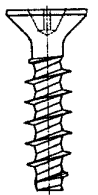
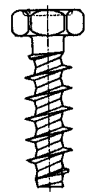

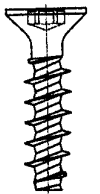


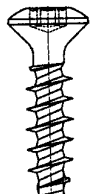


Table 136 Recommended hole diameters for DG-screw

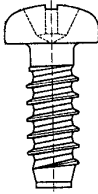
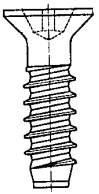
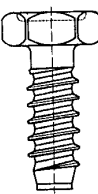
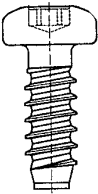
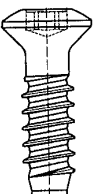
Material Brinell hardness depth HB 5/250	Nominal screw diameter							Installation depth (mm)
	DG 25	DG 30	DG 35	DG 40	DG 50	DG 60	DG 80	
GD Al Si12 60-100 (values according to DIN 1725)	2.35 - -	2.80 2.80 -	3.25 3.25 -	3.70 3.70 -	4.70 4.75 4.80	- 5.65 5.75	- 7.60 7.70	3.0- 6.0 6.0-10.0 10.0
GD Al Si9 Cu3 80-120 (values according to DIN 1725)	2.35 - -	2.75 2.80 -	3.20 3.25 -	3.65 3.70 -	4.65 4.70 4.75	- 5.65 5.70	- 7.55 7.65	3.0- 6.0 6.0-10.0 10.0
GD Zn Al4 Cu1 85-105 (values according to DIN 1743)	2.35 - -	2.80 2.80 -	3.30 3.30 -	3.75 3.75 -	4.75 4.75 4.85	- 5.70 5.80	- 7.65 7.75	3.0- 6.0 6.0-10.0 10.0

Overview WN-screws

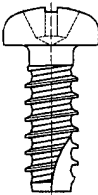
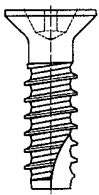
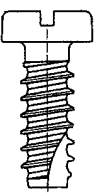
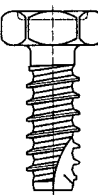
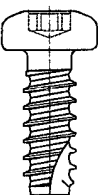
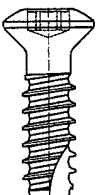
PT[®]-screw

WN 1411	WN 1412	WN 1413	WN 1446	
				
WN 1447	WN 1423	WN 1451	WN 1452	WN 1453
				

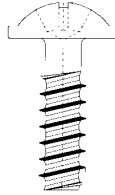
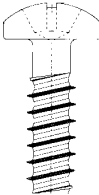
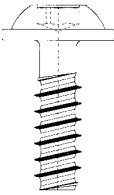
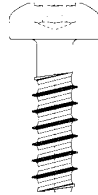
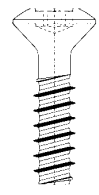
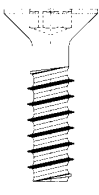
DG[®]-screw

WN 1542	WN 1543	WN 1546	WN 1552	WN 1553
				

DURO-PT[®] screw

WN 1742	WN 1743	WN 1744	WN 1746	WN 1752	WN 1753
					

DELTA PT[®] screw

WN 5411	WN 5412	WN 5451	WN 5452	WN 5453	WN 5454
					

Above you find a selection of WN-screws on the market.
More information is presented to you by our sales department.

Source: Ejot.

Overview Taptite®-screws

Casehardened self-tapping screws for metal, M-thread.

The Taptite screw roll forms its own mating threads at a torque which is much lower than the tightening torque.

The Taptite II thread is designed to make the torque even lower than previous Taptite screws.

Screws with the Taptite II thread are usually casehardened but are also available in tempered so-called Corflex®.

However, the casehardening causes the screw to have less elasticity than a tempered 8.8, and should therefore not be used in high-tensile joints or when loads are dynamic. In high-tensile joints, it is recommended to use Taptite II in Corflex® performance.

Casehardened screws with Taptite II thread can form threads in sheet metal and profile made of:

- Steel with a hardness up to 250 HB.
- Aluminium and copper and their alloys.
- Castings made of iron, steel, aluminium, zinc, magnesium and copper alloys.

Table 69 Thread diameters Taptite®

Screw size mm	Thread			
	D		C	
	max.	min.	max.	min.
M2,5	2,48	2,39	2,57	2,48
M3	2,95	2,87	3,05	2,97
M4	3,95	3,85	4,07	3,99
M5	4,92	4,84	5,08	5,00
M6	5,90	5,80	6,10	6,00
M8	7,88	7,78	8,13	8,03
M10	9,85	9,75	10,15	10,05
M12	11,83	11,73	12,18	12,08

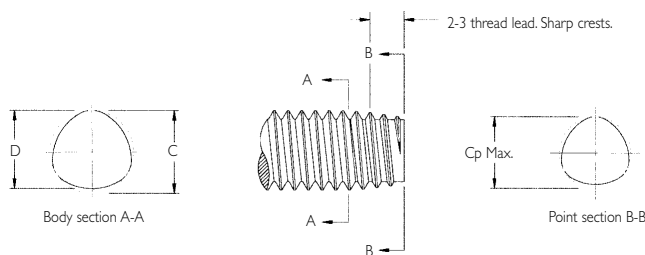


Table 69.I Thread diameters Taptite II®

Screw size mm	Thread				Point
	C		D		C _p max.
	max.	min.	max.	min.	
M1.6 × 0.35	1.66	1.58	1.59	1.51	1.31
M2 × 0.40	2.06	1.98	1.98	1.90	1.67
M2.5 × 0.45	2.57	2.48	2.48	2.39	2.13
M3 × 0.50	3.07	2.98	2.97	2.88	2.58
M3.5 × 0.60	3.58	3.48	3.46	3.36	3.00
M4 × 0.70	4.08	3.98	3.94	3.84	3.40
M4.5 × 0.75	4.59	4.48	4.44	4.33	3.85
M5 × 0.80	5.09	4.98	4.93	4.82	4.31
M6 × 1.00	6.10	5.97	5.90	5.77	5.13
M7 × 1.00	7.10	6.97	6.90	6.77	6.13
M8 × 1.25	8.13	7.97	7.88	7.72	6.91
M10 × 1.50	10.15	9.97	9.85	9.67	8.69
M12 × 1.75	12.18	11.97	11.83	11.62	10.47
M14 × 2.00	14.20	13.97	13.80	13.57	12.25
M16 × 2.00	16.20	15.97	15.80	15.57	14.25

Two performances

Corflex is available in two different hardening performances.

Corflex N - toughened to property class 10.9. Performance N is capable of rolling threads in plastic metals, whose hardness do not exceed HB 100.

Corflex I - toughened to property class 10.9 and with induction hardened point. The point's hardness in this performance is at least HRC 45, i.e. as hard as case-hardened Taptite, which gives equally good thread rolling characteristics.

DUO-Taptite® - this thread is a further development of the Taptite-thread. The improved functionality is gained by giving the bolt tap and thread different triangular-cylindricity. The non-cylindricity has been decreased on the thread, which gives better interaction between screw and goods material and better joint strength - especially at short grip lengths.

The bolt tap has on the other hand been given a larger non-cylindricity and also stabilizing threads. Therefore the screw will be straightened in the hole at the same time as the rolling of threads starts more easily and demands a lower torque, despite of that there is needed less axial force. The bolt tap reaches full diameter after 3-4 pitches of thread.

Taptite® in Stainless steel are designated for montage in soft materials, for example light metals with a rigidity that does not exceed HV 115.

Thread cross section

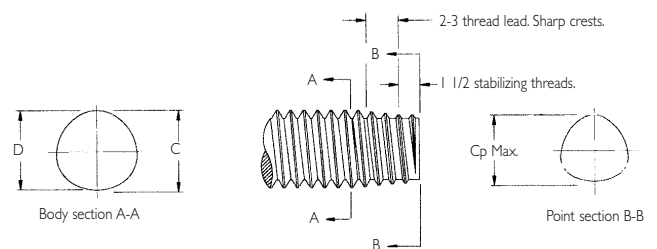
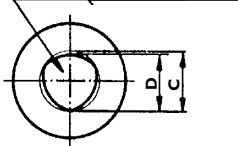


Table 139 Thread diameters DUO-Taptite®

Screw size mm	Thread				Point
	C		D		C _p max.
	max.	min.	max.	min.	
M2.5 × 0.45	2.57	2.48	2.52	2.44	2.22
M3 × 0.50	3.07	2.98	3.02	2.93	2.69
M3.5 × 0.60	3.58	3.48	3.52	3.42	3.13
M4 × 0.70	4.08	3.98	4.01	3.91	3.57
M4.5 × 0.75	4.59	4.48	4.51	4.41	4.04
M5 × 0.80	5.09	4.98	5.01	4.90	4.51
M6 × 1.00	6.10	5.97	6.00	5.87	5.38
M7 × 1.00	7.10	6.97	7.00	6.87	6.38
M8 × 1.25	8.13	7.97	8.00	7.85	7.23
M10 × 1.50	10.15	9.97	10.00	9.82	9.07
M12 × 1.75	12.18	11.97	12.00	11.80	10.92
M14 × 2.00	14.20	13.97	14.00	13.77	12.77
M16 × 2.00	16.20	15.97	16.00	15.77	14.77

Table 227 Thread diameters Taptite 2000®

(Is yet a further development of the Taptite thread.)

Screw size mm	Thread		Point C _p max.
	C nominal	D nominal	
M1.6 × 0.35	1.60	1.56	1.40
M2 × 0.40	2.00	1.96	1.77
M2.5 × 0.45	2.50	2.45	2.25
M3 × 0.5	3.00	2.95	2.71
M3.5 × 0.6	3.50	3.44	3.17
M4 × 0.7	4.00	3.93	3.60
M5 × 0.8	5.00	4.92	4.55
M6 × 1.0	6.00	5.90	5.38
M8 × 1.25	8.00	7.87	7.23
M10 × 1.5	10.00	9.85	9.08
M12 × 1.75	12.00	11.82	10.92
M14 × 2.0	14.00	13.80	12.77
M16 × 2.0	16.00	15.80	14.76

Assembly and resistance

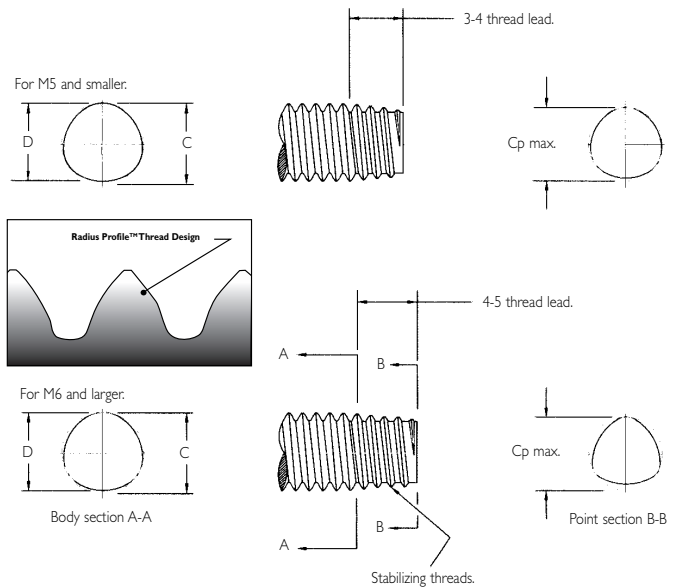
Taptite-screws are best assembled using screwdrivers with good moment thoroughness (capability >2).

Rotation speed between 300 and 1500 r/m is appropriate depending on thread diameter; head shape and assembly conditions in general. The table can be used as a guideline when testing assembly moments.

Table 228 Assembly recommendations. Guideline values for commonly occurring applications.

Screw size mm	Plate thickness	Hole size	Thread forming torque	Rec. assembly torque	Failure torque
M3 × 0.5	1.0	2.70	0.30-0.45	1.0	1.5-2.0
	2.0	2.75	0.35-0.55	1.0	1.6-2.5
	3.0	2.75	0.50-0.80	1.6	2.5-3.5 *
M4 × 0.7	2.0	3.60	0.60-0.85	1.8	2.8-3.8
	3.0	3.65	0.90-1.3	3.3	5.5-7.5
	4.0	3.65	1.2-1.6	4.3	7.0-10.0 *
M5 × 0.8	2.5	4.55	1.3-2.0	2.8	5.3-8.0
	3.5	4.55	1.5-2.7	6.0	10-12
	5.0	4.60	2.0-3.0	7.0	11-14 *
M6 × 1.0	3.0	5.40	2.0-2.8	5.0	9-13
	4.5	5.50	3.2-4.5	10.0	16-21
	6.0	5.50	3.5-4.8	10.0	18-25 *
M8 × 1.25	4.0	7.30	4.8-7.0	20.0	33-42
	6.0	7.35	5.5-9.5	28.0	43-53
	8.0	7.35	7-12	30.0	55-65 *
M10 × 1.5	5.0	9.20	11-15	30.0	53-63
	8.0	9.20	14-19	45.0	80-92
	10.0	9.25	15-22	55.0	92-102 *
M12 × 1.75	6.0	11.00	23-29	60.0	108-130
	9.0	11.10	25-31	65.0	115-135
	12.0	11.10	30-38	100.0	175-200 *

* Indicates probability that screw will break.

**Table 140 Tensile strength and torque for Corflex®-screw**

Nominal thread diameter mm	Tensile breaking kN	Tightening torque ¹⁾
M5	14,2	7,2
M6	20,1	13
M8	36,6	30
M10	58	58
M12	84,3	100
M16	157	250

¹⁾ In through holes after the thread has been stamped.

Table 229 and 230 are taken from the ISO standard for Taptite, other information is taken from our manufacturers.

Table 229 Mechanical properties for Taptite®-screw acc. to ISO 7085

Nominal thread diameter mm	Breaking torque min. Nm	Tensile breaking ^a min. N
M2	0,5	1 940
M2,5	1,2	3 150
M3	2,1	4 680
M3,5	3,4	6 300
M4	4,9	8 170
M5	10,0	13 200
M6	17,0	18 700
M8	42,0	34 000
M10	85,0	53 900
M12	150,0	78 400

^a For information only.

The values mentioned above apply when assembling screw in test plate according to table 230.

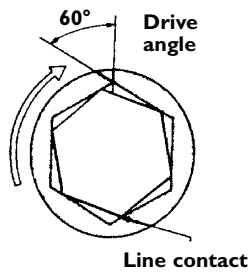
Table 230 Test plate thickness and hole diameter

Nominal thread diameter	2	2,5	3	3,5	4	5	6	8	10	12
Plate thickness	2	2,5	3	3,5	4	5	6	8	10	12
Hole diam. max. min.	1,825 1,800	2,275 2,250	2,775 2,750	3,18 3,15	3,68 3,65	4,53 4,50	5,43 5,40	7,336 7,300	9,236 9,200	11,143 11,100

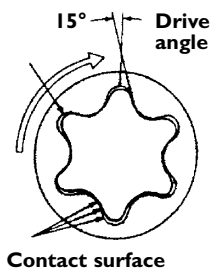
The test plate should be of steel and have a rigidity of 140-180 HV.

Sixpoint socket grip Torx®

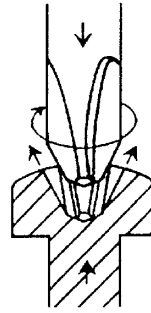
The Torx-system is revolutionizing the market when it comes to replacing traditional driving types such as hexagon, cross recess, slot etc.



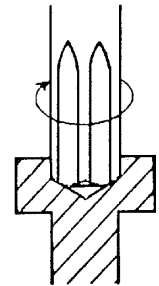
The hexagon drawback



The Torx advantage



Inclined surfaces cause cam-outs



No cam-out. The driving surface is parallel to the screw's axis

Longer driver life

The absence of cam-outs and high axial forces at assembly makes the Torx tools last much longer. The assembly costs are considerably reduced thanks to fewer standstills and lower tool costs.

Stable grip

The narrow tolerances in Torx-grips and tools make the screws easier to control. The risk of inclined fastening is very small and the assembling is faster. The assembling of drilling and tapping screws is improved.

Does not tire the assembler

The excellent straightening between screw and Torx assembly tools considerably reduces inclined fastening and the tiring axial force.

In several larger Swedish companies, the change from cross-recessed to Torx grip has considerably contributed to reducing work-related injuries.

Table I 43 Machine screw with sixpoint socket grip ISO I 4583

Screw dim.	Torx grip	d _k		k		rf rad.	A ref.	t min.
		max.	min.	max.	min.			
M2	T6	4,0	3,7	1,60	1,46	3,2	1,75	0,63
M2,5	T8	5,0	4,7	2,10	1,96	4	2,4	0,91
M3	T10	5,6	5,3	2,40	2,26	5	2,8	1,01
M3,5	T15	7,00	6,64	2,60	2,46	6	3,35	1,07
M4	T20	8,00	7,64	3,10	2,92	6,5	3,95	1,27
M5	T25	9,50	9,14	3,70	3,52	8	4,5	1,52
M6	T30	12,00	11,57	4,6	4,3	10	5,6	2,02
M8	T45	16,00	15,57	6,0	5,7	13	7,95	2,79
M10	T50	20,00	19,48	7,50	7,14	16	8,95	3,62

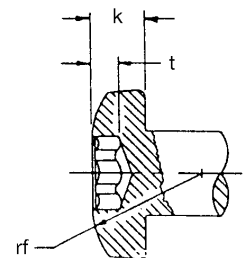
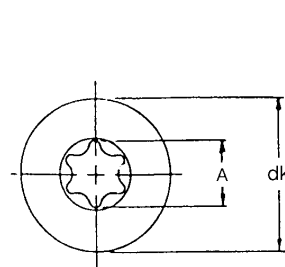


Table I 44 Tapping screw with sixpoint socket grip ISO I 4586

Screw dim.	Torx grip	d _k		k max.	A ref.	t min.
		max.	min.			
ST2,9	T10	5,5	5,2	1,7	2,8	0,65
ST3,5	T15	7,3	6,9	2,35	3,35	1,0
ST4,2	T20	8,4	8,0	2,6	3,95	1,14
ST4,8	T25	9,3	8,9	2,8	4,5	1,39
ST5,5	T25	10,3	9,9	3	4,5	1,65
ST6,3	T30	11,3	10,9	3,15	5,6	2,02

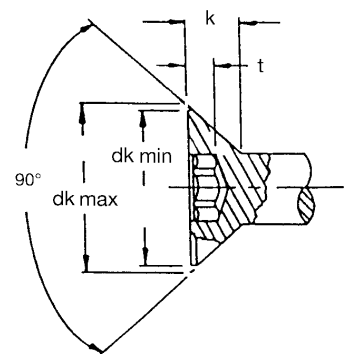
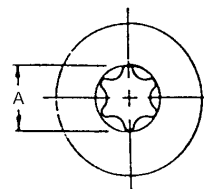
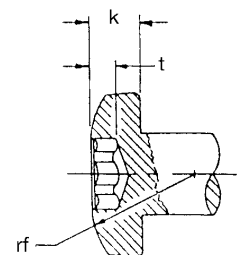
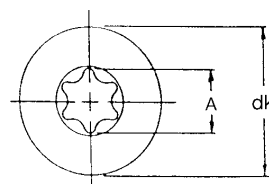


Table I 45 Tapping screw with sixpoint socket grip ISO I 4585

Screw dim.	Torx grip	d _k		k		rf rad.	A ref.	t min.
		max.	min.	max.	min.			
ST2,9	T10	5,6	5,3	2,40	2,15	5	2,8	1,01
ST3,5	T15	7,00	6,64	2,60	2,35	6	3,35	1,14
ST4,2	T20	8,00	7,64	3,1	2,8	6,5	3,95	1,42
ST4,8	T25	9,50	9,14	3,7	3,4	8	4,5	1,65
ST5,5	T25	11,00	10,57	4,0	3,7	9	4,5	1,65
ST6,3	T30	12,00	11,57	4,6	4,3	10	5,6	2,02



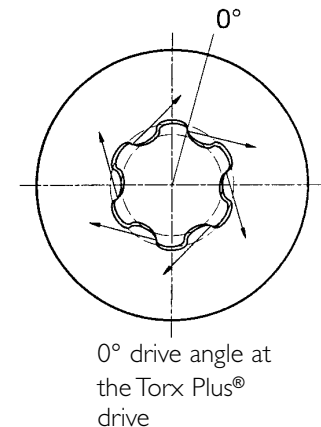
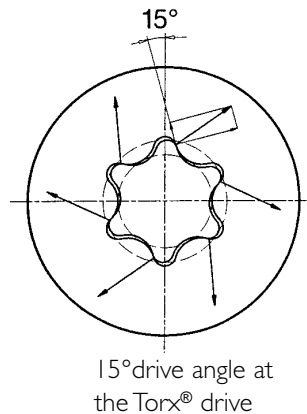
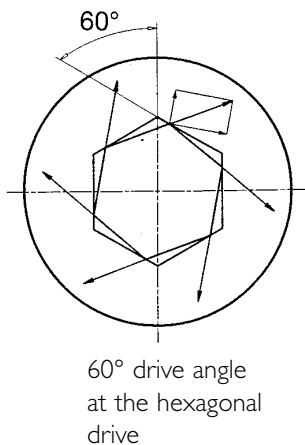
Torx Plus®

Torx Plus® is a further development of Torx® Original. The geometry is created from elliptic shapes. Above Torx® Original's good features Torx Plus® has, amongst others, the following advantages:

- The service life is on average, 100% longer.
- The torsion strength is on average, 25% higher.
- It is possible to transmit a higher turning torque.
- Less risk of unmeshing.
- Lower axial force.
- Longer tool service life than other grip systems.

The further developed design includes:

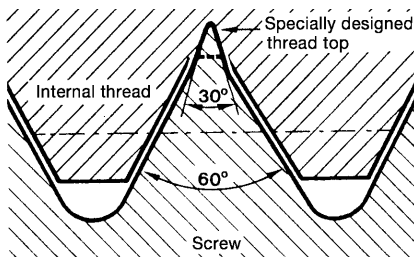
- To eliminate the radial forces that create tensions in the screw grip, one has succeeded to decrease the drive angle to 0°. The cross section area of the cams is increased to improve the grip.
- Another advantage is that it is possible to assemble with the existing tool for Torx if problems arise on the field.



Powerlok®

Locking screw in property class 10.9

Powerlok® has the same triangular-cylindrical shape as Taptite®. Thanks to the especially designed thread top Powerlok® gives you an excellent locking in holes which already have cut threads.



The design of the Powerlok®-thread.

Two performances

The Powerlok®-screws are available in two different hardening performances.

Powerlok N - toughened to property class 10.9, hardness HB 300-360.

Powerlok H - case-hardened to a surface hardness of HRC 47 and a core hardness of HRC 28-36, i.e. the same as for normal Taptite.

Field of application

Powerlok N - Everywhere where other types of locking screws or locking devices are used when fastening in holes.

Powerlok H - In materials that can not be transformed plastic, for example, cast iron, and extremely hard materials with HB >250, where Powerlok N can be deformed.

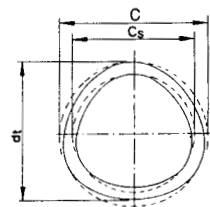


Table 141 Thread diameter Powerlok®

Thread	Circumscribed circle C		Two-point measure d_t		Point C_s
	min.	max.	min.	max.	max.
M 3	3,06	3,16	2,91	3,06	2,98
M 4	4,08	4,23	3,94	4,09	3,98
M 5	5,11	5,26	4,95	5,10	4,98
M 6	6,15	6,30	5,95	6,10	5,98
M 8	8,20	8,35	7,95	8,10	7,97
M10	10,25	10,40	9,95	10,10	9,97
M12	12,30	12,45	11,95	12,10	11,97

Table 142 Tightening torque in Nm

Thread	Powerlok N, 10.9	Powerlok H, $R_m=900\text{N/mm}^2$
M 3	1,5	1,1
M 4	3,5	2,5
M 5	7,0	5,0
M 6	12,0	8,5
M 8	29,0	20,0
M10	57,0	40,0
M12	99,0	70,0

Welding nut

General information:

The welding nut is available in a number of different designs.
It can be delivered in both steel and stainless materials.
It is available in dimensions M3-M16.

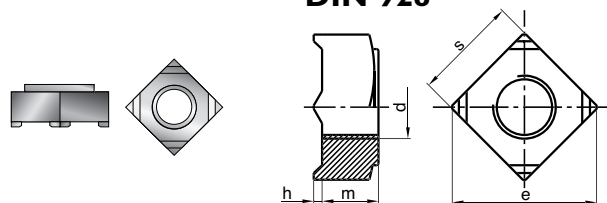
Field of application:

DIN 928. For automated pressure welding.

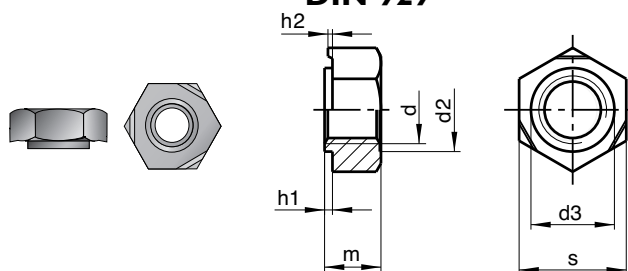
DIN 929. For manual pressure welding.

The nut is also available in unthreaded performance for painted details and self-tapping screws.

DIN 928



DIN 929



Hole tolerances

Table I 46 DIN 928

Thread diameter	Sheet metal thickness t		Hole diameter d ₄ ¹⁾ H11
	min.	max.	
M3	0,63	2,5	4,5
M4	0,75	3	6
M5	0,88	3,5	7
M6	0,88	4	8
M7	0,88	4	9
M8	1	4,5	10,5
M10	1,25	5	12,5
	1,25	5	13,5
M12	1,5	5	14,8
M14	2	6	16,8
M16	2	6	18,8

¹⁾ To guarantee the replaceability with DIN 929, the hole diameter of DIN 928 is corresponding to the hole diameter of DIN 929. The hole diameter is not dependent on the welding nut's other measures. Different hole diameters are allowed.

Table I 47 DIN 929

Thread diameter	Sheet metal thickness t		Hole diameter d ₅ H11
	min.	max.	
M3	0,63	2,5	4,5
M4	0,75	3	6
M5	0,88	3,5	7
M6	0,88	4	8
M7	0,88	4	9
M8	1	4,5	10,5
M10	1,25	5	12,5
	1,25	5	13,5
M12	1,5	5	14,8
M14	2	6	16,8
M16	2	6	18,8

Welding plate

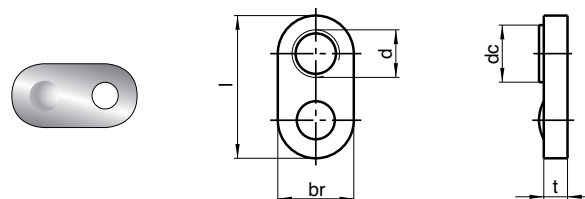
General information:

Made of sheet metal.

It is available in dimensions M4-M10.

Field of application:

In situations when having difficulties with assembling other welding nuts.



Tee nut

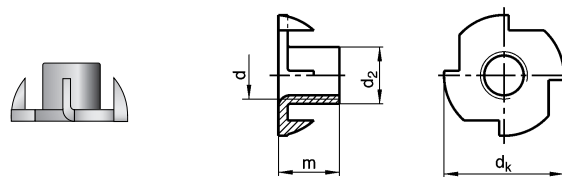
General information:

Shaped in sheet metal.

It is available in dimensions M3-M10.

Field of application:

The nut is pressed into a pre-drilled hole in the wooden design. The flaps lock the nut and prevent rotation.



Speed nut

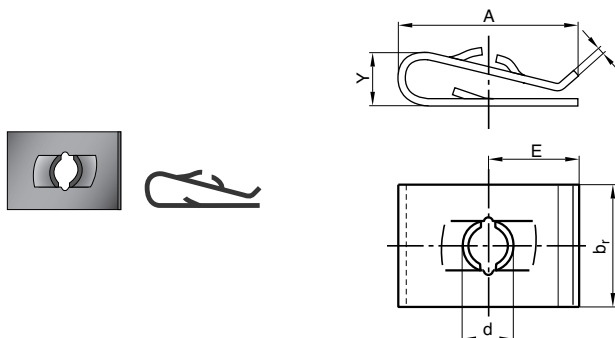
The speed nut is available in several different designs.

General information:

It is manufactured from spring steel and stainless steel.

Field of application:

It is used in material thickness 0,7-6,0. When there are existing holes. The clamping force is limited.

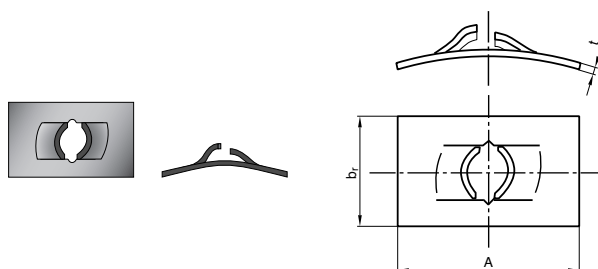


General information:

It is manufactured from spring steel.

Field of application:

The speed nut is independent of the material's thickness. When assembled, the nut's shape makes it self-locking.



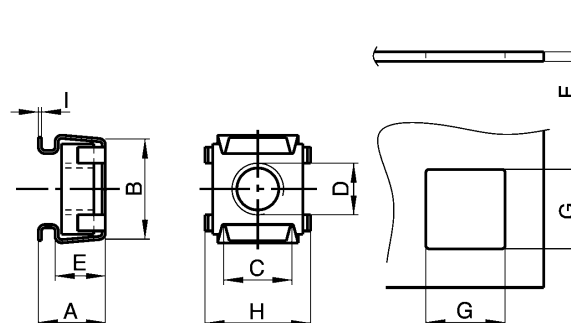
Cage nut

General information:

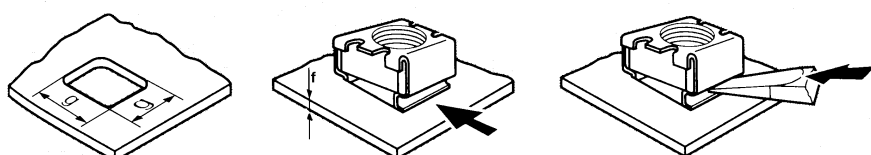
The cage nut is available in several different designs. The cage is delivered in stainless steel A2, with a zinc-plated nut. It is available in dimensions M3-M10.

Field of application:

It is used when fast assemblage is needed. The nut in the cage is self-centred, which allows a certain amount of play between screw and nut.



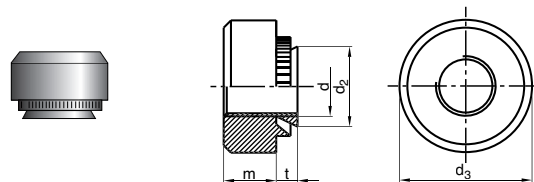
Assembly instruction:



Pressure nut

General information:

The pressure nut is available in several different designs. It can be delivered in both steel and stainless materials.

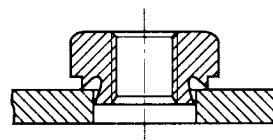


Field of application:

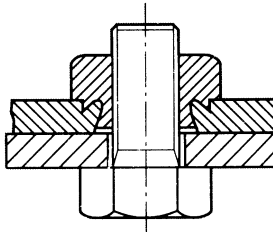
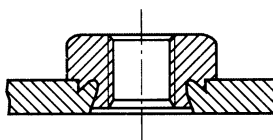
It is used in thin-walled materials, as for example steel, stainless steel, brass, copper and so on. Most of these pressure nuts give a plain bottom side.

Assembly instruction:

Centre the nut over the pre-pressed hole.



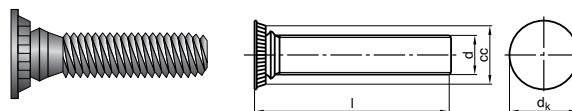
The nut is pressed in place between stamp and die.



Pressure screw

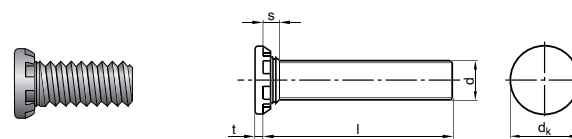
General information:

The pressure screw is available in several of different designs. It can be delivered in aluminium, steel and stainless materials.

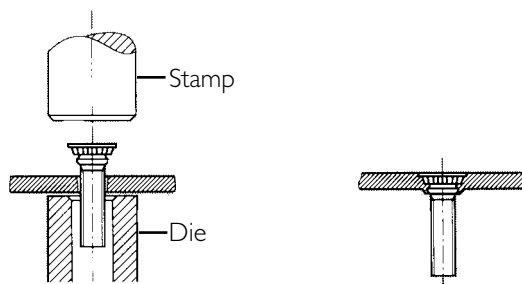
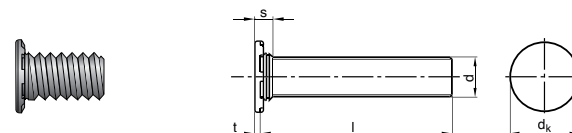


Field of application:

It is used in thin-walled materials, as for example steel, stainless steel, brass, copper and so on. Most of these pressure nuts give a plain upper side.



Assembly instruction:



Stamping nut

General information:

The stamping nut is available in dimensions M4-M10. It is delivered in property class 8 and is available in plain and zincplated performance. It can also be delivered unthreaded for use with thread-shaping screw.

Advantages:

Vibration resistant.
Total cost.
Corrosion.

Tool in upper position.

The stamp presses the nut against and through the plate with the help from the die.

Material from the plate is pressed into the space on the bottom side of the nut.

The cap piece is pressed into the die.

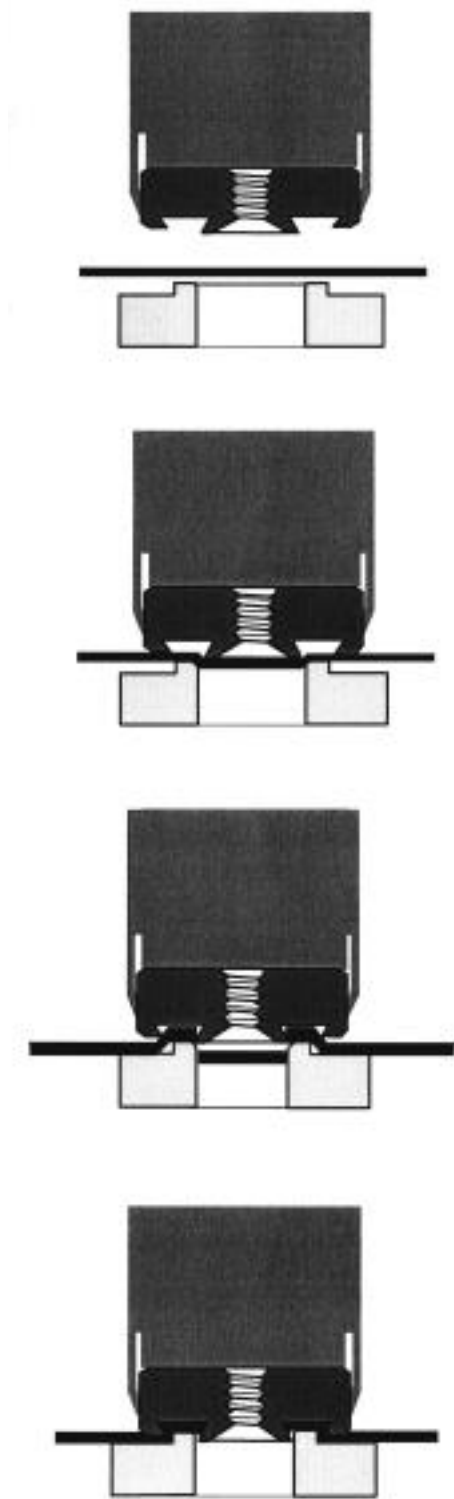
When reaching the bottom, material floats out into the flanges of the nut and the nut is attached to the plate.
The stamping is finished.

Source: Hultén.

Field of application:

The nut stamps its own hole. It can be used together with automatic tools.

In combination with hot-galvanised coil material, surface treatment can be excluded.



MATTSSONS

+46 371-890 00

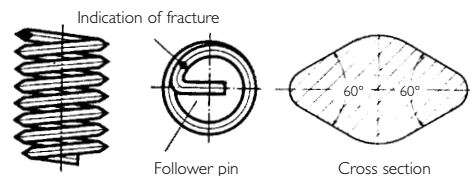
HeliCoil® Plus

In a screw joint reinforcement the first thread carries half the total load - the thread length is badly used.

In a HeliCoil® Plus joint, the load on the first thread is reduced from 50% to 30% of the total screw load. The better load distribution and the larger outer diameter of the HeliCoil® Plus insert make the screw joint stronger, and you can choose a shorter thread length in soft and light materials. At the same time the fatigue strength of the screw is considerably improved. HeliCoil® Plus thread inserts give a strong thread that allows you to use a high resistance screw in soft materials.

Technical data

HeliCoil® Plus wire has tight tolerances and very high surface finish. The wire is shaped as a springing coil with concentric inner and outer thread with follower pin. The material of the wire is stainless chrome-nickel steel (SIS 2333).



Tensile strength: 1400 N/mm²

Surface hardness: 425 HV 0,2

Finish: Rz=2,5 µm

µg: Low thread friction gives high clamping force

Table 148 Recommended lengths of HeliCoil® Plus

Target values for min. length of HeliCoil® Plus thread inserts. The values are affected by material strength, screw quality and are valid at 20°.										
Material strength	Screw property classes									
Tensile strength (N/mm ²)	3.6 4.6	4.8 5.6	5.8 6.6	6.8 6.9	8.8	9.8	10.9	12.9	14.9	
Up to 100	1,5 d	1,5 d	2 d	2,5 d	3 d	3 d	—	—	—	
> 100-150	1,5 d	1,5 d	2 d	2 d	2,5 d	2,5 d	2,5 d	2,5 d	3 d	
> 150-200	1 d	1,5 d	1,5 d	1,5 d	2 d	2 d	2 d	2,5 d	2,5 d	
> 200-250	1 d	1 d	1,5 d	1,5 d	1,5 d	1,5 d	2 d	2,5 d	2,5 d	
> 250-300	1 d	1 d	1 d	1 d	1,5 d	1,5 d	1,5 d	2 d	2 d	
> 300-350	1 d	1 d	1 d	1 d	1 d	1,5 d	1,5 d	1,5 d	2 d	
> 350-400	1 d	1 d	1 d	1 d	1 d	1 d	1,5 d	1,5 d	1,5 d	
> 400	1 d	1 d	1 d	1 d	1 d	1 d	1,5 d	1,5 d	1,5 d	

The target values are chosen to make the screw the joint's weakest part.

In some cases it is possible to decrease the table's target values. Practical tests are recommended. Other lengths can be delivered.

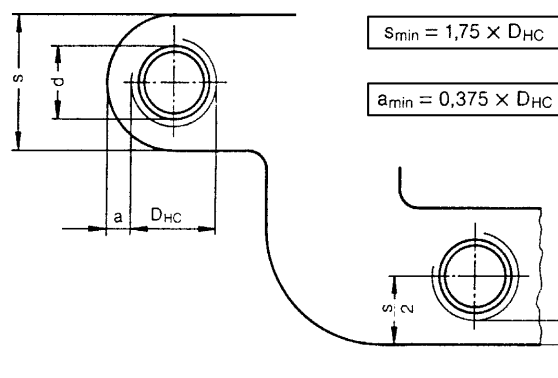
Target values for lowest wall thickness

The measure for lowest wall thickness (a_{min}) is dependent on the operation data of the joint, the material's strength and the thread length. The formula for the recommended a_{min} is valid for aluminium, cast iron and other soft/weak materials where the HeliCoil Plus thread length = 1,5 d.

d = Dimension

D_{HC} = HeliCoil material thread outer diameter

a = Wall thickness



Source: Colly Components AB.

HeliCoil® Plus

The programme

HeliCoil® Plus thread inserts are available in two designs: HeliCoil® Plus and HeliCoil® Plus Screwlock. Characteristics in common for both types are low tolerances and exact thread-profile.



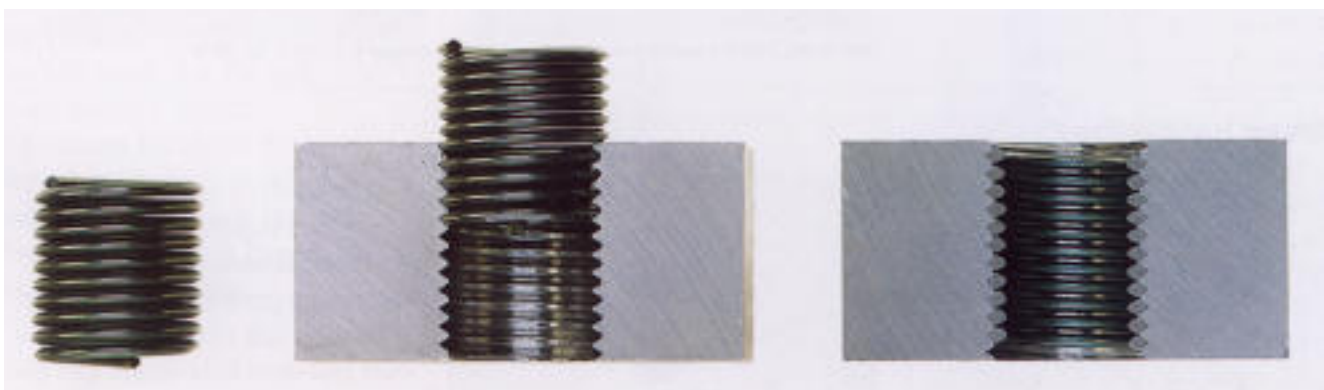
HeliCoil® Plus

The thread insert with its precision-shaped wire creates after assemblage a goods thread of very high quality. The finish-assembled HeliCoil® Plus thread has a tolerance according to DIN 13 6H (on request DIN 13 4H). For control and safe identification the HeliCoil® Plus is green coloured.



HeliCoil® Plus Screwlock

HeliCoil® Plus Screwlock has the same thread technical advantages as the HeliCoil® Plus. Furthermore the thread insert has a built-in screw locking. The polygon-shaped locking round clamps and locks the screw effectively under dynamic as well as static loads. Standard values for locking torques are according to DIN 267 and ISO 2320. Screwlock thread inserts are coloured red to easily separate them from the green coloured HeliCoil® Plus. The thread insert with its locking turn can be used together with a screw with a property class from 8.8. For stainless screw, lubrication with thread paste is recommended.



HeliCoil® Plus is securely fastened

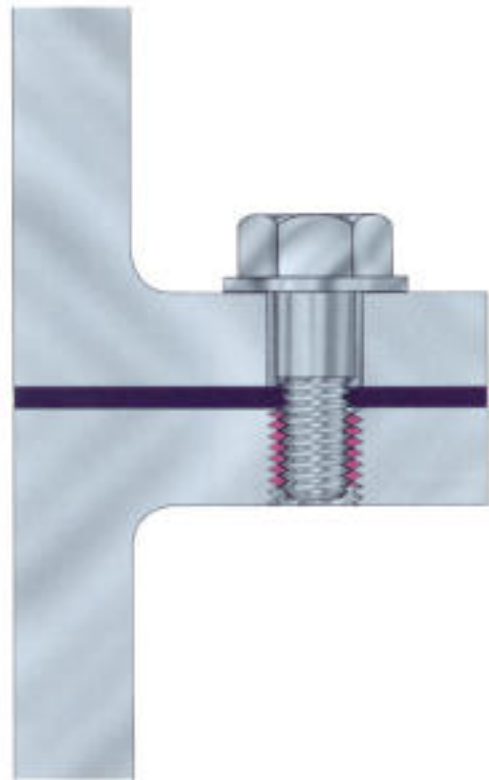
HeliCoil® Plus has before assemblage larger diameter than the goods thread. The larger diameter is carefully calculated, which guarantees that the thread insert is securely fastened

after assemblage. Any extra locking device or gluing is not needed.

Effective screw locking

The low friction of the HeliCoil® Plus gives a high pre-tension. High preserved pre-tension is the safest method for screw locking. In joint reinforcements where high pre-tension cannot be achieved or preserved, for example joint reinforcements with soft gaskets, springing elements or when using short, thick screws, the HeliCoil® Screwlock could advantageously be used.

The thread insert gives maximum safety because the screw is effectively locked in the locking round (the waist grip). No assembler forgets or loses the fastener when you choose HeliCoil® Screwlock. The thread insert is also perfect for adjusting screws. Polygon-shaped elastic locking rounds lock the screw even under dynamic and static loads - safe and reliable. HeliCoil® Screwlock is always delivered in red colour for safe and unequivocal identification.



Joint reinforcement with soft gasket.

**Joint reinforcement with short clamping length.
Screwlock locking nut is the solution.**

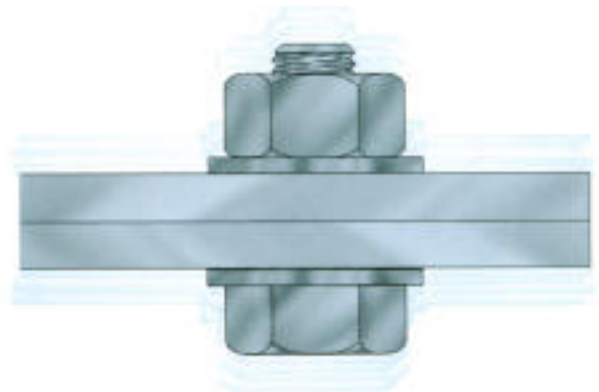


Table 149 Screw locking with HeliCoil® Plus Screwlock

Standard values for the locking torque according to DIN 267 part 15 and ISO 2320. It is valid for coarse and fine pitch of thread. Values in Nm (property class 8.8.)											
Thread	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20
1:st tightening, max	0,43	0,90	1,60	3,00	6,00	10,5	15,5	24,0	32,0	42,0	54,0
1:st loosening, min	0,12	0,18	0,29	0,45	0,85	1,5	2,3	3,3	4,5	6,0	7,5
5:th loosening, min	0,08	0,12	0,20	0,30	0,60	1,0	1,6	2,3	3,0	4,2	5,3

Source: Colly Components AB.

Use the right drilling diameter, drilling depth and thread depth for HeliCoil® Plus

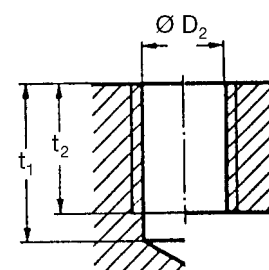
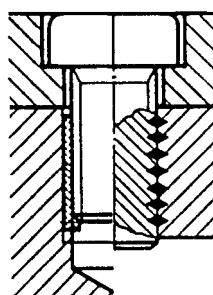
Table 150 HeliCoil® Plus Thread inserts

Dim		Spiral drill $\varnothing D_2$	Thread depth ¹⁾ t_2 min	
d	P	Rec	x d	mm
M 2,5	0,45	2,6	1 d	2,5
			1,5 d	3,75
			2 d	5,0
			2,5 d	6,25
			3 d	7,5
M 3	0,5	3,2	1 d	3,0
			1,5 d	4,5
			2 d	6,0
			2,5 d	7,5
M 3,5	0,6	3,7	1 d	3,5
			1,5 d	5,25
			2 d	7,0
			2,5 d	8,75
M 4	0,7	4,2	1 d	4,0
			1,5 d	6,0
			2 d	8,0
			2,5 d	10,0
M 5	0,8	5,2	1 d	5,0
			1,5 d	7,5
			2 d	10,0
			2,5 d	12,5
M 6	1,0	6,3	1 d	6,0
			1,5 d	9,0
			2 d	12,0
			2,5 d	15,0
M 7	1,0	7,3	1 d	7,0
			1,5 d	10,5
			2 d	14,0
			2,5 d	17,5
M 8	1,25	8,4	1 d	8,0
			1,5 d	12,0
			2 d	16,0
			2,5 d	20,0
M 8 x 1	1,0	8,3	1 d	8,0
			1,5 d	12,0
			2 d	16,0
			2,5 d	20,0
M 9	1,25	9,4	1 d	9,0
			1,5 d	13,5
			2 d	18,0
			2,5 d	22,5
M 10	1,5	10,50	1 d	10,0
			1,5 d	15,0
			2 d	20,0
			2,5 d	25,0
M 10 x 1	1,0	10,25	1 d	10,0
			1,5 d	15,0
			2 d	20,0
			2,5 d	25,0
M 10 x 1,25	1,25	10,40	1 d	10,0
			1,5 d	15,0
			2 d	20,0
			2,5 d	25,0
M 12	1,75	12,50	1 d	12,0
			1,5 d	18,0
			2 d	24,0
			2,5 d	30,0
M 12 x 1,25	1,25	12,25	1 d	12,0
			1,5 d	18,0
			2 d	24,0
			2,5 d	30,0
M 12 x 1,5	1,5	12,50	1 d	12,0
			1,5 d	18,0
			2 d	24,0
			2,5 d	30,0
M 14	2,0	14,50	1 d	14,0
			1,5 d	21,0
			2 d	28,0
			2,5 d	35,0
M 14 x 1,5	1,5	14,50	1 d	14,0
			1,5 d	21,0
			2 d	28,0
			2,5 d	35,0
M 16	2,0	16,50	1 d	16,0
			1,5 d	24,0
			2 d	32,0
			2,5 d	40,0
M 16 x 1,5	1,5	16,50	1 d	16,0
			1,5 d	24,0
			2 d	32,0
			2,5 d	40,0

Source: Colly Components AB.

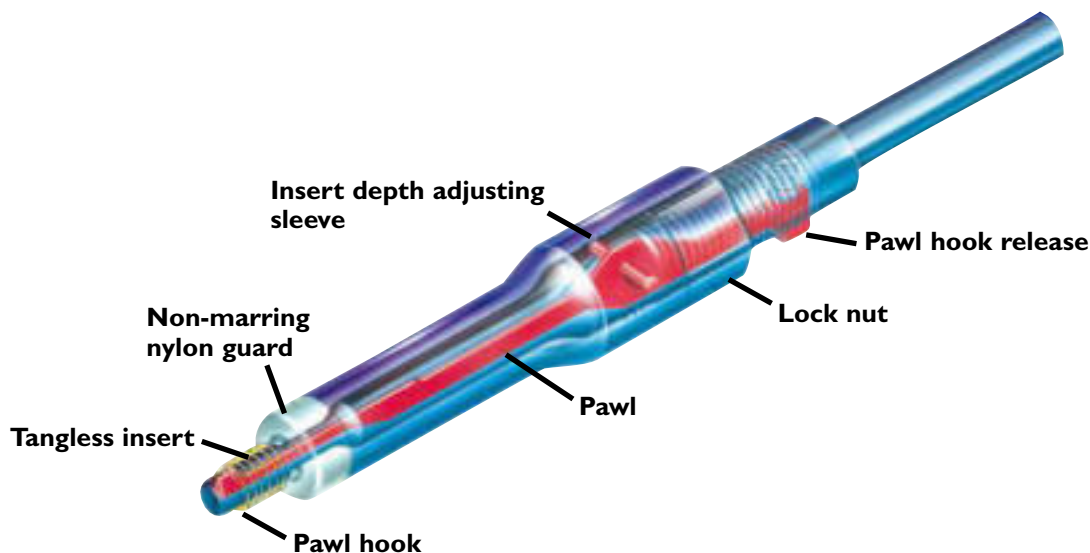
Dim		Spiral drill $\varnothing D_2$	Thread depth ¹⁾ t_2 min	
d	P	Rec	x d	mm
M 18	2,5	18,75	0,5 d	9,0
			0,75 d	13,5
			1 d	18,0
			1,5 d	27,0
			2 d	36,0
M 18 x 1,5	1,5	18,50	0,5 d	9,0
			0,75 d	13,5
			1 d	18,0
			1,5 d	27,0
			2 d	36,0
M 18 x 2	2,0	18,50	0,5 d	9,0
			0,75 d	13,5
			1 d	18,0
			1,5 d	27,0
			2 d	36,0
M 20	2,5	20,75	0,5 d	10,0
			0,75 d	15,0
			1 d	20,0
			1,5 d	30,0
			2 d	40,0
M 20 x 1,5	1,5	20,50	0,5 d	10,0
			0,75 d	15,0
			1 d	20,0
			1,5 d	30,0
			2 d	40,0
M 20 x 2	2,0	20,50	0,5 d	10,0
			0,75 d	15,0
			1 d	20,0
			1,5 d	30,0
			2 d	40,0
M 22	2,5	22,75	0,5 d	11,0
			0,75 d	16,5
			1 d	22,0
			1,5 d	33,0
			2 d	44,0
M 22 x 2	2,0	22,50	0,5 d	11,0
			0,75 d	16,5
			1 d	22,0
			1,5 d	33,0
			2 d	44,0
M 24	3,0	24,75	0,5 d	12,0
			0,75 d	18,0
			1 d	24,0
			1,5 d	36,0
			2 d	48,0
M 24 x 2	2,0	24,50	0,5 d	12,0
			0,75 d	18,0
			1 d	24,0
			1,5 d	36,0
			2 d	48,0
M 27	3,0	27,75	0,5 d	13,5
			0,75 d	20,3
			1 d	27,0
			1,5 d	40,5
			2 d	54,0
M 30	3,5	31,00	0,5 d	15,0
			0,75 d	22,5
			1 d	30,0
			1,5 d	45,0
			2 d	60,0
M 33	3,5	34,00	0,5 d	16,5
			0,75 d	24,8
			1 d	33,0
			1,5 d	49,5
			2 d	66,0
M 36	4,0	37,00	0,5 d	18,0
			0,75 d	27,0
			1 d	36,0
			1,5 d	54,0
			2 d	72,0
M 36 x 3	3,0	37,00	0,5 d	18,0
			0,75 d	27,0
			1 d	36,0
			1,5 d	54,0
			2 d	72,0

t_1 = Min. drilling depth. See DIN 76 part 1.



All measures in mm.

Tangless® CoilThread inserts and tools

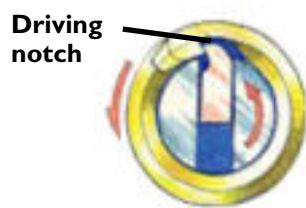


KATO Tangless® inserts give you all the benefits, features and performances of conventional tanged inserts. In fact, KATO Tangless® inserts are identical in form, fit and function to conventional tanged inserts. The only things missing from KATO Tangless® inserts are the tangs!

That is why KATO Tangless® CoilThread Inserts stand out from all other helically-coiled inserts. Instead of a tang, tangless inserts feature a unique, ramped driving notch on the inside diameter of the first coil on each end of the insert (see diagram below).

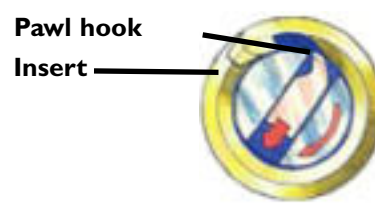
To drive the insert we developed an innovative installation tool with patented, internal, spring-loaded pawl located on the tip of the tool's mandrel. During installation, this hooked pawl locks into the Insert Driving Notch and rotates the insert into the tapped hole. The pawl then retracts into the mandrel to allow the tool to back out of the installed insert.

End view during insert installation



The spring-loaded pawl within the installation tool engages the driving notch to install the insert. The chamfered ends of the insert allow the insert to smoothly enter the tapped hole.

End view of tool leaving installed insert



Once the insert is driven to the proper depth, the installation tool automatically reverses rotation. The pawl slides back into the tool's recess as the mandrel unscrews from the installed insert.

The installation process is simple:

1. Partially thread an insert onto the tool's mandrel.
No need to orient the insert...they're bi-directional!
2. Align the insert with the tapped hole and press the trigger on the electric installation tool.

That's it! The rest is automatic. The insert goes in, the tool comes out, and the job is finished. The insert is prepared for a bolt or screw.

Thread inserts

Threaded inserts of high quality, installed after the casting or shaping process, can save a lot when it comes to raw material, machinery time and quality control. Threaded inserts are favourably used where previously thread-cutting or thread-shaping screws were used. Threaded inserts reduce the problem with brittle materials. When installing a screw directly into plastics the threads are worn due to repetitive assembly. This results in repairs and unnecessary costs.

Assembling threaded inserts after shaping or casting can reduce machinery time, and you avoid risk of tool damages that can arise due to dropping or misplaced details to be casted.

No cleaning is necessary due to that no plastics can flow into the threads.

No misplaced inserts will reduce the quality costs.

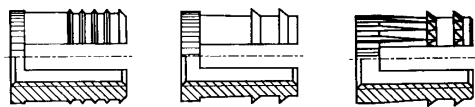
Assemblage of threaded inserts is easy to automatize.

- Threaded inserts can be used for steel, light metal, plastics and wood.
- Threaded inserts are available manufactured from steel, stainless steel and brass.

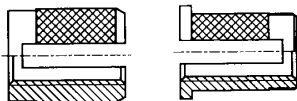
Threaded inserts are available on the market in several different performances. The aim with threaded inserts is to receive a good thread in material with low strength. Large fields of application are in the plastics, wood and metal industry.

Below follow some examples of threaded inserts.

B-Lok Self-locking threaded insert

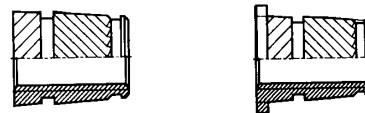


MV 812 - 815
F 821 - 823
E 830/831

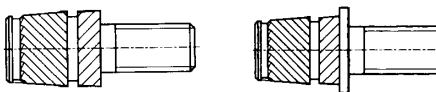


R 841
RK 842

S-Lok Heat or ultrasonically assembled threaded insert



853 I 855 I



858 I 859 I



860 862

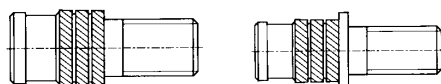
Mubux Pressed in threaded insert stud



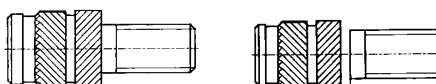
850 852



863 864



856 857



866 867

Thread inserts

B-Lok®

Dimensions: It is available in M2-M18.

Material: Brass.

Field of application: Thermoplastics.
Duroplastics.
PU/PUR-foam.
Wood.

1. B-lok is pressed into the retaining hole.
The insert collapses due to the slotted feature.
2. When the screw is turned in, both segments return to their former position. The outer profile is anchored to the hole. The screw is kept in place by the expansion torque.

For lower volumes B-lok is embedded by a simple manual press (or drill). For higher volumes single or multiple tools are available on request.

B-lok is an insert with different outer profiles, which allow optimal anchoring in all molded plastic parts.

Mubux-A®

Dimensions: It is available in M2-M18.

Material: Brass.

Field of application: Duroplastics.
Thermoplastics.

Insert the Mubux-A insert with the pilot end facing downwards into the receiving hole and then press in using a lever assembly or a small press. Do not knock in Mubux-A using a hammer.

With Mubux-A outstanding pull-out properties are achieved if it is inserted into the molded components immediately after removal from the mold, when the component has not yet completely cooled down.

Mubux-A has also proved very satisfactory in some duroplastic materials where it is embedded using ultrasonics.

S-Lok®

Dimensions: It is available in M3-M10.

Material: Brass.

Field of application: Thermoplastics.

S-Lok is a threaded insert or a stud, with two bands of opposing herringbone knurl and a pilot end for problem-free insertion.

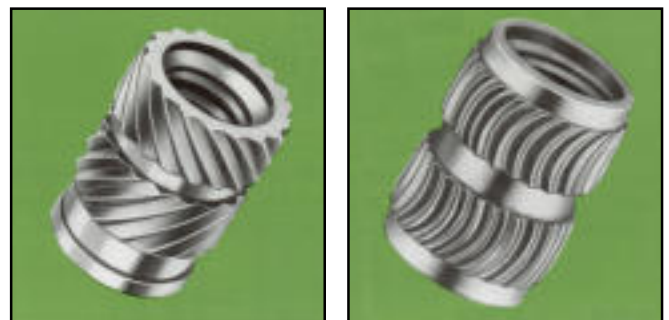
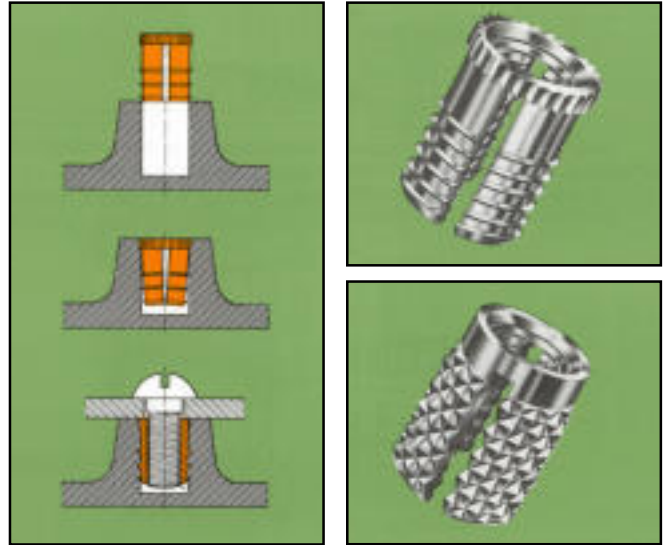
Its unique shape, which is tailored to the material, has been developed specifically for insertion into plastic components by means of ultrasonic vibration or by thermal heat transfer.

Well known manufacturers of ultrasonic welders recommend S-Lok due to the low energy requirement, the short insertion times and the problem-free production. It is suitable for all molded components made from thermoplastics.

B-Lok Self-locking threaded insert.

Product facts:

- Unsurpassed quick installation.
- Automatic locking prevents loosening.
- Saves costs for additional locking features.



Source: Kerb-Konus.

Ensats^{®P} self cutting threaded inserts

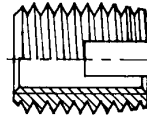
Ensats 302, standard with slot.

Ensats 302

Dimensions: It is available in M3-M16.

Material: Hardened steel.

Field of application: Plastics, wood, metal.



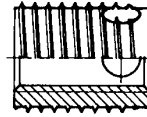
Ensats 307/308, type 3 hole, short and long version.

Ensats 307/308

Dimensions: It is available in M3-M16.

Material: Hardened steel.

Field of application: Thermoplastics, duroplastics, light metal alloys.



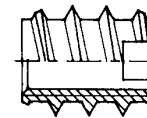
Ensats 309, with slot, special outer thread.

Ensats 309

Dimensions: It is available in M3-M16.

Material: Brass.

Field of application: Thermoplastics, wood, fibre, polyurethane.



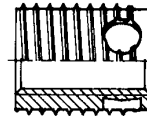
Ensats 337/338, type 3 blind hole, short and long version.

Ensats 337/338

Dimensions: It is available in M3-M16.

Material: Hardened steel.

Field of application: Thermoplastics, duroplastics, light metal alloys.



The chips produced during insertion are deposited there and cannot fall into sensitive equipment parts.

Product facts:

Can be used in all plastics, duroplastics, thermoplastics, PU/PUR foam, hard-wood and laminates, pressboard and metals.

Maximum strength compared with other systems.

Possible fields of application:

Ensats threaded inserts are used almost everywhere in plastics and metal industries.

The automotive industry, household industry and electronic industry are large users of threaded inserts.

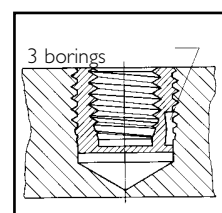
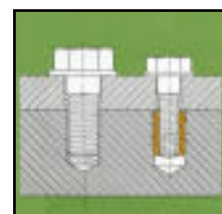
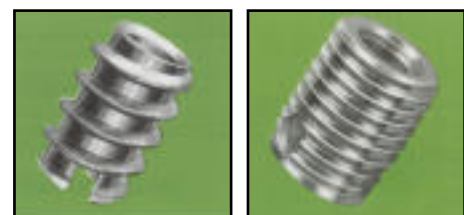
The picture demonstrates two different screw connections with equal pull-out strength. The increase in shear area obtained by the use of Ensats allows full utilisation of the tensile strength of the screws. The designer is able to incorporate the smallest screw diameter for this application.

Ensats special 337/338 with chip chambers on the periphery.

The cutting bores are designed as chip reservoirs.

The chips produced during insertion are deposited there and cannot fall into sensitive equipment parts.

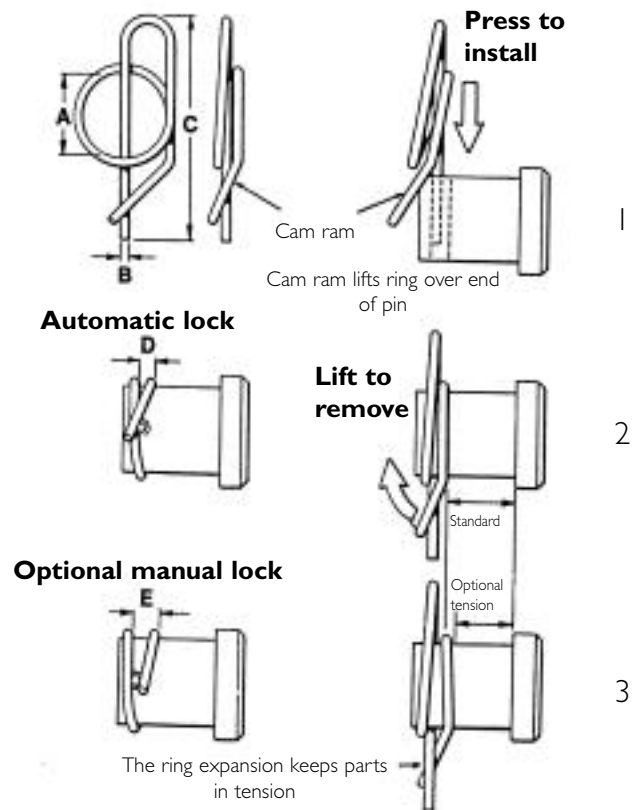
Source: Kerb-Konus.



Ring cotter-clip

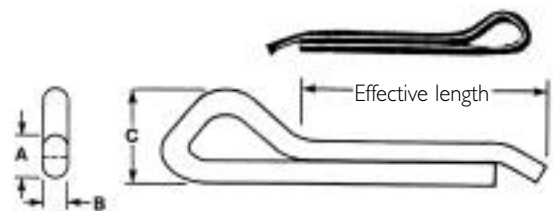
The revolutionary Rue ring cotter-clip grips the axis. Automatic lock makes this one of the safest cotters on the market.

The cotter is quickly attached, without tools. Another advantageous feature is the manual secondary lock, which braces the cotter and dampens vibrations. It is made of hard-drawn spring wire, zincplated or stainless, and is easy to attach - easy to remove.



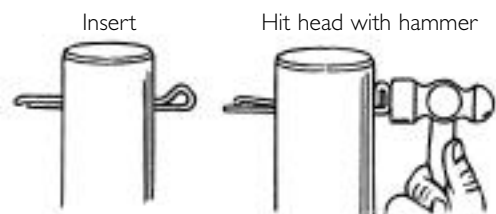
Split pin

Hammerlock split pins are known for their ease to install and use. The special design of the cotter pin makes it possible to lock it with only one hammer blow. Size is based upon effective length, which corresponds to the length from under head to end of prong, see graph. It is only produced in zincplated steel with low carbon content.



The shanks spread and lock themselves

When a hammer hits the head of the cotter pin, the shorter stem is forced down over the long stem's curved end. Therefore the stems are forced apart, and lock the pin.



Blind rivet

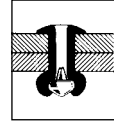
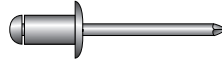
Blind rivet, also called "pop-rivet", is to a great extent used for joints in the manufacturing- as well as in the construction industry.

Riveting with blind rivets is a very simple and reliable fastening system that creates a vibration resistant joint. Blind rivets fit most materials, for example sheet metal, plastic, wood and laminate.

Rivet heads

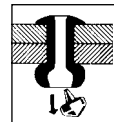
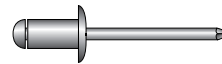
Protruding head • BS-mandrel

The splint head is fastened after it has been riveted. Seals against particles and dirt. Air-tight rivet suitable for higher sealing requirements.



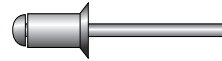
Protruding head • BH-mandrel

The splint head is loosened when riveting. Reduces the corrosion risk. The hole is practical for design solutions.



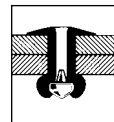
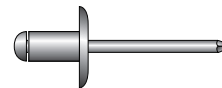
Countersunk head • BS-mandrel

The splint head is fastened after it has been riveted. Seals against particles and dirt. Air-tight rivet suitable for higher sealing requirements.



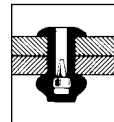
Large protruding head • BS-mandrel

Idealistic for soft and elastic materials, for example rubber moldings. A large contact surface gives reliable fastening.



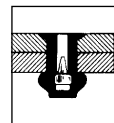
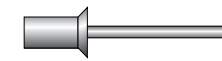
Protruding head

An air-tight rivet is a rivet with fully confined rivet body. This guarantees a completely water and air-tight riveting. Suitable for use in overlap joints with roof and facade plates.



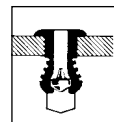
Countersunk head

An air-tight rivet is a rivet with fully confined rivet body. This guarantees a completely water and air-tight riveting. Suitable for use in overlap joints with roof and facade plates.



Protruding head • BS-mandrel

For porous and brittle materials, for example wood and brick. The grooves give safe fastening in the material and good withdrawing resistance.



Material:

The blind rivet is delivered in the following materials:

Steel
Aluminium
Stainless/Acidproof
Copper
Bronze

Monel (this is a rivet of copper and nickel alloy. It gives a high strength and a very high corrosion resistance.)
It is also available in lacquered performance.

Blind rivet

Recommended grip ranges acc. to DIN 7337.

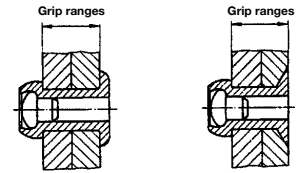


Table 172

Rivet body aluminium/mandrel steel or stainless steel A2

d ₁	2,4 ^{*)}	3	3,2	4	4,8	5	6 ^{*)}	6,4 ^{*)}
l	Grip ranges							
4	0,5 - 2	0,5 - 1,5	—	—	—	—	—	—
6	2 - 4	1,5 - 3,5	1,5 - 3	2 - 3	—	—	—	—
8	4 - 6	3,5 - 5,5	3 - 5	3 - 4,5	2 - 4	—	—	—
10	—	5,5 - 7	5 - 6,5	4,5 - 6	4 - 6	—	—	—
12	—	7 - 9	6,5 - 8,5	6 - 8	6 - 8	2 - 6	—	—
16	—	9 - 13	8,5 - 12,5	8 - 12	8 - 11	6 - 10	—	—
20	—	13 - 17	12,5 - 16,5	12 - 16	11 - 15	10 - 14	—	—
25	—	17 - 22	16,5 - 21,5	16 - 21	15 - 20	14 - 18	—	—
30	—	—	—	21 - 25	20 - 24	18 - 23	—	—
35	—	—	—	25 - 30	24 - 29	—	—	—
40	—	—	—	30 - 35	29 - 34	—	—	—
45	—	—	—	35 - 40	34 - 39	—	—	—
50	—	—	—	40 - 45	39 - 44	—	—	—

^{*)} Not valid for countersunk head.

Table 173

Rivet body steel/mandrel steel

d ₁	2,4	3	3,2	4	4,8	5	6 ^{*)}	6,4 ^{*)}
l	Grip ranges							
6	—	0,5 - 3	0,5 - 2,5	—	—	—	—	—
8	—	3 - 5	2,5 - 4,5	2 - 4	—	—	—	—
10	—	5 - 7	4,5 - 6,5	4 - 6	2,5 - 4,5	—	—	—
12	—	7 - 9	6,5 - 8,5	6 - 8	4,5 - 6,5	3 - 6	—	—
16	—	9 - 12,5	8,5 - 12	8 - 11	6,5 - 10,5	6 - 9	—	—
20	—	12,5 - 16,5	12 - 16	11 - 15	10,5 - 14,5	9 - 13	—	—
25	—	—	16 - 21	15 - 20	14,5 - 19,5	13 - 17	—	—
30	—	—	—	20 - 25	—	—	—	—
35	—	—	—	25 - 30	—	—	—	—

^{*)} Not valid for countersunk head.

Table 174

Rivet body stainless steel A2 or nickel copper alloy/mandrel steel or stainless steel A2

d ₁	2,4	3 ^{*)}	3,2 ^{*)}	4 ^{*)}	4,8 ^{*)}	5 ^{*)}	6	6,4
l	Grip ranges							
6	—	1 - 3	1 - 2,5	1 - 2	—	—	—	—
8	—	3 - 5	2,5 - 4,5	2 - 4	—	—	—	—
10	—	5 - 7	4,5 - 6,5	4 - 6	—	—	—	—
12	—	7 - 9	6,5 - 8,5	6 - 8	—	—	—	—
16	—	—	8,5 - 12	8 - 11	—	—	—	—
20	—	—	12 - 16	11 - 15	—	—	—	—
25	—	—	16 - 21	15 - 20	—	—	—	—

^{*)} Not valid for countersunk head.

Table 175

Rivet body copper/mandrel steel, stainless steel A2 or brass

d ₁	2,4	3 ^{*)}	3,2 ^{*)}	4 ^{*)}	4,8	5	6	6,4
l	Grip ranges							
4	—	0,5 - 1,5	—	—	—	—	—	—
6	—	1,5 - 3	2,5 - 3,5	—	—	—	—	—
8	—	3 - 5	3,5 - 4,5	—	—	—	—	—
10	—	5 - 7	4,5 - 6,5	—	—	—	—	—
12	—	7 - 9	6,5 - 8,5	—	—	—	—	—

^{*)} Not valid for countersunk head.

Source: DIN 7337.

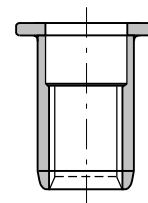
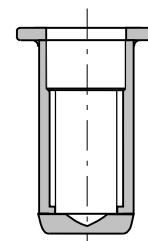
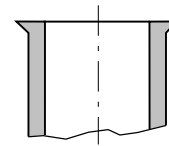
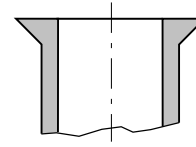
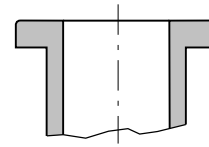
Blind rivet nut

Rivet heads

The plane head is the most common head type, and is usually used in applications where the shape of the head does not have to follow the contour of the workpiece.

The countersunk head is used in materials where you don't want a column of air between the details. The countersink angle 90° at countersunk blind rivet nut, and it means that the head should be 0,1 mm above the surface. This prevents rotation of the nut at when assembling.

The low profile head is used where you punch holes and the insert's head can be pressed into the material.



Open or closed blind rivet nut

When there is a demand for absolute tight assembly, and when the screw must be protected from chemical or mechanical damage, e.g. in pipes or tanks, the closed insert is used.

When there is less demand for tight assembly, e.g. in sheet metal or profiles, an open blind rivet nut is used, which also permits a certain independence of the screw's length.

Source: C. Edgren.

Function and advantages:

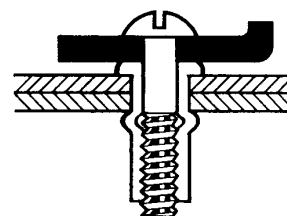
POP® NUT is assembled in drilled or punched holes with normal tolerance. The blind rivet nut is assembled onto the assembly tools mandrel manually or automatically, depending on the type of tool used. When the mandrel is pressed backwards the unthreaded part expands radially and the blind rivet nut is fastened in the material. The mandrel is unscrewed and the blind rivet nut is secured firm enough for it not to rotate when the screw is fastened.

The blind rivet nut thread has at least six turns. This results in very strong joints. It is the ideal solution for pipes and profiles of metal and plastic. But the blind rivet nut is just as often used in joints that do not require blind rivet nut assembling, simply because of the advantages gained when assembling. One of these is that the assembly always can be performed at the correct stage of production and without risk of damaging any surface treatments.

For assembly:

One important advantage of this fastener system is the tools. They are robust and easy to handle. The mouthpiece and mandrel can easily be replaced. One single tool can therefore be used with several insert sizes. There is everything from simple handheld tools to advanced air tools with hydraulics and automatic screwing functions of the mandrel.

Source: Emhart Teknik.



General information:

A simple and ideal solution to obtain strong threads in thin materials. It is assembled from one side and is then permanently attached. Suits all material thicknesses between 0,25 and 8,0 mm. It is available in a uncompromised assortment in steel, aluminium and stainless, from M3 to M12.

- | | |
|-------------------------|--|
| Unigrip: | Flexible gripping area (fewer variants, better economy). |
| Smallgrip: | Shorter grip length with optimal function for very thin materials and when space is limited. |
| Hexagon: | Hexagon shape for the best torsional strength. |
| Stainless: | A2-quality for environment class 4. |
| Grooved Unigrip: | For higher torsional safety. |

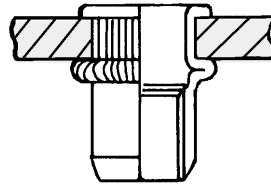
Different performances of blind rivet nuts

Eurosert

General information:

EUROSERT is a blind rivet nut developed for European standard and designed to simplify assembly. A large plane head copes with axial forces.

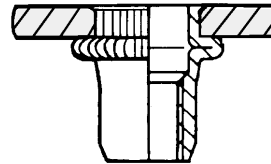
EUROSERT is available with SPLINES to increase torsional resistance.



Nutsert

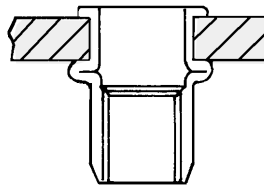
General information:

NUTSERT - Thin is especially developed to be assembled in very thin materials. At assembly a considerable edge is shaped on the lower side which gives the joint strength. The self-countersinking head gives a flat surface which simplifies the attachment of other details.



General information:

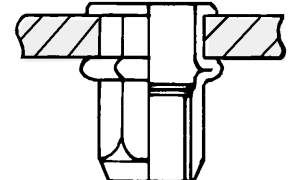
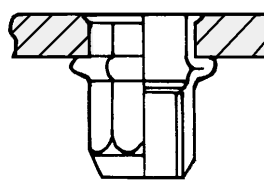
NUTSERT - Flat head TSN is, since it is made of aluminium, very appropriate to use in light metal constructions. The main shape handles high axial forces and provides a strong and stable joint.



Hexsert

General information:

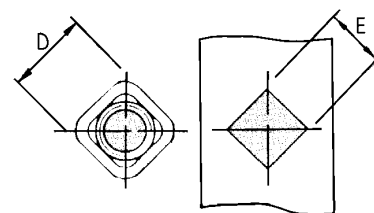
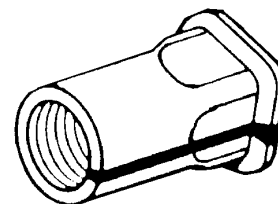
HEXSERT hexagon shape guarantees a very torsionally strong joint. The self-countersinking head gives a plane surface that facilitates the fastening of other details. It is also available with flat head.



Squaresert

General information:

SQUARESERT is assembled in a square punched hole and provides the same torsional strength as a hexagon insert.



Source: Ejot & Avdel System.

Faster assembly and larger field of application of blind rivet nuts.

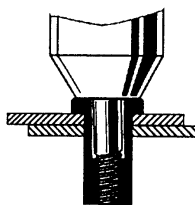
The assembling of blind rivet nuts is fast and simple. Lately special tools have been developed - the technique has been further rationalized.

Screwing and unscrewing can nowadays be made easier with a new assembly tool, which automatically changes direction of rotation at the different phases of the assembly.

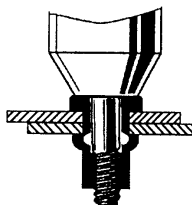
The preparatory work has also been simplified. When assembling hexagon blind rivet nut, there is for instance a hole converter which punches hexagon holes from circular drill holes, which means that hexagon blind rivet nuts now can be used everywhere - where you can reach with an ordinary hand-drilling machine.

Source: C. Edgren.

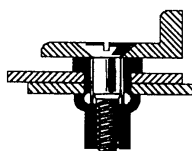
Assembly:



The blind rivet nut is threaded onto the assembly tools mandrel and is placed in the assembly hole to be fastened.

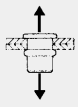
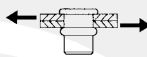



When fastened, the rivet expands towards the lower side of the workpiece.




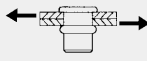

The assembly tool is unscrewed and the screw joint is ready to be screwed on.

Table 151

d	 Tensile strength kg/rivet (N/rivet)								 Shearing force kg/rivet (N/rivet)								 Max tightening torque				TYPE
	Aluminium		Steel		Stainless		Brass		Aluminium		Steel		Stainless		Brass		Alum	Steel	Stainl	Brass	
	kg	N	kg	N	kg	N	kg	N	kg	N	kg	N	kg	N	kg	N	kgm Nm	kgm Nm	kgm Nm	kgm Nm	
M3	193	1900	397	3900	540	5300			65	640	112	1100	183	1800			0,07	0,1	0,15		FTT FTS FTR FTTC
																	0,7	1	1,5		
M4	407	4000	692	6800	672	6600			122	1200	213	2100	315	3100			0,25	0,4	0,8		
																	2,5	4	8		
M5	662	6500	1171	11500	1283	12600	1080	10600	193	1900	264	2600	580	5700	285	2800	0,5	0,8	1,4	0,6	FTT FTS FTR FTTC
																	5	8	14	6	
M6	794	7800	1681	16500	1793	17600	1579	15500	275	2700	387	3800	672	6600	417	4100	0,8	1,5	2,4	1	
																	8	15	24	10	
M8	1253	12300	2547	25000	3260	32000	2302	22600	397	3900	550	5400	978	9600	580	5700	2	2,6	3,8	2,2	FTT FTS FTR FTTC
																	20	26	38	22	
M10	1783	17500	3260	32000	4279	42000			427	4200	703	6900	1019	10000			2,5	4,5	5,5		
																	25	45	55		
M12			3464	34000							764	7500						7			FTT FTS FTR FTTC
																	70				

Source: Far.

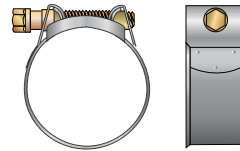
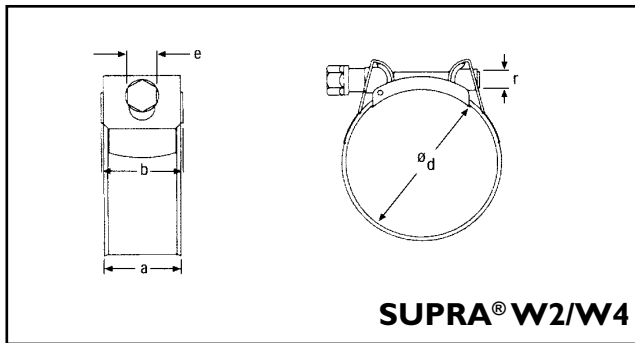
Table I52

d	 Tensile strength kg/rivet (N/rivet)								 Shearing force kg/rivet (N/rivet)								 Max. tightening torque				TYPE
	Aluminium		Steel		Stainless		Brass		Aluminium		Steel		Stainless		Brass		Alum	Steel	Stainl	Brass	
	kg	N	kg	N	kg	N	kg	N	kg	N	kg	N	kg	N	kg	N	kgm Nm	kgm Nm	kgm Nm	kgm Nm	
M4			713	7000							224	2200						0,5			FTTE - ER
																		4,9			
M5			1202	11800							366	3600						0,9			
																		8,8			
M6			1711	16800							489	4800						1,6			
																		15,7			
M8			2567	25200							580	5700						2,7			FTRE
																		26,5			
M10			3617	35500							703	6900						4,6			
																		45			
M4			438	4300							152	1500						0,3			
																		2,9			
M5			891	8750							203	2000						0,6			FTRE
																		5,88			
M6			1019	10000							254	2500						1,2			
																		11,7			
M8			1222	12000							326	3200						2,4			PR
																		23,5			
M3			387	3800							91	900						0,1			
																		1			
M4			703	6910							193	1900						0,3			
																		2,9			
M5			1314	12900							203	2000						0,6			
																		5,88			
M6			1783	17500							295	2900						1,2			
																		11,7			
M8			2088	20500							326	3200						2,4			
																		23,5			

When assembling and choosing a rivet nut it is important to choose the right nut for the material thickness in the application.

Source: Far.

Mikalor[®] hose clamps



W2

Screw: Property class 8.8, zincplated.

Band & Housing : Stainless steel X6Cr 17 (DIN 1.4016) (AISI-430).

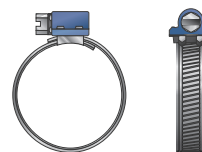
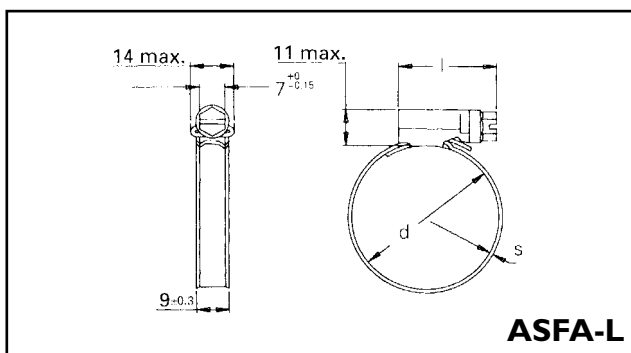
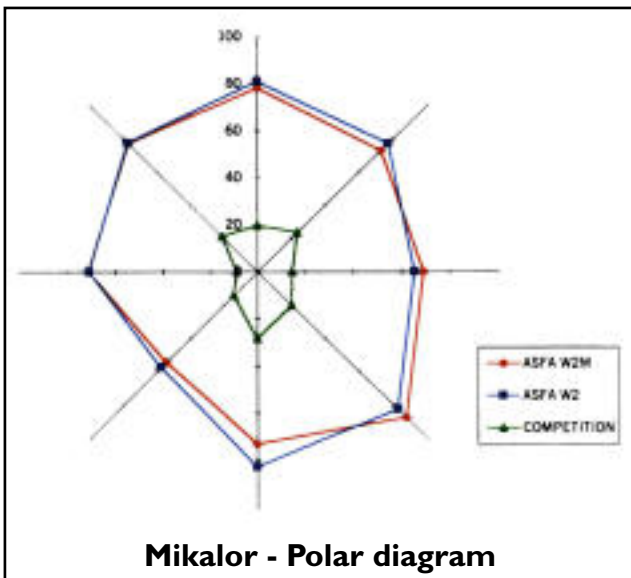
Other components: Steel 1.0333, zincplated.

W4

All stainless steel.

X5CrNi 1810 (DIN 1.4301) (AISI-304).

Thanks to a great flexibility for a perfect grip throughout the contact surface and ensure a fully leakproof system.



W2

Screw: Steel Qst 34.3 (DIN 1.0213) zincplated.

Band and housing: Stainless steel X6 Cr 17 (DIN 1.4016) (AISI-430).

W4

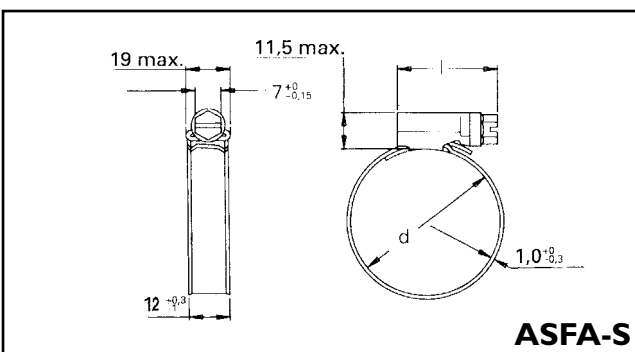
Screw: Stainless steel AISI-302 Cu.

Band and housing: Stainless steel X5CrNi 1810 (DIN 1.4301) (AISI-304).

W5

Screw: Stainless steel AISI-316 Cu.

Band and housing: Stainless steel X5CrNiMo 17122 (DIN 1.4401) (AISI-316).



Drywall screw

General information:

The drywall screw is manufactured from case-hardened steel and can, for example, be delivered in a phosphatised and zincplated performance. Most drywall screws can be delivered in coils.

Field of application:

It is especially meant for fastening of gypsum boards onto steel and wooden crossbars. The screw particular head shape countersinks without damaging the paper layer of the gypsum board.

The drywall screw is available in the following performances:

Drywall screw (for steel beam max 0,9 mm and wooden beam).

Performance: Double thread with sharp point.



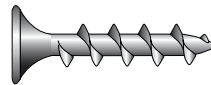
Drywall screw (for steel beam max 2,5 mm).

Performance: Single thread with drilling point.



Drywall screw (for wooden beam).

Performance: Single thread with sharp point.



Drywall screw (for hard gypsum board).

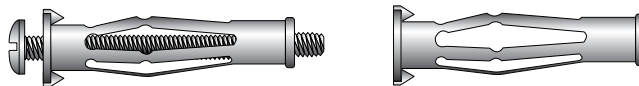
Performance: Double thread with sharp point. Counter running milling thread for effective countersinking.



Metal anchor (Molly-plug)

General information:

The metal anchor is a fastener of steel with a bottom socket with an internal thread for screws.



Field of application:

The metal anchor is suitable for fastening in gypsum boards, particle boards and fibre boards. It is available in lengths for 1-3 boards and has a grip area up to material thickness of 45 mm. The screw in the anchor can be replaced by another screw with the same diameter and thread.

Performance:

Plane head with 2 locking blips. A case nut with M/UNC-thread. 3-5 locking blips depending on size.

Function:

The blades unfold and lock when the screw is tightened. The gripping-blades expand on the rear side and form a pyramid, that locks the anchor effectively and distribute tension loads on a large area.

Table 164 Technical data

Dimension	Practical loading capability in N for 13 mm gypsum boards					
	Ceiling			Wall		
	1 layer	2 layers	3 layers	1 layer	2 layers	3 layers
M 4	120	150	180	180	350	400
M 5	150	200	230	350	550	650
M 6	180	250	280	400	650	750

The loading values above are recommended max. loads.

Table 165 Recommendations for holes

Screw dim. mm	Drilling Ø mm
M 4	8,0
M 5	11,0
M 6	13,0



MATTSSONS

+46 371-890 00

Stud expander-shell bolt (express bolt)

General information:

The stud expander-shell bolt is manufactured from steel and is available in zincplated, hot dip galvanized- and stainless/acidproof performance.



Field of application:

The stud expander-shell bolt is mainly meant for installations in concrete. For examples electric, pipe, construction and ventilation assemblage. It is approved for use in fire resistant classed building-ups.

Performance:

The upper part of the stud expander-shell bolt is externally threaded and provided with a nut and a washer of steel. On the lower part of the expander there is, depending on dimension and length, one or two clips that expand over a tapered part of the bolt.

The stud expander-shell bolt has a special stopping point to avoid damages on the threads at assembly.

Assembly instruction:

TB-EXPANDER

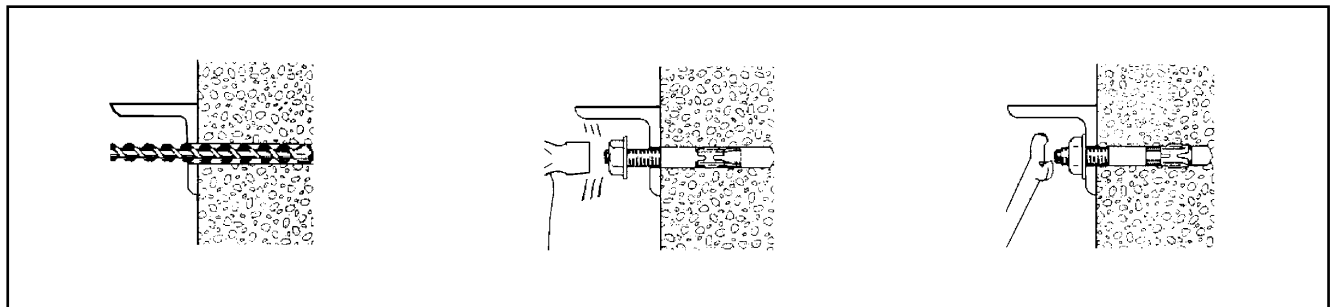


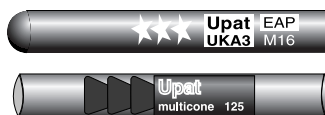
Table 161 Practical loading capability in kN

Dimension	Assembly depth	Withdrawing force		Shearing force	
		Concrete quality		Concrete quality	
		K25	K40	K25	K40
M6	40	2,3	3,0	1,6	2,2
	50	3,2	4,0	2,2	2,8
M8	40	2,0	2,9	2,0	2,5
	55	3,3	4,7	3,8	4,4
M10	40	2,2	3,1	1,6	2,2
	60	4,0	5,6	5,7	6,5
M12	50	3,1	4,4	2,2	3,0
	75	6,5	9,3	9,6	10,5
M16	100	9,4	13,4	12,3	13,7
M20	120	12,3	17,4	15,9	19,3

Chemical anchor

General information:

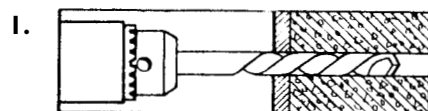
The chemical anchor consists of a chemical anchor cartridge with binding medium and a stud screw with a nut and a washer.



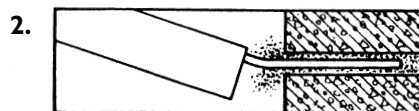
Field of application:

The chemical anchor is meant for fastenings in, for example concrete, brick, natural stone and light concrete.

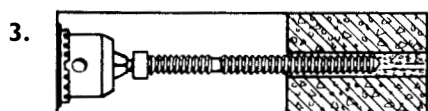
Assembly instruction:



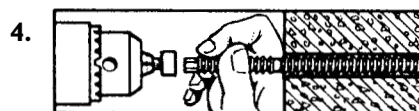
Drill a hole in the material.



Scrape the hole clean with the stud screw and clean with compressed air.



Remove the chemical anchor cartridge from the package and check that the chemical substance is floating. Then put the cartridge into the hole. With the drilling machine the bolt is driven into the hole and mixes the component to a permanent fastening. The stud screw is rotated to the proper depth. N.B.! Do not rotate against the bottom of the hole as this could mix drill cuttings with the chemical substance and deteriorate adherence. Check that the substance has filled the hole completely.



The machine is removed from the stud screw by first holding the bolt with your hand and then loosen the machine from the stud screw. N.B.! The chemical anchor then has to harden for the requisite time.

Table 162

Practical carrying capacity for stud screw in steel 5.8 and stainless/acid-proof SS 2347

Stud screw	Installation depth mm	Withdrawing load			Shear load		
		Withdrawing force kN	Distance to edge, mm		Shearing force kN		Distance to edge mm
			K25	K40	K25	K40	
M8	80	4,6	85	55	3,2	3,4	80
M10	90	6,2	110	70	5,0	5,4	100
M12	110	8,8	135	85	7,0	7,9	120
M16	125	12,8	180	115	12,4	14,6	160
M20	170	22,8	225	140	18,5	22,8	200
M24	210	33,6	270	170	26,5	32,9	240
M30	280	56,0	330	205	41,5	52,3	300

The relative distance between two chemical anchors has to be at least 1,8 times the table's border distance.

When only permanent loads, the values above should be multiplied with factor 0,8.

Table 163 Duration of hardening

Temp °C	Time
- 5	5 hours
± 0	60 hours
+10	30 hours
+20	20 hours

The duration of hardening is doubled when bedding is damp.

Screw plug TP

General information:

The plug is colour marked to make it easier to find the right dimension.



Field of application:

The TP plug is a screw plug meant for fastening in concrete, brick and light concrete.

Material:

Polyethylene.

Range of temperature: -50°C to +80°C.

Table 157 Technical data

Product denomination	Colour	Plug length mm	Drill Ø Concrete/light concrete mm	Min drilling depth mm	Wood screw no/Ø mm	Practical load capacity with largest screw*) Shear load/pull load		
						Concrete K25 kN	Solid brick kN	Light concrete 500 and haydite kN
TP 0	White	17	5,5/-	20	6-10/3,5-5	0,4/0,15	0,3/0,15	-
TP 1	Yellow	22	5,5/5	25	6-10/3,5-5	0,5/0,25	0,4/0,2	0,1/0,05
TP 2	Red	35	5,5/5	40	6-10/3,5-5	0,6/0,4	0,5/0,3	0,15/0,05
TP 2B	Brown	40	8/7	45	10-14/5-6	1,2/0,8	0,7/0,4**)	0,25/0,1
TP 3	Blue	46	10/9	50	10-16/5-7	1,4/1,0	-	0,3/0,15
TP 4	Green	59	12/10	65	- /8-10	3,0/2,0	-	0,5/0,25
TP 14	Grey	70	14/-	78	- /10-12	4,0/2,5	-	-
TP 16	Orange	80	16/-	88	- /12	5,0/3,0	-	-
TP 20	Black	100	20/-	108	- /16	6,0/4,5	-	-

*) A weaker screw gives lower values.

**) Screw no. 12.

If long-time load with pulling load or if temperatures are above normal, choose a larger number of, or, fasteners made of metal.

Nylon plug

General information:

The nylon plug is suitable for cut-off assemblage because it has no collar.

Outward flanges prevent rotation in porous materials.



Field of application:

The nylon plug is meant for fastening in concrete, natural stone, brick, light concrete and leca.

Material:

Polyamide.

Range of temperature: -40°C to +85°C.

Table 158 Technical data

Dimension d	Drilling diameter	Screw diameter mm	Breaking value kN Brick	Concrete
5 x 25	5	2,5-4,0	2,0	2,2
6 x 30	6	3,5-5,0	3,2	3,6
8 x 40	8	4,5-6,0	5,0	5,5
8 x 65 (long)	8	4,5-6,0	5,0	5,5
10 x 50	10	6,0-8,0	7,0	10
10 x 80 (long)	10	6,0-8,0	7,0	10
12 x 60	12	8,0-10,0	8,5	14

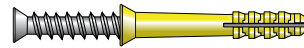
The screw has to be screwed 0,8-1,0 times the length of the plug. The value presented in the table above is actual

rupture limits. To compute an allowed load we suggest a safety factor of 3-6 times the values in the table.

Nail plug

General information:

The plug is delivered as a complete assembly kit where the nail is fastened in the plug. The nail plug is driven in with a hammer and is possible to screw off when disassembling.



Field of application:

The nail plug is used for assembly of bases, mouldings, kitchen cabinet making etc. The plug is used in concrete, brick and natural stone.

Material:

Plug: Polyamide.

Nail: Steel, zincplated or laquered.

Range of temperature: -40°C up to +80°C.

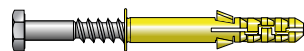
Table 159 Practical carrying capacity

Dimension mm	Installation depth mm	Concrete/Brick Pull load kN	Shear load kN
5	20	0,20	0,28
6	30	0,26	0,40
8	40	0,40	0,64
10	45	0,50	0,78

Facade plug

General information:

The facade plug consists of a screw and a nylon plug. Outward placed clips prevent the plug from rotating in holes or porous material.



Field of application:

The facade plug is available in two performances, the first for assembly in concrete, brick and calcareous sandstone. The second is suitable for assembly in light concrete, light clinker (leca) and hollow block.

Material:

Plug: Polyamide.

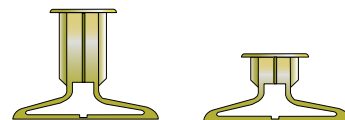
Screw: Steel, zincplated, hot dip galvanized or stainless/acid-proof.

Range of temperature: -40°C up to +85°C.

Drywall plug

General information:

The plug has a plane head and collar with lock levers. It is available in various dimensions with grip area 3 mm - 27 mm.



Field of application:

The drywall plug is meant for assembly in gypsum and particle boards.

Material:

Plug: Polyamide.

Range of temperature: -30°C to +120°C.

Withdrawing values

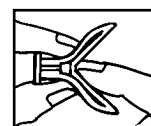
Values below are measured in laboratory tests. Usable values are gained by dividing the actual value by four; i.e. the usable value is 25% of the table value. When testing screw 10 has been used.

Table 160

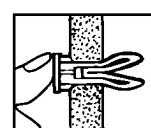
Material	Gross loads kN	
	Shearing force	Pulling force
Gypsum 13 mm	0,37 (10 kg)	0,16 (4,5 kg)
Gypsum 26 mm (2x13)	0,65 (17,5 kg)	0,26 (7 kg)
Particle board 12 mm	0,66 (17,5 kg)	0,26 (7 kg)

Safety factor 2,5 for shearing force, 3,0 for pulling force.

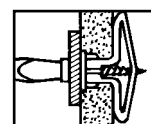
Assembly instruction



1. Drill hole Ø 8 mm. Press the drywall plug together.



2. Press the plug in.



3. Tighten the screw until it touches the surface. Then turn the screw another 360°, not more.

Trademarks of socket head cap screws

In the world there are three manufacturers that have distinguished themselves by focusing on a niche within socket head cap screws. Here we try to present those

differences that make them better than the rest of the manufacturers of socket head cap screws. First follows a brief description of the three.

FONTANA - Consistent and reliable

Italian manufacturer that may be the world's largest manufacturer of standard screws. As the automotive industry is the largest group of customers, the manufacturing is designed with a unique process control. Especially when it comes to control of the materials for the products, where they foremostly in 2001 differed from other manufacturers. This guarantees minimum variation. Producing a strict standard (both 8.8 and 12.9), they have a somewhat narrower assortment than similar suppliers that have focused on socket head cap screws.

HOLO•KROME® - Smart and gripping

An American specialist with the business idea of manufacturing high-tensile (12.9) standard socket head cap screws. This results in that they in their factory manufacture a very wide assortment of socket head cap screws. HOLO•KROME® has focused on joints that demand a maximum reliable screw. They were first in the industry and still have an outstanding handling when it comes to individual marking of screws. They have better and smoother (perhaps the best on the market) surface finish that is far beyond what the standards require. This results in a more constant friction at assembly. Choice of material, measure tolerances and angles are chosen to achieve maximum clamping force.

UNBRAKO® - Pretty and strong























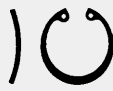










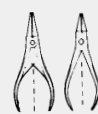
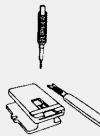
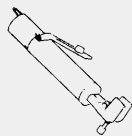
A known trademark in Sweden, where socket head cap screws were called Unbrako® when the standard for socket head cap screws in class 12.9 was introduced in Sweden. Nowadays the manufacturing is carried out in Ireland. Unbrako® works within the segment of high-tensile 12.9 screws. They have a very fine surface finish and tapered socket head grips for better socket head feeling. They have decided to position themselves within the higher tolerance limit within the tolerance area for hardness. They call it H130. Unbrako® products are also available marked with a production batch.

Table 133 Grades

Table of comparison with grades 1-10. It is judged in comparison with the well-known leading manufacturers on the market.

	FONTANA	HOLO•KROME®/HOLO•KROME ⁺		UNBRAKO®
Assortment 8.8	3	0	0	0
Assortment 12.9	2	8	1	6
Assortment Special	5	1	1	4
Choice of material	7	8	9	9
Method of production	6	8	9	6
Variation in material	7	7	8	7
Clamping force	5	8	10	5
Fatigue	6	8	10	7
Variation in hardness	6	6	6	6
Automatic assembling	6	8	8	2
Aesthetic	5	7	10	6
Surface finish	5	8	10	9
Traceability markings	5	10	10	9

Overview retaining rings

Seeger ring DIN 471/472 For shafts		Seeger ring in inches For shafts		Seeger V-ring For shafts		Seeger K-ring For shafts	
For bores		For bores		For bores		For bores	
A 3 - A 1000	J 8 - J 1000	AZ ⁵ / ₃₂ - AZ ⁷ / ₁₆	JZ ⁷ / ₁₆ - JZ ⁷ / ₁₆	AV 10 - AV 100	JV 10 - JV 100	AK 16 - AK 140	JK 16 - JK 170
							
Seeger ring DIN 471/472 Strong		G-ring		Triangular ring		Toothed rings	
AS 12 - AS 200	JS 20 - JS 200	G 1,5 - G 30	D 1,5 - D 15	KS 1,5 KS 10	ZA 1,5 - ZA 45	ZJ 8,0 - ZJ 50	
							
ST		DIN 6799		H Circlips		Locking ring	
Circlips							
ST 3 - ST 10		RA 1,2 - RA 24,0		H 3 - H 55		S 10 - S 100	
							
Seeger L-ring		Seeger W-ring		Retaining ring		Tapered rings	
For shafts		For shafts		For shafts		For bores	
For bores		For bores		For bores		For bores	
AL 16 - AL 100	JL 16 - JL 100	AW 40 - AW 150	JW 40 - JW 150	SL 3 - SL 15	JB 40 - JB 140		
							
DIN 5417		Seeger circlips		Circlips DIN 7993		Circlips	
For shafts		For shafts		For shafts		DIN 73123/130	
For bores		For bores		For bores		For bores	
SP 30 - SP 400	SW 4 - SW 460	SB 7 - SB 440	RW 4 - RW 125	RB 7 - RB 125	SKA/SKC 10 - 35		
							
Shim washer DIN 988		Shim washer DIN 988		Retaining rings pliers DIN 5254/5256		Assembly tool	
For shafts		For shafts		For shafts		For shafts	
SS 3 - SS 170		PS 3 - PS 170		ZGA/ZGJ		Seeger Krab®	
							
							

Source: Seeger catalogue.