



verbindet.



# STS<sup>®</sup> plus

The optimized connection for thermoplastics

# SCHRIEVER STS® PLUS

**Our challenge:** Due to specific material properties, connections of thermoplastic synthetics frequently cause serious problems in the areas of construction, assembly and in terms of load capacities. Due to the extended expertise in the manufacturing of screws that we acquired over decades, Schriever has now expanded their product range with the new Schriever STS® plus-screw.

**Our solution:** The new Schriever STS® plus-screw.



**Forces at the thread flank**

**STS plus®-screw**

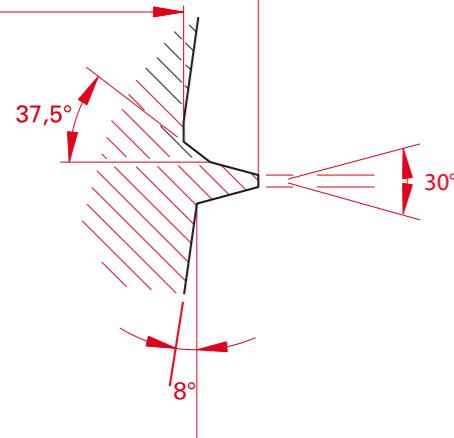
F Rad. 2 = 0,259 R  
F Axi. 2 = 0,966 R

**Comparison self-tapping screw**

F Rad. 1 = 0,500 R  
F Axi. 1 = 0,867 R

d1

d2



**Increased thread**

This screw is the optimized connection for thermoplastics. It is the further development of the proven Schriever STS®-screw. Compared to customary screws for thermoplastics, it combines the accustomed quality with a huge saving potential for the user.

The optimum 30°-flank angle reduces the radial extension compared to conventional flanks of screw threads (e.g. self-tapping screws) with a 60°-flank angle. The high axial force enables the displaced plastic to disperse.

**Advantages for our customers**

In addition to the known properties of the STS®-screw, the Schriever STS® plus-geometry provides further deciding advantages such as:

1. A substantially increased operating life of the screw connection in a static or dynamic loading case.
2. Optimized connection and self-locking behaviour in the thermoplastic material through improved thread geometry.
3. Increased pre-stressing force through larger flank overlapping on the bearing side.
4. The possibility to employ shorter screws and/ or smaller diameters for the same applied load, which results in a considerable saving potential for the customer.
5. Higher torsion resistance and tensile strength.

**Our service**

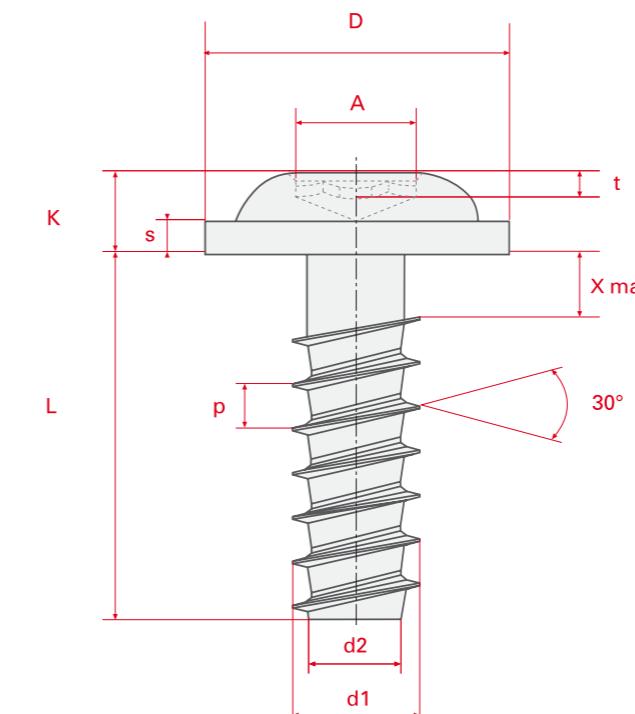
Our experts are predominantly interested in the optimal usage of the Schriever STS® plus screw in your specific application. Your joining applications will be technically analysed in our laboratory and design recommendations provided.

**Flank coverage**

A high flank overlapping at low screw-in-depth is achieved by the optimized pitch, which also results in a high pre-stressing force at low surface pressure.

**Cost-benefit ratio**

The screw-in-depth can be significantly smaller and therefore the connections more cost-effective.



**Screw in size**

**Reduction of size and/ or diameter**

Due to the Schriever STS® plus a smaller or shorter screw can be used at constant flank coverage.

**Example:** With the same screwing-in-depth a Schriever STS®T50 can be replaced with a Schriever STS® plus T40.

Equally can the screwing-in-depth be reduced with the thread diameter unchanged using the Schriever STS® plus.

**Minimized loss of pre-stressing force**

Thermoplastic materials tend to flow when a force is applied and thus lead to stress relief. This characteristic is called relaxation. Due to the low seating stress of the Schriever STS® plus thread, the loss of pre-stressing force is minimized and an excellent long-term behaviour of the screw connection is achieved.

The ideal thread geometry reduces the material damage by deformation through heating caused by excessive friction.

**Mechanical strength, dynamic load capacity**

The expanded core cross section increases the torsion resistance of the Schriever STS® plus-screw. This also favours the usage in highly reinforced thermoplastics.

Due to the low pitch, the entire connection proves an increased resistance to shock and vibration when exposed to a dynamic load.

**Fitness for repeat assembly**

Service and repair work requires repeat assembly of thread forming screws. It is therefore essential to constantly inspect the connections.

The Schriever STS® plus-screw has been tested in this respect during its development and generally meets the requirements of VDE 0700.



**STS<sup>+</sup>**

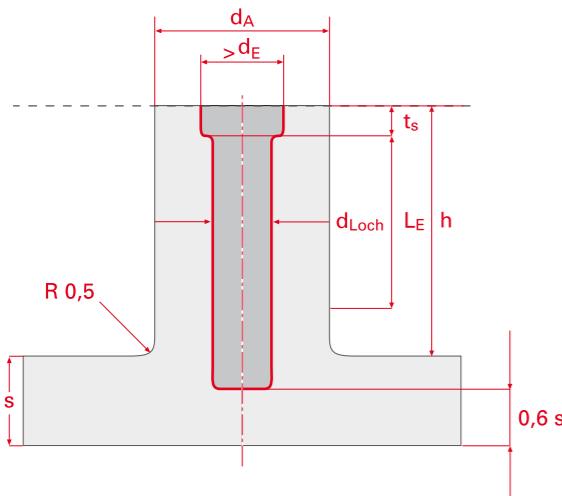


**STS<sup>+</sup>**



## Tube design

Therefore the relief bore which prevents the tube to burst open is essential in particular for the function of the entire connection. In this context, the relief bore that prevents the cracking of the tube is extremely important. Experimental research has shown that a value of  $0.8 \times d$  results in the optimal diameter of the tube bore. In materials containing a high portion of filler, this value can be increased to  $0.89 \times d$ .



d = nominal-Ø of screw

$d_{\text{hole}} = 0,80 \text{ bis } 0,89 \times d$

$L_E \geq 2 \times d$

$t_s \approx 0,4 \times d$

$d_A \geq 1,7 \times d$

$h \geq L_E + 1 \times d$

s = without set parameters

$d_E = 1,05 \times d$

We recommend to perform fitting tests with the first out-of-tool parts. For this purpose, please contact our laboratory for assistance.

## Recommendations for the dimensioning of the dome

Material	Hole diameter	Min. outside diameter tube	Min. screw-in-depth
ABS	$0,86 \times d$	$2,00 \times d$	$2,00 \times d$
ASA	$0,84 \times d$	$2,00 \times d$	$2,00 \times d$
PA 6	$0,81 \times d$	$1,85 \times d$	$1,70 \times d$
PA-GF 30	$0,86 \times d$	$2,00 \times d$	$1,90 \times d$
PA 6.6	$0,81 \times d$	$1,85 \times d$	$1,70 \times d$
PA 6.6 GF 30	$0,83 \times d$	$2,00 \times d$	$1,80 \times d$
PBT	$0,81 \times d$	$1,85 \times d$	$1,70 \times d$
PBT GF 30	$0,86 \times d$	$1,80 \times d$	$1,70 \times d$
PC	$0,89 \times d$	$2,50 \times d$	$2,20 \times d$
PC GF 30	$0,89 \times d$	$2,20 \times d$	$2,00 \times d$
PE LD	$0,76 \times d$	$2,00 \times d$	$2,00 \times d$
PE HD	$0,81 \times d$	$1,80 \times d$	$1,80 \times d$
PET	$0,81 \times d$	$1,85 \times d$	$1,70 \times d$
PET GF 30	$0,86 \times d$	$1,80 \times d$	$1,70 \times d$
POM Acetal	$0,81 \times d$	$1,95 \times d$	$2,00 \times d$
PP	$0,76 \times d$	$2,00 \times d$	$2,00 \times d$
PPO	$0,89 \times d$	$2,50 \times d$	$2,20 \times d$
PS	$0,86 \times d$	$2,00 \times d$	$2,00 \times d$
PVC (hart)	$0,86 \times d$	$2,00 \times d$	$2,00 \times d$
SAN	$0,83 \times d$	$2,00 \times d$	$1,90 \times d$

## Material

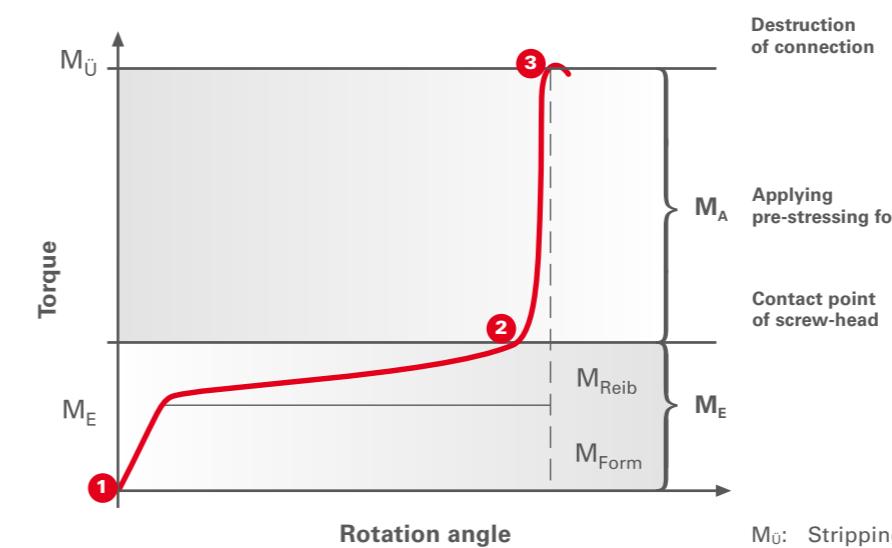
Schriever STS<sup>+</sup> plus-screws are of high-tensile hardened and tempered by default. We supply case-hardened and stainless steel (A2 [1.4567], A4 [1.4578] and 1.4016 [magnetic]) on request.

## Ordering example

STS<sup>+</sup> plus of nominal Head diameter = 3.0 mm  
Length = 12 mm · Head = KN 6031 · Drive 'Pozidrive'  
KN 6031 STS<sup>+</sup> plus 30 x 12 - Z

## In detail

### The Schriever STS<sup>+</sup> plus connection



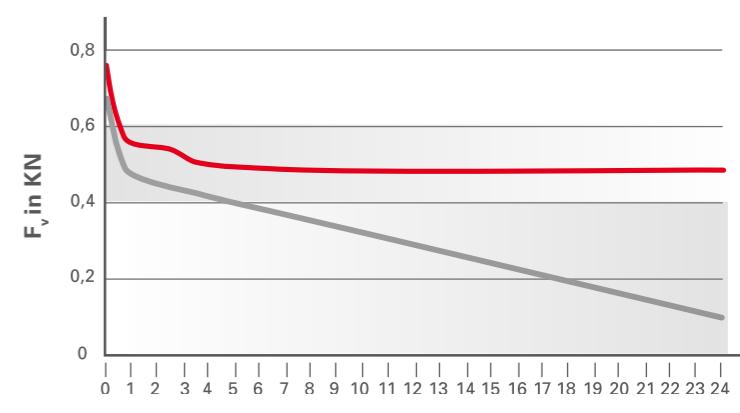
The greater the ratio  $M_{\dot{U}} / M_E$  the higher the assembly reliability of the screw connection.

## Our requirements for the Schriever STS<sup>+</sup> plus

In order to avoid relaxations and tension cracks through excessive pre-stressing forces it is necessary to keep the insertion torque at a minimum. Schriever's engineers recommend to calculate the insertion torque on the basis of the following formula:  

$$M_A = 0,6 \times (0,4 \times M_{\dot{U}} \text{ min.} + 1,4 \times M_E \text{ max.})$$

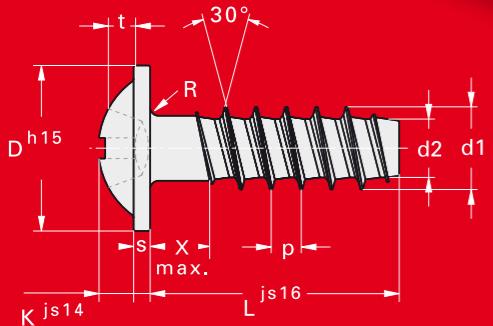
We supply customized designs deviating from our standard quality upon request.



— Schriever STS<sup>+</sup> plus  
— Self-tapping screw

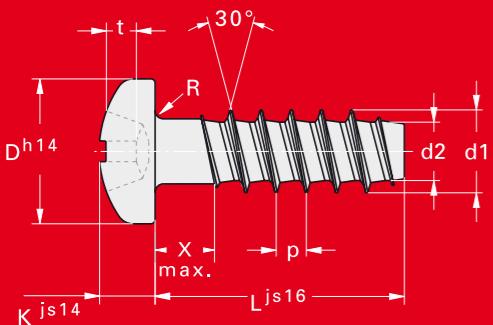


**STS<sup>+</sup>**



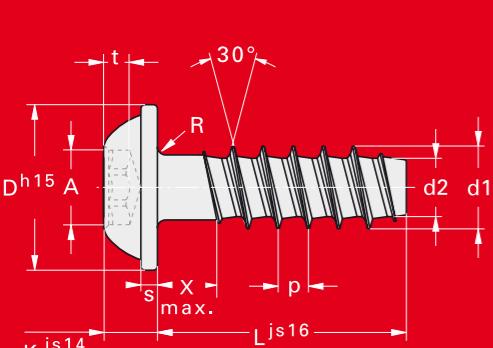
### KN 6031

Dimensions		14	16	18	20	22	25	30	35	40	45	50	60	70	80
Thread outside-Ø	d1	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Head-Ø	D	3,20	3,60	4,00	4,50	5,00	5,50	6,50	7,50	9,00	10,00	11,00	13,50	15,50	
Head height	K	1,15	1,20	1,35	1,40	1,60	1,80	2,10	2,40	2,50	2,50	3,20	4,00	4,60	
Flange thickness	S	0,50	0,60	0,60	0,60	0,60	0,70	0,80	0,90	1,00	1,00	1,20	1,40	1,60	
Radius	R max.	0,20	0,25	0,25	0,35	0,35	0,40	0,50	0,50	0,60	0,60	0,70	0,80	0,90	
H-cross recess	t min.				0,51	0,68	0,82	1,15	1,07	1,33	1,33	1,98	2,24	2,84	
Penetration depth	t max.				0,97	1,14	1,28	1,61	1,70	1,96	1,96	2,61	2,90	3,50	
Z-cross recess	t min.					1,01	1,26	1,08	1,40	1,40	2,01	2,27	2,91		
Penetration depth	t max.					1,26	1,51	1,54	1,86	1,86	2,47	2,73	3,37		
Cross-size H/Z		0	0	0	1	1	1	1	2	2	2	2	3	3	



### KN 6032

Dimensions		14	16	18	20	22	25	30	35	40	45	50	60	70	80
Thread outside-Ø	d1	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Head-Ø	D	2,60	3,00	3,30	3,50	3,90	4,40	5,30	6,10	7,00	7,50	8,80	10,50	12,30	
Head height	K	1,05	1,20	1,30	1,60	1,60	1,90	2,30	2,70	3,10	3,20	3,50	4,20	5,10	
Flange thickness	S	0,20	0,25	0,25	0,35	0,35	0,40	0,50	0,50	0,60	0,60	0,70	0,80	0,90	
Radius	R max.				0,64	0,74	0,92	1,19	1,23	1,51	1,51	2,12	2,44	3,00	
H-cross recess	t min.				1,10	1,20	1,38	1,65	1,86	2,14	2,14	2,75	3,10	3,66	
Penetration depth	t max.					1,08	1,36	1,26	1,62	1,62	2,23	2,23	2,57	3,14	
Z-Kreuzschlitz	t min.					1,33	1,61	1,72	2,08	2,08	2,67	2,67	3,03	3,61	
Penetration depth	t max.						2	2	2	2	2	3	3		
Cross-size H/Z		0	0	1	1	1	1	1	2	2	2	2	3	3	



### KN 6038

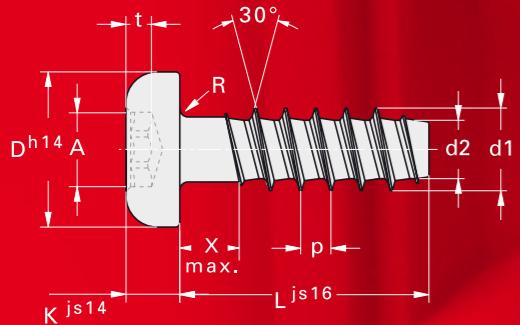
Dimensions		14	16	18	20	22	25	30	35	40	45	50	60	70	80
Thread outside-Ø	d1	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Head-Ø	D	3,20	3,60	4,00	4,50	5,00	5,50	6,50	7,50	9,00	10,00	11,00	13,50	15,50	18,00
Head height	K	1,15	1,20	1,35	1,60	1,60	1,90	2,30	2,70	3,10	3,20	3,50	4,20	4,90	5,60
Flange thickness	S	0,50	0,60	0,60	0,60	0,60	0,70	0,80	0,90	1,00	1,10	1,20	1,40	1,60	1,80
Radius	R max.	0,20	0,25	0,25	0,35	0,35	0,40	0,50	0,50	0,60	0,60	0,70	0,80	0,90	1,00
Hexalobular drive	A Ref.	T 3	T 5	T 6	T 6	T 6	T 8	T 10	T 15	T 20	T 20	T 25	T 30	T 30	T 40
Penetration depth	t min.	0,40	0,50	0,50	0,65	0,65	0,80	1,00	1,10	1,40	1,40	1,50	1,90	2,30	2,60
Penetration depth	t max.	0,55	0,65	0,65	0,85	0,85	1,00	1,30	1,50	1,80	1,80	1,90	2,40	2,90	3,20

not recommended

not recommended

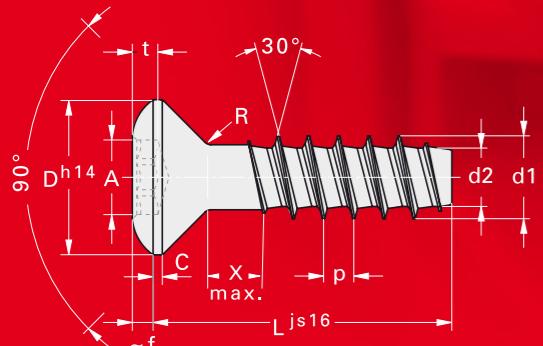


**STS<sup>+</sup>**



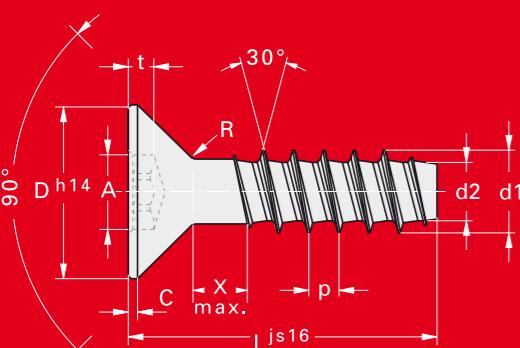
**KN 6039**

Dimensions	10	12	14	16	18	20	22	25	30	35	40	45	50	60	70	80	
Thread outside-Ø	d1	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Head-Ø	D	2,00	2,30	2,60	3,00	3,30	3,50	3,90	4,40	5,30	6,10	7,00	7,50	8,80	10,50	12,30	14,10
Head height	K	0,80	0,95	1,05	1,20	1,30	1,60	1,60	1,90	2,30	2,70	3,10	3,20	3,50	4,20	4,90	5,60
Radius	R max.	0,20	0,20	0,20	0,20	0,25	0,35	0,35	0,40	0,50	0,50	0,60	0,60	0,70	0,80	0,90	1,00
Hexalobular drive	T 2	T 3	T 3	T 5	T 6	T 6	T 6	T 8	T 10	T 15	T 20	T 20	T 25	T 30	T 30	T 40	
A Ref.	1,00	1,20	1,20	1,45	1,75	1,75	1,75	2,40	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75	
Penetration depth	t min.	0,30	0,35	0,35	0,50	0,50	0,65	0,65	0,80	1,00	1,10	1,40	1,40	1,50	1,90	2,30	2,60
	t max.	0,45	0,50	0,50	0,65	0,65	0,85	0,85	1,00	1,30	1,50	1,80	1,80	1,90	2,40	2,90	3,20



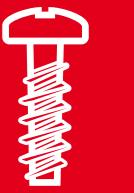
**KN 6040**

Dimensions	16	18	20	22	25	30	35	40	45	50	60	70	80				
Thread outside-Ø	d1				1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Head-Ø	D						4,00	4,40	5,00	6,00	7,00	8,00	9,00	10,00	12,00	14,00	16,00
Cylindrical head height	C max.						0,35	0,35	0,55	0,55	0,65	0,70	0,70	0,75	0,85	0,90	0,95
f ≈							0,40	0,40	0,50	0,70	0,80	1,00	1,00	1,20	1,20	1,30	1,40
Radius	R max.						0,80	0,80	1,00	1,20	1,40	1,60	1,80	2,00	2,40	2,60	3,20
Hexalobular drive	T 6	T 6	T 8	T 10	T 15	T 20	T 20	T 25	T 25	T 30	T 30	T 40					
A Ref.	1,75	1,75	2,40	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75						
Penetration depth	t min.						0,65	0,65	0,80	1,00	1,10	1,40	1,40	1,50	1,90	2,30	2,60
	t max.						0,85	0,85	1,00	1,30	1,50	1,80	1,80	1,90	2,40	2,90	3,20



**KN 6041**

Dimensions	10	12	14	16	18	20	22	25	30	35	40	45	50	60	70	80	
Thread outside-Ø	d1	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Head-Ø	D	2,35	2,65	2,80	3,35	3,65	4,00	4,40	5,00	6,00	7,00	8,00	9,00	10,00	12,00	14,00	16,00
Cylindrical head height	C max.	0,20	0,25	0,30	0,35	0,35	0,35	0,35	0,55	0,55	0,65	0,70	0,70	0,75	0,85	0,90	0,95
Radius	R max.	0,40	0,40	0,50	0,60	0,60	0,80	0,80	1,00	1,20	1,40	1,60	1,80	2,00	2,40	2,60	3,20
Hexalobular drive	T 2	T 3	T 3	T 5	T 6	T 6	T 6	T 8	T 10	T 15	T 20	T 20	T 25	T 30	T 30	T 40	
A Ref.	1,00	1,20	1,20	1,45	1,75	1,75	1,75	2,40	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75	
Penetration depth	t min.	0,30	0,35	0,35	0,50	0,50	0,50	0,70	0,75	0,95	1,10	1,25	1,25	1,50	2,30	2,40	
	t max.	0,45	0,50	0,50	0,65	0,65	0,65	0,65	0,90	1,00	1,30	1,45	1,70	1,65	2,00	2,90	2,90



# STS<sup>+</sup>

Screw	10	12	14	16	18	20	22	25	30	35	40	45	50	60	70	80
d <sub>1</sub> (mm)	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Length* L (mm)	3,0															
	3,5															
	4,0															
	4,5															
	5,0															
	6,0															
	7,0			SP		(SB)										
	8,0		SP	SP	SP	SB	(SB)									
	9,0		SP	SP	SP	SP, SB	SB	(SB)								
	10,0		SP	SP	SP	SP, SB	SB	(SB)								
	12,0		SP	SP	SP	SP, SB	SP, SB	SB	(SB)	(SB)						
	14,0		SP	SP	SP	SP, SB	SP, SB	SP, SB	SB	(SB)	(SB)					
	15,0		SP	SP	SP	SP, SB	SP, SB	SP, SB	SP, SB	SB	(SB)	(SB)				
	16,0		SP	SP	SP	SP, SB	(SB)	(SB)								
	18,0		SP	SP	SP	SP, SB	(SB)									
	20,0		SP	SP	SP	SP, SB										
	21,0		SP	SP	SP	SP, SB										
	22,0		SP	SP	SP	SP, SB										
	24,0		SP	SP	SP	SP, SB										
	25,0		SP	SP	SP	SP, SB										
	27,0		SP	SP	SP	SP, SB										
	30,0		SP	SP	SP	SP, SB										
	35,0		SP	SP	SP	SP, SB										
	36,0		SP	SP	SP	SP, SB										
	40,0		SP	SP	SP	SP, SB										
	42,0		SP	SP	SP	SP, SB										
	45,0		SP	SP	SP	SP, SB										
	48,0		SP	SP	SP	SP, SB										
	50,0		SP	SP	SP	SP, SB										
	60,0		SP	SP	SP	SP, SB										
	70,0		SP	SP	SP	SP, SB										
	80,0		SP	SP	SP	SP, SB										
	100,0		SP	SP	SP	SP, SB										

Countersunk screws L + 0,6 x d<sub>1</sub>  
Lengths from 60 mm only available with  
partial thread (Partial thread length 4 x d<sub>1</sub>)  
Special geometry on request.

SB Version with cutting edge available  
(SB) Version with cutting edge available  
(not in connection with KN 6031 and  
KN 6038)

SP Version with form groove available  
SN Version with grooves available in all  
standard lengths from Ø 2,5 mm

Minimum length

Maximum length

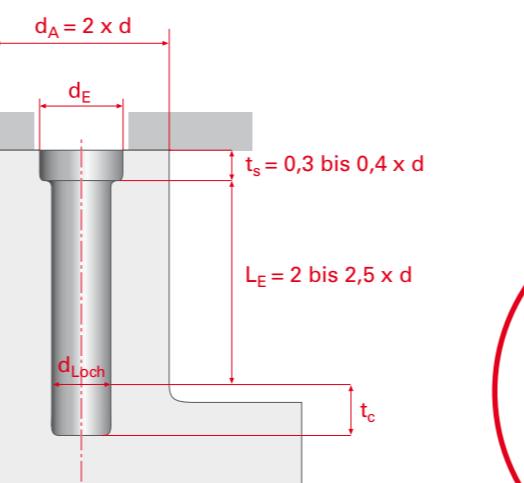
\* Other standard lengths and shank  
ends, deviating lengths and ends on  
request

## Schriever STS® plus SN

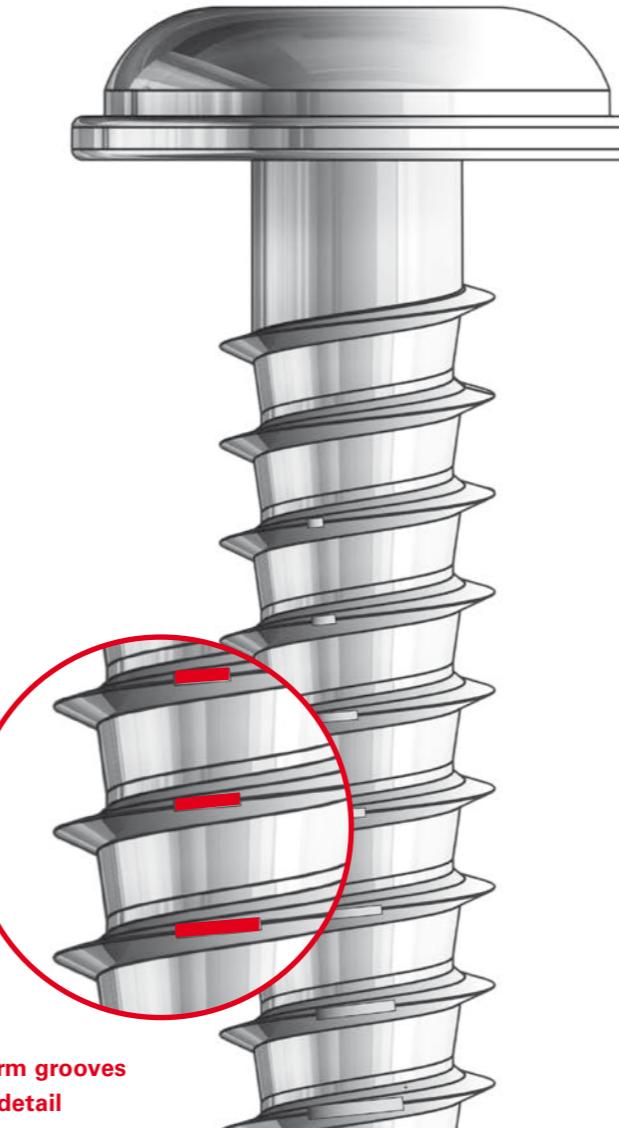
### Direct insertion for thermoset materials

The STS® plus SN-screw enables for direct insertion in plastic assemblies. This also applies when plastics are employed which have particular requirements on the screw connection due to their hardness and brittleness.

The thread geometry of the renowned STS® plus modified by shaped with form grooves can also be used reliably in complex applications in thermoset materials.



d<sub>hole</sub> = hole-Ø = 0,83 bis 0,90 x d<sub>1</sub>  
dependent on material grade  
d = nominal-Ø of screw  
d<sub>E</sub> = relief bore = d + 0,2 mm  
t<sub>c</sub> = depth of chip space = 0,8 bis 1,2 x d



## Tolerances and thread dimensions

Nominal dimension (mm)	h 14	h 15	js 14	js 16
over to				
0	3	0 / - 0,25	0 / - 0,40	± 0,125
3	6	0 / - 0,30	0 / - 0,48	± 0,15
6	10	0 / - 0,36	0 / - 0,58	± 0,18
10	18	0 / - 0,43	0 / - 0,70	± 0,215
18	30	0 / - 0,52	0 / - 0,84	± 0,26
30	50	0 / - 0,62	0 / - 1,00	± 0,31
50	80	0 / - 0,74	0 / - 1,20	± 0,37

Thread tip	Designation
Standard	--
Full dog point	Ka
Search tip	SP
Scraper groove	SB
Other thread tips on request.	

Dimensions	10	12	14	16	18	20	22	25	30	35	40	45	50	60	70	80	
Thread outside-Ø	d <sub>1</sub>	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,50	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00
Tolerance thread outside-Ø	+0,08	+0,08	+0,08	+0,08	+0,08	+0,08	+0,08	+0,08	+0,10	+0,10	+0,10	+0,15	+0,15	+0,18	+0,18	+0,18	+0,18
Thread core-Ø	d <sub>2</sub>	0,64	0,78	0,93	1,07	1,22	1,36	1,51	1,72	2,09	2,45	2,81	3,17	3,53	4,26	4,98	5,70
Thread pitch	p	0,44	0,51	0,57	0,64	0,71	0,78	0,85	0,95	1,12	1,29	1,46	1,63	1,80	2,14	2,48	2,82
Thread run-out	X max.	0,50	0,60	0,70	0,80	0,90	1,00	1,10	1,30	1,50	1,80	2,00	2,30	2,50	3,00	3,50	4,00

Additional process tolerances correspond to Schriever KN 6001

## Head drives

<table border="

# TEST THE BEST

**Comparison SCHRIEVER -KN- with EJOT -WN-  
for the same application areas or purposes**



## SCHRIEVER KN STS plus

6031	5411
6032	5412
6038	5451
6039	5452
6040	5453
6041	5454

## EJOT WN Delta PT

The Schriever STS plus® screws can also be used with all commercially available corrosion protection surfaces. Please feel free to contact us.

No matter whether you need one screw,  
ten screws or 5,000 screws.

Within three working days after receipt of the order, you will receive the screws for plastics.

## › **Speed production**

- › Samples for free
- › 3D - files (drawings)

- › Individually produced for you
- › Starting from 10,000 parts
- › Available in 4 weeks
- › Samples can be tested free of charge

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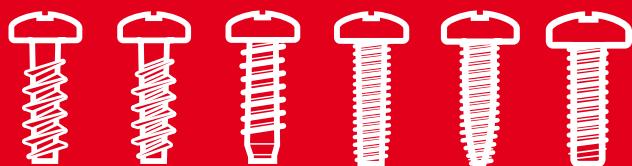
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**STS® | STS® plus** for thermoplastics

**SLS® | S-trax®** for light metals

**SBS®** for thin sheets

**SGF®** metric self-trapping screws



**STS**

**STS+**

**SLS**

**S-trax**

**SBS**

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**Hans Schriever GmbH & Co. KG · Verbindungstechnik**

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