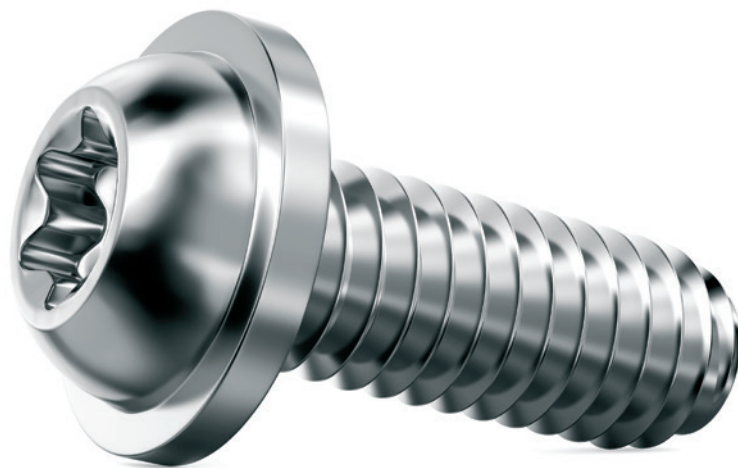


BOSSARD

Proven Productivity



Delta PT[®]

Calculable Extra Performance



“The Delta PT® has an optimum geometry which favours the working of the plastic during the screwing process, and which reduces the damaging generation of heat.”



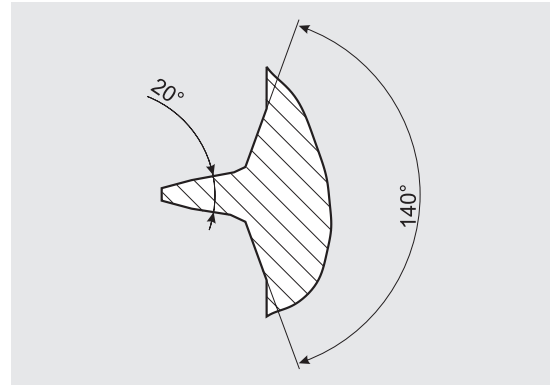
The Fastener for Plastics

The plastic connector

The DELTA PT® screw is the result of many years of experience in direct fastening into thermoplastics.

Thread Angle Geometry

The newly developed thread flank geometry allows an unimpeded material flow, and reduces heat built up that could potential damage the plastic.



Thread Pitch

An optimal pitch design leads to a high clamp load, while causing only low surface pressures. This reduces preload loss, thus making it resistant against vibration.

Stress Area

The increased V-shaped stress area ensures high torsional strength and tensile strength.

Clamp Load Oriented Design – the DELTA CALC® Computer Simulation Program

Along with improved technical features, a calculation program was also developed for the DELTA PT® screw. The program can simulate and predict how the screw will perform in a given plastic.

This calculation program enables qualitative predictions on how the joint will behave under both static and dynamic loading. It makes it possible to lay out joints that last, which means safety and reliability.

The program is based on VDI 2230, and it allows clamp load oriented designs.

For further questions on DELTA CALC® calculations, please consult your partner at Bossard Engineering.

It can be used to make theoretical estimates of fastened joints in thermoplastics and provides guidance on dimensioning. It also can predict the lifespan and durability under the influence of a given temperature.

Advantages at a Glance

- Minimum radial stress due to narrow flank angle
- Optimum material flow during installation
- Optimized thread pitch increases vibration resistance
- Substantially increased service life of the joint
- High tensile strength
- High torsional strength
- Permits shorter screws and/or smaller diameters compared with conventional plastic fasteners
- High strength material – heat treated steel property class PT10
- The DELTA PT® calculation program allows vclamp load oriented designs

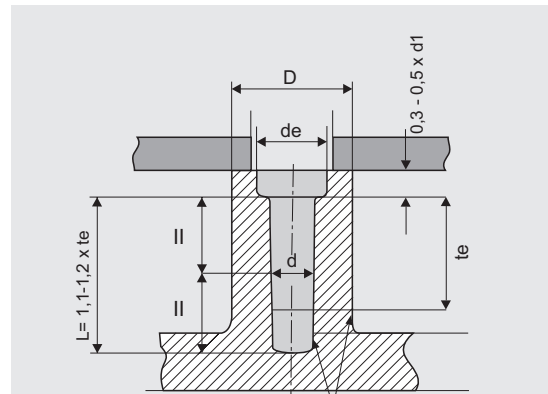
Boss Geometry

For all conventional plastics up to $E=20\,000\text{ N/mm}^2$.

Outside $\varnothing D$	$= 2 \times d$
Pilot holed	$= 0.8 \times d_1$
Engagement t_e	$= 2 \times d_1$
Edge relief d_e	$= d_1 + 0.2\text{ mm}$

d_1 = Nominal diameter of the screw

For reinforced plastics $E > 20\,000\text{ N/mm}^2$ tests are recommended.



Calculation Program

Based on VDI 2230, it permits clamp load oriented joints.

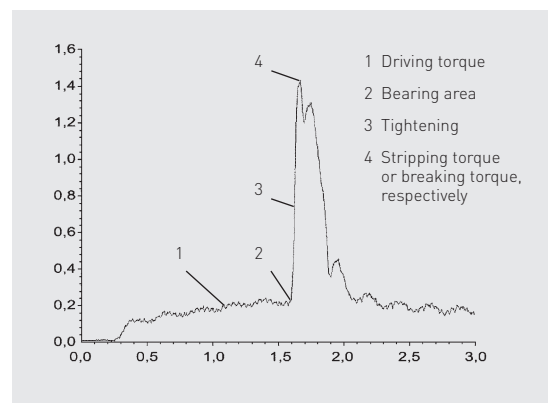
The applicability can then be tested/verified by a Bossard engineer.

What should one consider during installation?

- Safe and cost-effective joints can only be obtained by using torque controlled or torque angle controlled power drivers. Low stress forming requires heat, which is generated by friction during the thread forming process.
- The driving speed should lie between 300 and 800 rpm. Both air powered and electrical powered screwdrivers can be used.
- Application tests should be carried out to verify calculated values, to check for repeatability and to uncover unforeseen influences.
- Please consult us early in the design stage if parts are considered for automated assembly. By doing so, fasteners can be defined and produced accordingly, to meet the automated assembly quality. (Lead time for these types of fasteners is about 10 – 16 weeks). Typically, «off-the-shelf fasteners» are not suited for automated assembly.

Calculating the Torque

For a safe joint, the difference between the driving torque (M_e) and the stripping torque ($M_{\ddot{u}}$) must be as large as possible. Bossard engineering can assist you determining true installation parameters, through applications testing on parts that are going to be used in the actual assembly. The optimal tightening torque M to be set on the screwdriver is established based on customer requirements. The results are then documented in a technical report.

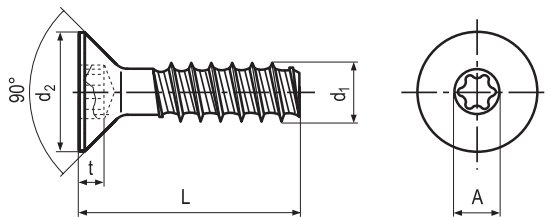


Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

Product overview

Flat head screws with Torx plus® / Autosert® **WN 5454**

● **BN 20167** | Stainless Steel A2



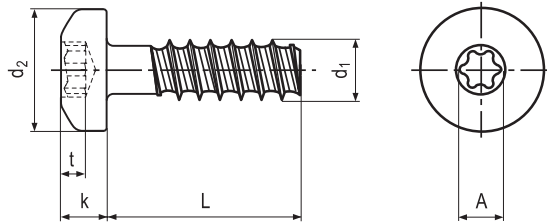
d	25	30	35	40
d_1	2,5	3	3,5	4
d_2	5	6	7	8
	8 IP	10 IP	15 IP	20 IP
A ~	2,4	2,8	3,35	3,95
t	min.	0,7	0,75	1,1
	max.	0,9	1	1,45

d	25	30	35	40
8	●	●		
10	●	●	●	●
L 12		●	●	●
14			●	●
16			●	●

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Oval head screws with Torx plus® / Autosert® WN 5452

● **BN 20166** | INOX A2

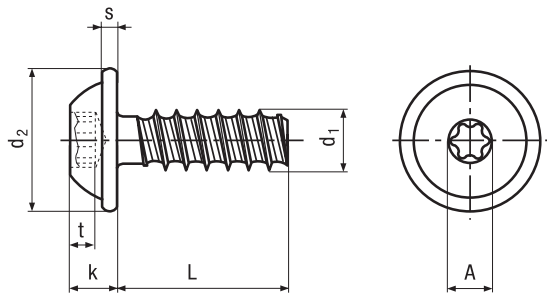


d	25	30	35	40	50	
d ₁	2,5	3	3,5	4	5	
d ₂	4,4	5,3	6,1	7	8,8	
k	1,9	2,3	2,7	3,1	3,5	
	8 IP	10 IP	15 IP	20 IP	25 IP	
A ~	2,4	2,8	3,35	3,95	4,5	
t	min.	0,8	1	1,1	1,4	1,5
	max.	1	1,3	1,5	1,8	1,9

d	25	30	35	40	50
8	●	●	●		
10	●	●	●	●	
12	●	●	●	●	
L 14		●	●	●	
16		●	●	●	
20		●	●	●	●
25		●	●	●	

Oval head screws with pressed-on disc, with Torx plus® / Autosert® WN 5451

● **BN 20040** | zinc plated, ● **BN 20165** | Stainless Steel A2



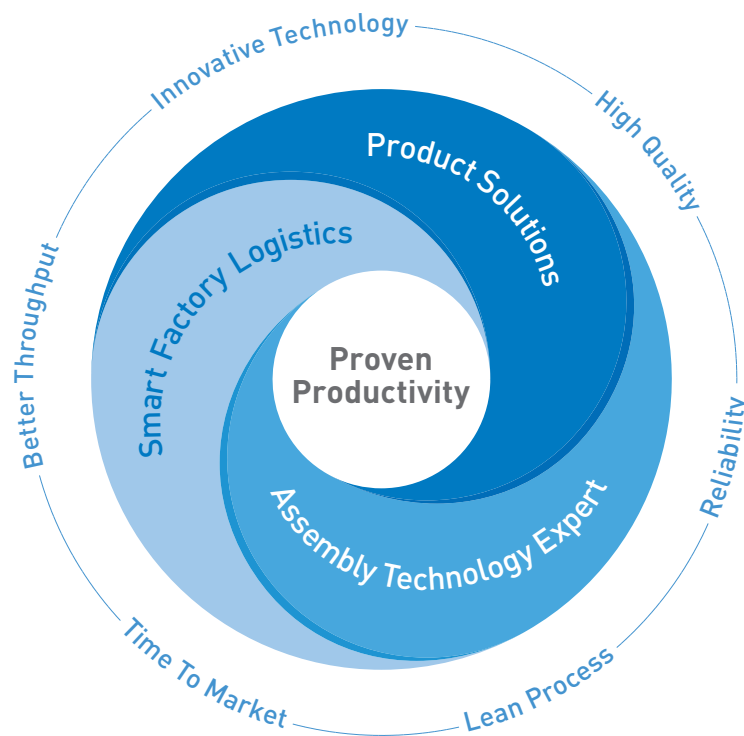
d	22	25	30	35	40	50	60
d ₁	2,2	2,5	3	3,5	4	5	6
d ₂	5	5,5	6,5	7,5	9	11	13,5
k	1,6	1,9	2,3	2,7	3,1	3,5	4,2
s	0,6	0,7	0,8	0,9	1	1,2	1,4
	6 IP	8 IP	10 IP	15 IP	20 IP	25 IP	30 IP
A ~	1,75	2,4	2,8	3,35	3,95	4,5	5,6
t	min.	0,65	0,8	1	1,1	1,4	1,9
	max.	0,85	1	1,3	1,5	1,8	2,4

d	22	25	30	35	40	50	60
5	●						
6	●	●					
8	●	●	●	●			
10	●	●	●	●	●		
12		●	●	●	●	●	
L 14			●	●	●	●	●
16			●	●	●	●	●
18			●		●	●	●
20			●	●	●	●	●
25			●	●	●	●	●
30						●	●
35							●

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Other variants upon request.

PROVEN PRODUCTIVITY – A PROMISE TO OUR CUSTOMERS

The strategy for success



From years of cooperation with our customers we know what achieves proven and sustainable impact. We have identified what it takes to strengthen the competitiveness of our customers. Therefore we support our customers in three strategic core areas.

Firstly, when finding optimal **Product Solutions**, that is in the evaluation and use of the best fastening part for the particular function intended in our customers' products.

Second, our **Assembly Technology Expert** services deliver the smartest solutions for all possible fastening challenges. Our services cover from the moment our customers developing a new product, to

assembly process optimization as well as fastening technology education for our customers' employees.

And thirdly, optimising our clients' productions in a smart and lean way with **Smart Factory Logistics**, our methodology, with intelligent logistics systems and tailor-made solutions.

Understood as a promise to our customers, "Proven Productivity" contains two elements: Firstly, that it demonstrably works. And secondly, that it sustainably and measurably improves the productivity and competitiveness of our customers.

And this for us is a philosophy which motivates us every day to always be one step ahead.

www.bossard.com