SCHRIEVER®

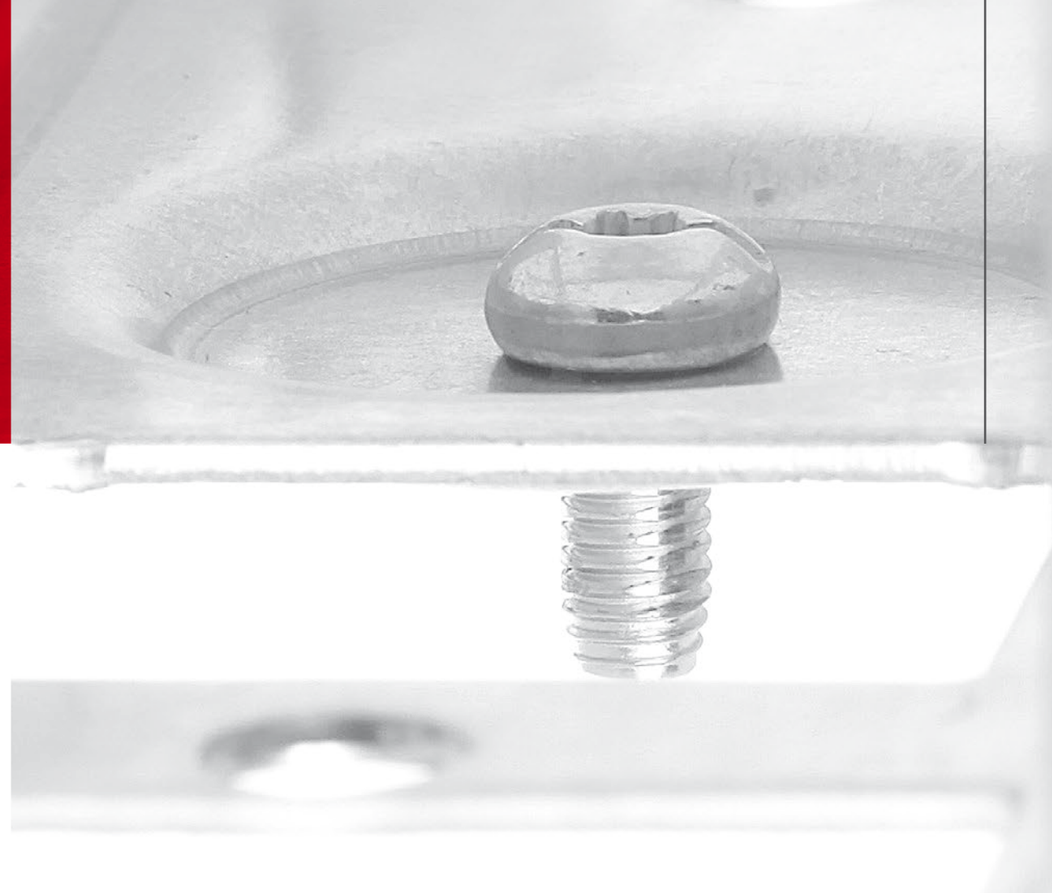
verbindet.

SGF®

The metric thread forming connection

SCHRIEVER SGF®

Our challenge: An economical solution
Application: Direct connections in cylindrical bores and casted bores.



SGF®

Schriever SGF®-screws are metric thread-forming, heat-treated screws. These screws are designed for applications without a female thread by forming a metric female thread in which a metric screw can be used where appropriate. In many cases the total cost of mechanical connections can be reduced significantly.

Value added

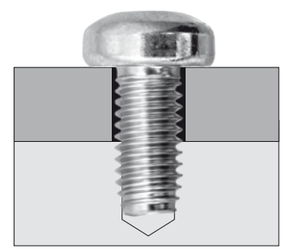
Advantages for the user:

1. High degree of economic efficiency by thread forming and inserting the screw in a single operation
2. No contamination of the assembly
3. Savings in additional nuts, washers etc.
4. Less disposition expenses for required parts
5. Low installation costs
6. No disturbance of grain flow in the component, therefore material solidification
7. Increased loose resist by using screw connections without ‘play‘

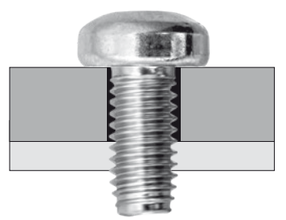
The thread forming properties are restricted when:

1. The difference in strength in the material of screw and component is too low.
2. The material grade is not suitable i. e. brittle metals (minimum elongation should be approx. 5 %).
3. Very high pre-stressing forces are required.

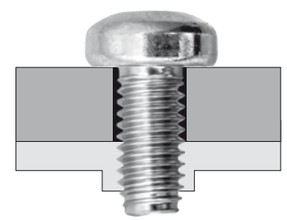
Various applications of direct connections



Blind hole in solid material



Example through hole



Example rim hole

Various design models of the Schriever SGF®-screw

Grooving tip, lobulation, lead-in threaded stud

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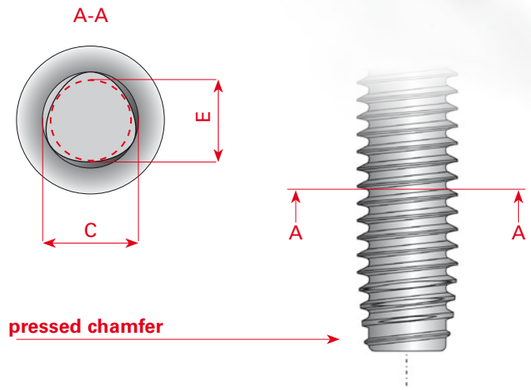
Schriever SGF®-FA

The Schriever SGF®-FA is characterized by a large lobulation of the cross-section (un-roundness, difference in the dimensions C and E). As a result, the installation torques are very low.

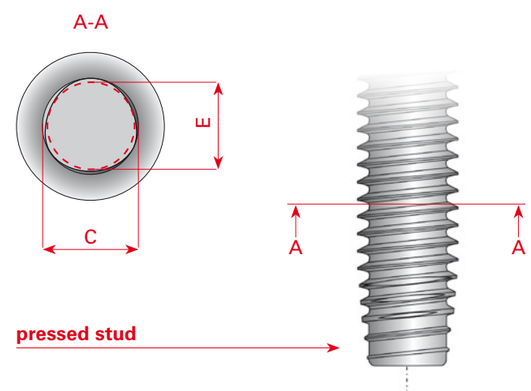
The ‘grip‘ of the screw takes place with a low axial pressing force at the start. The thread forming process already starts at the first turning of the screw. The length of the grooving tip is approx. 2.5 x p. The special thread geometry enables a constant low installation torque across the whole screw-in depth.



Schriever SGF®-ZA

Compared to the Schriever SGF®-FA the ZA screw has a thread forming tip with a lead-in stud. This lead-in stud aids to better locate and center of the bore.

The lobulation (un-roundness, difference in the dimensions C and E) is lower than the one of the Schriever SGF®-FA. Consequently, a low installation torque is combined with a high axial load carrying capacity of the connection. The length of the grooving tip is here 3-4 x p.



The grooving tip of the Schriever SGF®

The 2 types of the SCHRIEVER SGF®-screws have differently designed grooving tips. All grooving tips feature fully formed thread flanks for a quick ‘grip‘ during assembly.
Guidelines for the geometry of drilled or stamped and casted bores are listed.

Material

Schriever SGF®-screws are case hardened be default according to WN 7500. We also supply steel grade 10.9 or 8.8 hardened and tempered as well as stainless steel (A2 [1.4567]) on request.

Screws are lubrication coated by default.

Ordering example
SGF® of nominal diameter = 3.0 mm
Length = 12 mm · full thread - head = KN 8039
Hexalobular drive size 10 and grooving tip = chamfer
KN 8039 SGF AM 3x12 -T10 - FA

DIN 7500 / WN 7500

Both SCHRIEVER SGF®-screw types are designed based on our WN 7500 which meets the requirements of DIN 7500. This applies particularly to the compliance with the guidelines on torques and forces.

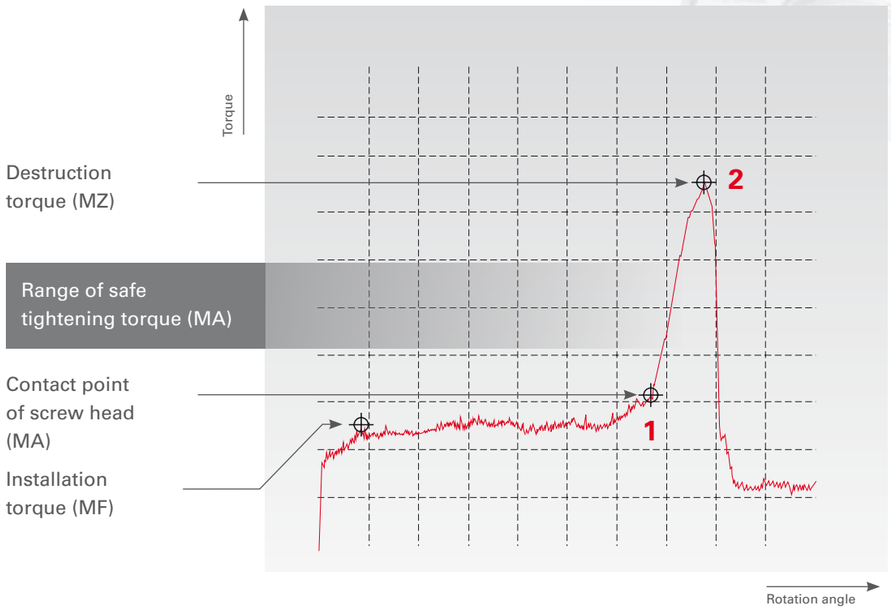
SGF®

Production range

The forming of the counter thread is created through the trilobular cross-section. To reduce the installation torque all SGF®-screws are coated with lubricants.

SGF®-screws can be manufactured fully or partially threaded. In both versions, the specialgeometry at the thread tip (chamfer or stud) aids the placement of the screw.

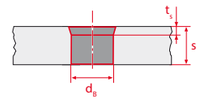
The torque path in the screw-in process



Design recommendation

Technical data for cylindrical bores of Schriever SGF®-screws

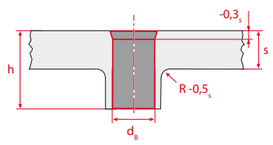
Typ	M 2	M 2,5	M 3	M 3,5	M 4	M 5	M 6
Screw-in depth material thickness s (mm)	Bore diameter d_B (mm)						
S 0,05 – 1,0	1,8	2,25	2,7				
S 1,0 – 1,6	1,8	2,25	2,7	3,2	3,65	4,5	5,4
S 1,6 – 2,5	1,85	2,25	2,75	3,2	3,65	4,55	5,5
S 2,5 – 4,0	1,85	2,3	2,75	3,2	3,7	4,65	5,5
S 4,0 – 6,3		2,3	2,75	3,25	3,7	4,65	5,55



Installation torques are dependent among others on the bore diameter. Smaller diameters usually increase the loose resist but also have a higher installation torque. The bore diameter can be reduced by approx. 0.05 mm if materials with lower tensile strength and good deformation properties (i.e. Al-alloys) are used. Tolerances have to be chosen according to DIN ISO 286.

Technical data for rim holes of Schriever SGF®-screws

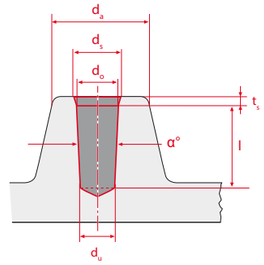
Typ	M 2	M 2,5	M 3	M 3,5	M 4	M 5	M 6
Sheet thickness s (mm)							
0,5	1,73 - 1,76	2,21 - 2,24	2,68 - 2,71				
0,8	1,75 - 1,78	2,23 - 2,26	2,71 - 2,74	3,15 - 3,18			
1	1,77 - 1,8	2,25 - 2,28	2,74 - 2,77	3,18 - 3,21	3,57 - 3,62	4,45 - 4,51	
1,5		2,27 - 2,30	2,77 - 2,80	3,21 - 3,24	3,62 - 3,65	4,51 - 4,57	5,38 - 5,45
2					3,65 - 3,69	4,57 - 4,63	5,41 - 5,48
3						4,63 - 4,69	5,44 - 5,51



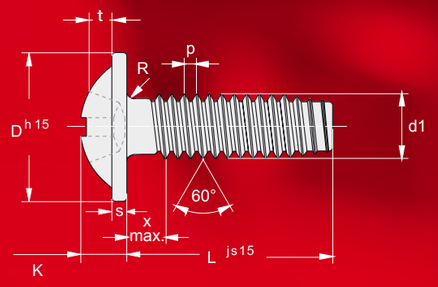
The design of the bores in rim holes is modeled on the DIN 7952 and is according to the schematic diagram.

Technical data for cast bore of Schriever SGF®-screws

Typ	M 2,5	M 3	M 3,5	M 4	M 5	M 6
Dimensions in mm						
d0	2,25	2,73	3,25	3,73	4,72	5,66
du	2,15	2,60	3,15	3,55	4,5	5,4
da	4	5	5,5	6,5	8,5	10
ts	0,45	0,5	0,6	0,7	0,8	1
ds	2,7	3,2	3,7	4,2	5,2	6,3
l 1) ∝ high strength = 1,5°				6,7	8,3	9,8
l 2) ∝ medium strength = 1,1°	5,3	6,3	7,3	8,2	10,3	12,4
l 3) ∝ low strength = 0,8°				12,4	15,4	18,5

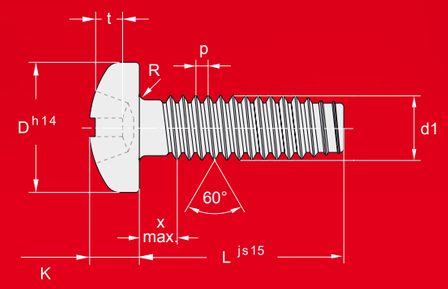


Example: for l 1 cast steel; for l 2 grey cast iron, aluminum, zinc; for l 3 magnesium, aluminum



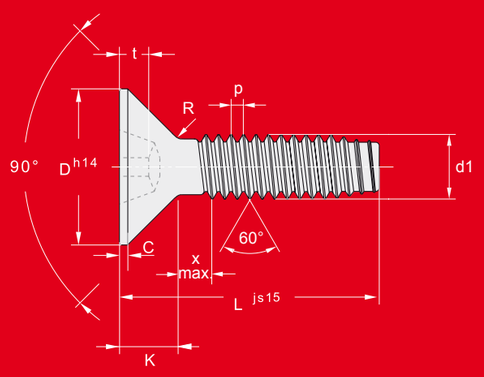
KN 8031 / KN 8131

Type		KN 8031	KN 8131	KN 8031	KN 8131	KN 8031	KN 8131	KN 8031	KN 8131	KN 8031	KN 8131	KN 8031	KN 8131	KN 8031	KN 8131
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	on request		on request		7,5	7,5	9	9	10	10	11,5	11,5	14,5	14,5
Head height + flange	**K**					2,35	2,35	2,6	2,6	3,05	3,05	3,55	3,55	4,55	4,55
Flange thickness	**s**					0,8	0,8	0,9	0,9	1,1	1,1	1,35	1,35	1,8	1,8
Radius	**R**					0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,25	0,25
H-cross recess	**t min.**					1,35	1,35	1,4	1,4	1,8	1,8	2,26	2,26	3	3
Penetration depth	**t max.**					1,8	1,8	2,03	2,03	2,46	2,46	2,87	2,87	3,66	3,66
Z-cross recess	**t min.**					1,58	1,58	1,47	1,47	1,88	1,88	2,28	2,28	3,02	3,02
Penetration depth	**t max.**					1,83	1,83	1,93	1,93	2,34	2,34	2,74	2,74	3,48	3,48
Cross-size H/Z						1	1	2	2	2	2	2	2	3	3



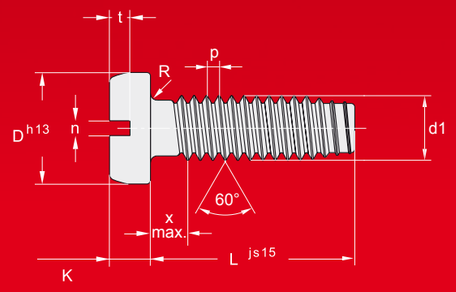
KN 8032 / KN 8132

Type		KN 8032	KN 8132	KN 8032	KN 8132	KN 8032	KN 8132	KN 8032	KN 8132	KN 8032	KN 8132	KN 8032	KN 8132	KN 8032	KN 8132
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	4	4	5	5	6	5,6	7	7	8	8	10	9,5	12	12
Head height	**K**	1,6	1,6	2	2,1	2,4	2,4	2,7	2,6	3,1	3,1	3,8	3,7	4,6	4,6
Tolerance head height		+/-0,12	-0,14	+/-0,12	-0,14	+/-0,12	-0,14	+/-0,12	-0,14	+/-0,15	-0,18	+/-0,15	-0,18	+/-0,15	-0,3
Radius	**R**	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,2	0,2	0,25	0,25
H-cross recess	**t min.**	1,1	0,9	1,3	1,15	1,7	1,4	1,74	1,4	2,04	1,9	2,77	2,4	3,03	3,1
Penetration depth	**t max.**	1,4	1,2	1,6	1,55	2	1,8	2,24	1,9	2,54	2,4	3,27	2,9	3,53	3,6
Z-cross recess	**t min.**	1,1	1,17	1,27	1,25	1,68	1,5	1,65	1,48	1,9	1,89	2,64	2,29	3,02	3,03
Penetration depth	**t max.**	1,35	1,42	1,52	1,5	1,93	1,75	2,11	1,93	2,36	2,34	3,1	2,74	3,48	3,46
Cross-size H/Z		1	0	1	1	1	1	2	2	2	2	2	2	3	3



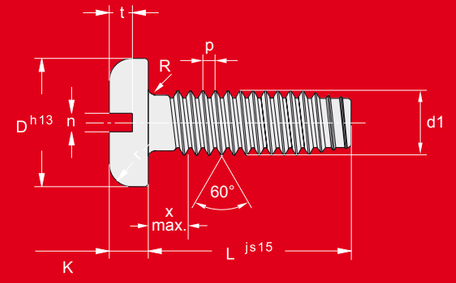
KN 8033 / KN 8133

Type		KN 8033	KN 8133	KN 8033	KN 8133	KN 8033	KN 8133	KN 8033	KN 8133	KN 8033	KN 8133	KN 8033	KN 8133	KN 8033	KN 8133
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	3,8	3,8	4,7	4,7	5,6	5,5	6,5	7,3	7,5	8,4	9,2	9,3	11	11,3
Head height	**K max**	1,2	1,2	1,5	1,5	1,65	1,65	1,93	2,35	2,2	2,7	2,5	2,7	3	3,3
Radius	**R**	0,5	0,5	0,7	0,6	0,8	0,8	0,95	0,9	1	1	1,3	1,3	1,6	1,5
H-cross recess	**t min.**	0,95	0,9	1,25	1,4	1,5	1,7	1,4	1,9	1,9	2,1	2,1	2,7	2,8	3
Penetration depth	**t max.**	1,25	1,2	1,55	1,8	1,8	2,1	1,9	2,4	2,4	2,6	2,6	3,2	3,3	3,5
Z-cross recess	**t min.**	0,92	0,95	1,22	1,48	1,48	1,76	1,34	1,75	1,6	2,06	2,05	2,6	2,46	3
Penetration depth	**t max.**	1,17	1,2	1,47	1,73	1,73	2,01	1,8	2,2	2,06	2,51	2,51	3,05	2,92	3,45
Cross-size H/Z		1	0	1	1	1	1	2	2	2	2	2	2	3	3



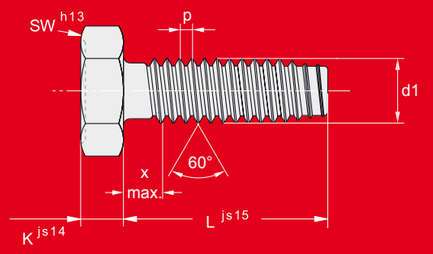
KN 8034 / KN 8134

Type		KN 8034	KN 8134	KN 8034	KN 8134	KN 8034	KN 8134	KN 8034	KN 8134	KN 8034	KN 8134	KN 8034	KN 8134	KN 8034	KN 8134
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	3,8	3,8	4,5	4,5	5,5	5,5	6	6	7	7	8,5	8,5	10	10
Head height	**K**	1,3	1,4	1,6	1,8	2	2	2,4	2,4	2,6	2,6	3,3	3,3	3,9	3,9
Tolerance head height		-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,18	-0,18	-0,3	-0,3
Radius	**R**	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,25	0,25
Slot width	**n min.**	0,56	0,56	0,66	0,66	0,86	0,86	1,06	1,06	1,26	1,26	1,26	1,26	1,66	1,66
	n max.	0,7	0,7	0,8	0,8	1	1	1,2	1,2	1,51	1,51	1,51	1,51	1,91	1,91
Slot depth	**t min.**	0,6	0,6	0,7	0,7	0,85	0,85	1	1	1,1	1,1	1,3	1,3	1,6	1,6



KN 8035 / KN 8135

Type		KN 8035	KN 8135	KN 8035	KN 8135	KN 8035	KN 8135	KN 8035	KN 8135	KN 8035	KN 8135	KN 8035	KN 8135	KN 8035	KN 8135
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	on request	4	on request	5	6	5,6	7	7	8	8	10	9,5	12	12
Head height	**K**		1,3		1,5	1,8	1,8	2,1	2,1	2,4	2,4	3	3	3,6	3,6
Tolerance head height			-0,14		-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,14	-0,3	-0,3
Radius	**R**		0,1		0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,25	0,25
Slot width	**n min.**		0,56		0,66	0,86	0,86	1,06	1,06	1,26	1,26	1,26	1,26	1,66	1,66
	n max.		0,7		0,8	1	1	1,2	1,2	1,51	1,51	1,51	1,51	1,91	1,91
Slot depth	**t min.**		0,5		0,6	0,7	0,7	0,8	0,8	1	1	1,2	1,2	1,4	1,4



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KN 8036 / KN 8136

Type		KN 8036	KN 8136	KN 8036	KN 8136	KN 8036	KN 8136	KN 8036	KN 8136	KN 8036	KN 8136	KN 8036	KN 8136	KN 8036	KN 8136
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Width across flats (AF size)	**SW**	4	4	5	5	5,5	5,5	6	6	7	7	8	8	10	10
Head height	**K**	1,4	1,4	1,7	1,7	2	2	2,4	2,4	2,8	2,8	3,5	3,5	4	4

* gepresster 6-kt

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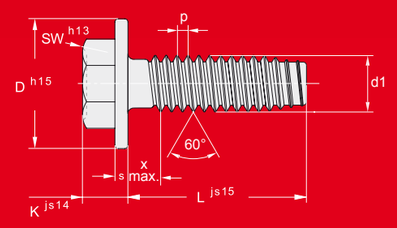
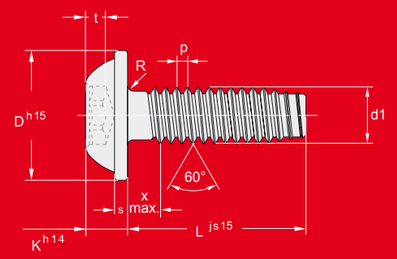


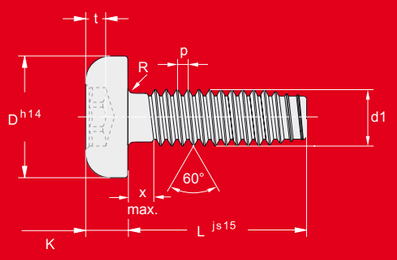
KN 8037 / KN 8137

Type		KN 8037	KN 8137	KN 8037	KN 8137	KN 8037	KN 8137	KN 8037	KN 8137	KN 8037	KN 8137	KN 8037	KN 8137	KN 8037	KN 8137
Dimensions		SGF AM2		SGF AM2.5		SGF AM3		SGF AM3.5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	on request		on request		on request			8,3		8,8	11	11	13,5	13,5
Width across flats (AF size)	**SW**								5,5		7	8	8	10	10
Head height	**K max.**								3,4		4,1	5,4	5,4	6,6	6,6
Flange thickness	**s**								0,6		0,8	1	1	1,1	1,1



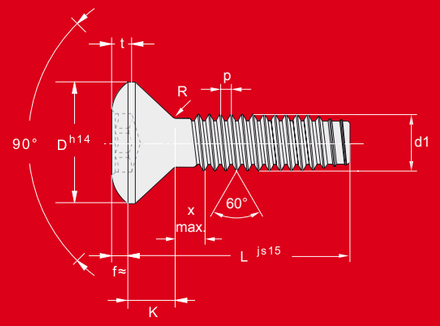
KN 8038 / KN 8138

Type		KN 8038	KN 8138	KN 8038	KN 8138	KN 8038	KN 8138	KN 8038	KN 8138	KN 8038	KN 8138	KN 8038	KN 8138	KN 8038	KN 8138
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**		5		6	7,5	7,5	9	9	10	10	11,5	11,5	14,5	14,5
Head height + Scheibe	**K**		1,4		1,9	2,35	2,35	2,5	2,5	3,05	3,05	3,5	3,5	4,55	4,55
Flange thickness	**s**		0,5		0,7	0,8	0,8	0,9	0,9	1,1	1,1	1,35	1,35	1,8	1,8
Radius	**R**		0,1		0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,25	0,25
Hexalobular drive			T 6		T 8	T 10	T 10	T 15	T 15	T 20	T 20	T 25	T 25	T 30	T 30
Penetration depth	**t min.**		0,65		0,75	1,00	1,00	1,10	1,10	1,30	1,30	1,50	1,50	1,90	1,90
	t max.		0,85		0,90	1,30	1,30	1,40	1,40	1,65	1,65	1,85	1,85	2,30	2,30



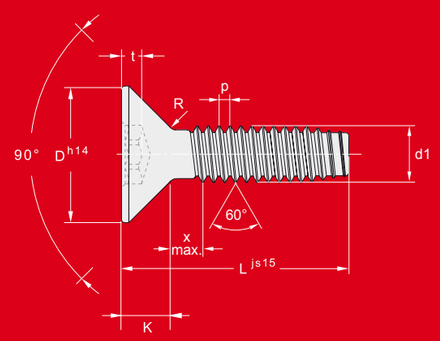
KN 8039 / KN 8139

Type		KN 8039	KN 8139	KN 8039	KN 8139	KN 8039	KN 8139	KN 8039	KN 8139	KN 8039	KN 8139	KN 8039	KN 8139	KN 8039	KN 8139
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	4	4	5	5	6	5,6	7	7	8	8	10	9,5	12	12
Head height	**K**	1,6	1,6	2	2,1	2,4	2,4	2,7	2,6	3,1	3,1	3,8	3,7	4,6	4,6
Tolerance head height		+/-0,12	-0,14	+/-0,12	-0,14	+/-0,12	-0,14	+/-0,12	-0,14	+/-0,15	-0,18	+/-0,15	-0,18	+/-0,15	-0,3
Radius	**R**	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,2	0,2	0,25	0,25
Hexalobular drive		T 6	T 6	T 8	T 8	T 10	T 10	T 15	T 15	T 20	T 20	T 25	T 25	T 30	T 30
Penetration depth	**t min.**	0,63	0,63	0,91	0,91	1,01	1,01	1,07	1,07	1,27	1,27	1,52	1,52	2,02	2,02
	t max.	0,77	0,77	1,04	1,04	1,27	1,27	1,33	1,33	1,66	1,66	1,91	1,91	2,42	2,42



KN 8040 / KN 8140

Typ		KN 8040	KN 8140	KN 8040	KN 8140	KN 8040	KN 8140	KN 8040	KN 8140	KN 8040	KN 8140	KN 8040	KN 8140	KN 8040	KN 8140
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	3,8	3,8	4,7	4,7	5,6	5,5	6,5	7,3	7,5	8,4	9,2	9,3	11	11,3
Head height	**K max.**	1,2	1,2	1,5	1,5	1,65	1,65	1,93	2,35	2,2	2,7	2,5	2,7	3	3,3
	f≈	0,5	0,5	0,6	0,6	0,75	0,7	0,9	0,8	1,1	1	1,25	1,2	1,5	1,4
Radius	**R**	0,5	0,5	0,7	0,6	0,8	0,8	0,95	0,9	1,1	1	1,35	1,3	1,6	1,5
Hexalobular drive		T 6	T 6	T 8	T 8	T 10	T 10	T 15	T 15	T 20	T 20	T 25	T 25	T 30	T 30
Penetration depth	**t min.**	0,63	0,63	0,91	0,91	0,88	0,88	1,27	1,27	1,42	1,42	1,65	1,65	2,02	2,02
	t max.	0,77	0,77	1,04	1,04	1,15	1,15	1,53	1,53	1,8	1,8	2,03	2,03	2,42	2,42



KN 8041 / KN 8141

Typ		KN 8041	KN 8141	KN 8041	KN 8141	KN 8041	KN 8141	KN 8041	KN 8141	KN 8041	KN 8141	KN 8041	KN 8141	KN 8041	KN 8141
Dimensions		SGF AM2		SGF AM2,5		SGF AM3		SGF AM3,5		SGF AM4		SGF AM5		SGF AM6	
Thread outside-Ø	**d1**	2	2	2,5	2,5	3	3	3,5	3,5	4	4	5	5	6	6
Head-Ø	**D**	3,8	3,8	4,7	4,7	5,6	5,5	6,5	7,3	7,5	8,4	9,2	9,3	11	11,3
Head height	**K max.**	1,2	1,2	1,5	1,5	1,65	1,65	1,93	2,35	2,2	2,7	2,5	2,7	3	3,3
Radius	**R**	0,5	0,5	0,7	0,6	0,8	0,8	0,95	0,9	1	1	1,3	1,3	1,6	1,5
Hexalobular drive		T 6	T 6	T 8	T 8	T 10	T 10	T 15	T 15	T 20	T 20	T 25	T 25	T 30	T 30
Penetration depth	**t min.**	0,51	0,51	0,66	0,66	0,7	0,7	1,16	1,16	1,14	1,14	1,12	1,12	1,39	1,39
	t max.	0,64	0,64	0,79	0,79	0,83	0,83	1,32	1,32	1,53	1,53	1,51	1,51	1,78	1,78

Tolerances

Nominal size (mm)		h 13	h 14	h 15	js 14	js 15
over	to					
0	3	0 /– 0,14	0 /– 0,25	0 /– 0,40	±0,125	±0,20
3	6	0 /– 0,18	0 /– 0,30	0 /– 0,48	±0,15	±0,24
6	10	0 /– 0,22	0 /– 0,36	0 /– 0,58	±0,18	±0,29
10	18	0 /– 0,27	0 /– 0,43	0 /– 0,70	±0,215	±0,35
18	30	0 /– 0,33	0 /– 0,52	0 /– 0,84	±0,26	±0,42
30	50	0 /– 0,39	0 /– 0,62	0 /– 1,00	±0,31	±0,50
50	80	0 /– 0,46	0 /– 0,74	0 /– 1,20	±0,37	±0,60

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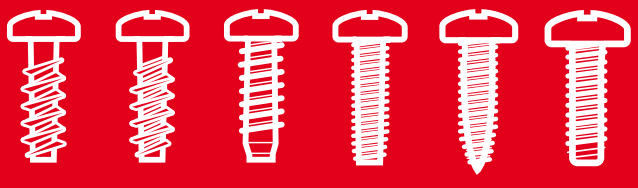

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