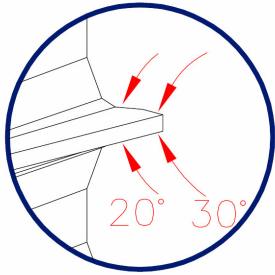


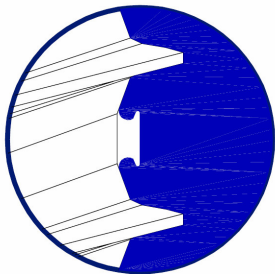


DELTA PT®

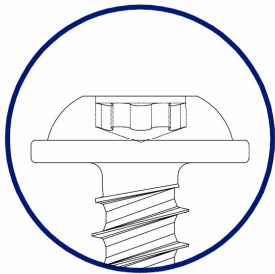
A Superior Thread-Former for Plastics



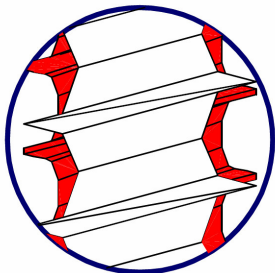
reduced radial stress



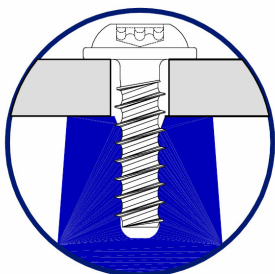
increased joint stability



excellent serviceability



high mechanical strength



superior vibration resistance



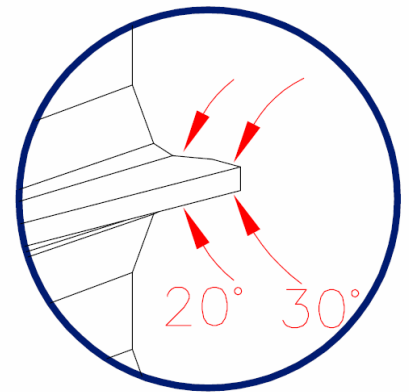


The DELTA PT[®] is a thread-forming fastener designed for superior performance in thermoplastic and thermoset materials.

Reduced Radial Stress

Innovative Flank Geometry

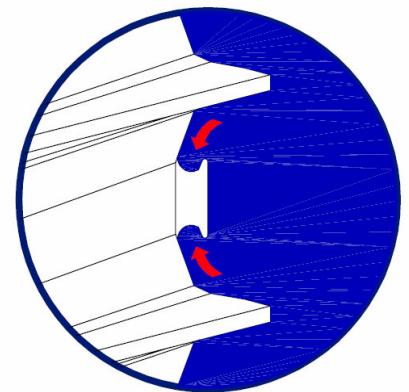
The unique flank geometry of the DELTA PT[®] is designed to reduce radial stress on the boss compared to typical 60° flank angles. The flank starts with a 30° angle which quickly backs off into a 20° angle. This allows completely unimpeded flow of the plastic material. The reduction in radial stress eliminates sink marks in the boss and allows for reduced wall thickness, leading to shorter molding cycle times and significant material savings.



Increased Joint Stability

Reinforced Cored Root

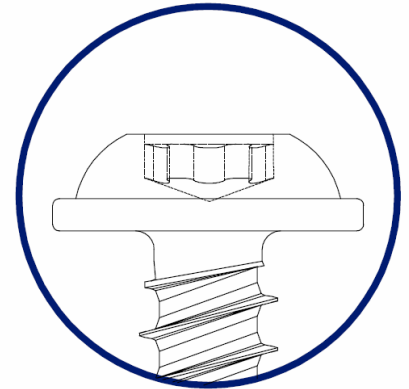
The multi-angled thread profile and unique cored recess of the DELTA PT[®] follow the natural flow of the boss material to provide maximum engagement. Fasteners with a flat root can cause material jam, which can create stress concentrations in the plastic and lead to cracking. The cored root eliminates stress concentrations and provides nearly 100% flank engagement in ATF recommended pilot holes, compared to only 60% flank engagement for most thread-formers.



Excellent Serviceability

Optimized Head Geometry

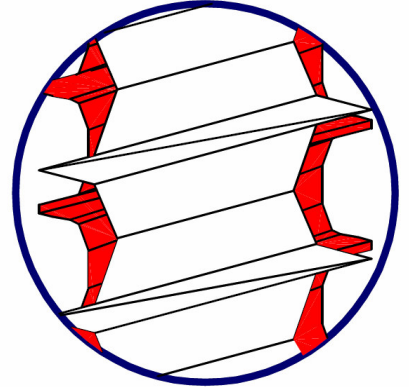
The DELTA PT[®] standard head sizes are designed with a large bearing surface and a deep drive recess penetration. The large bearing surface distributes pressure over a wider area of the boss, decreasing stress in the plastic that could lead to cracking and deformation. A large bearing surface enhances joint stability by reducing creep and increasing break-loose torque. The deep drive recess penetration of the Torx Plus[®] recess virtually eliminates the possibility of the recess stripping during installation and allows for multiple installations and increased joint serviceability.



High Mechanical Strength

Large Minor Diameter

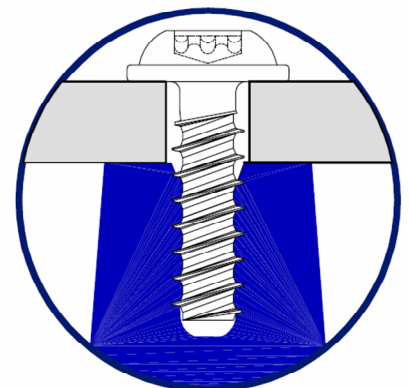
The increased minor diameter and larger cross sectional area of the DELTA PT[®] offer an increase in torsional and tensile strength of up to 50% over the previous generation PT[®]. As a result, the DELTA PT[®] can withstand the high torque requirements presented by thermoset and highly glass filled thermoplastic materials.



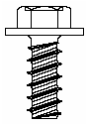
Superior Vibration Resistance

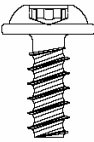
Refined Helix Angle

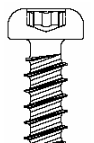
The helix angle was developed by optimizing the relationship between the highest possible clamp load at low contact pressure in the plastic material. Due to the refined pitch, an increased number of threads are engaged in the boss when compared to other fasteners at equal installation depths. The optimum helix angle leads to a joint with high dynamic safety and vibration resistance.

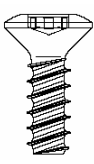


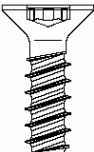
Delta PT	Dimensions		20	22	25	30	35	40	45	50	60	70	80	100
	External thread diameter		2.00	2.20	2.50	3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	10.00
	Thread pitch		0.78	0.85	0.95	1.12	1.29	1.46	1.63	1.80	2.14	2.48	2.82	3.50
	Thread run-out	X max.	1.00	1.10	1.30	1.50	1.80	2.00	2.30	2.50	3.00	3.50	4.00	5.00

Indented Hex Flange Head														
	Washer Diameter	D	no manufacturing at present	6.50	7.00	9.00	10.00	10.50	13.50	15.50	18.00	21.00		
	Width Across Flats	W		4.00	5.00	5.00	5.50	7.00	8.00	10.00	10.00	13.00		
	Width Across Corners	E min.		4.27	5.36	5.36	5.96	7.59	8.71	10.95	10.95	14.16		
	Head Height	K		2.80	2.90	3.50	4.00	4.10	5.20	6.10	7.00	8.70		
	Washer Thickness	s		0.70	0.70	0.90	0.90	0.90	1.10	1.20	1.30	1.50		
	Radius	R max.		0.50	0.60	0.60	0.70	0.70	0.80	0.90	1.00	1.20		

Torx Plus® Round Washer Head														
	Head diameter	D	4.50	5.00	5.50	6.50	7.50	9.00	10.00	11.00	13.50	15.50	18.00	21.50
	Head height	K	1.60	1.60	1.90	2.30	2.70	3.10	3.20	3.50	4.20	5.10	5.60	6.60
	Washer thickness	s	0.60	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.40	1.60	1.80	2.20
	Radius	R max.	0.35	0.35	0.40	0.50	0.50	0.60	0.60	0.70	0.80	0.90	1.00	1.10
	Torx Plus®/Autosert® size		6 IP	6 IP	8 IP	10 IP	15 IP	20 IP	20 IP	25 IP	30 IP	30 IP	40 IP	50 IP
	Recess width	A ref.	1.75	1.75	2.40	2.80	3.35	3.95	3.95	4.50	5.60	5.60	6.75	8.95
	Recess penetration depth	t min. max.	0.65 0.85	0.65 0.85	0.80 1.00	1.00 1.30	1.10 1.50	1.40 1.80	1.40 1.80	1.50 1.90	1.90 2.40	2.30 2.90	2.60 3.20	3.00 3.50

Torx Plus® Pan Head														
	Head diameter	D	3.50	3.90	4.40	5.30	6.10	7.00	7.50	8.80	10.50	12.30	14.10	17.00
	Head height	K	1.60	1.60	1.90	2.30	2.70	3.10	3.20	3.50	4.20	4.90	5.60	6.60
	Radius	R max.	0.35	0.35	0.40	0.50	0.50	0.60	0.60	0.70	0.80	0.90	1.00	1.10
	Torx Plus®/Autosert® size		6 IP	6 IP	8 IP	10 IP	15 IP	20 IP	20 IP	25 IP	30 IP	30IP	40 IP	50 IP
	Recess width	A ref.	1.75	1.75	2.40	2.80	3.35	3.95	3.95	4.50	5.60	5.60	6.75	8.95
	Recess penetration depth	t min. max.	0.65 0.85	0.65 0.85	0.80 1.00	1.00 1.30	1.10 1.50	1.40 1.80	1.40 1.80	1.50 1.90	1.90 2.40	2.30 2.90	2.60 3.20	3.00 3.50

Torx Plus® Oval Countersunk Head														
	Head diameter	D	4.00	4.40	5.00	6.00	7.00	8.00	9.00	10.00	12.00	14.00	16.00	20.00
	Cyl. 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	1.10
	Spher. head height	f ref.	0.40	0.40	0.50	0.70	0.80	1.00	1.00	1.20	1.20	1.30	1.40	1.60
	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	4.50
	Torx Plus®/Autosert® size		6 IP	6 IP	8 IP	10 IP	15 IP	20 IP	20 IP	25 IP	30 IP	30IP	40 IP	50 IP
	Recess width	A ref.	1.75	1.75	2.40	2.80	3.35	3.95	3.95	4.50	5.60	5.60	6.75	8.95
	Recess penetration depth	t min. max.	0.65 0.85	0.65 0.85	0.80 1.00	1.00 1.30	1.10 1.50	1.40 1.80	1.40 1.80	1.50 1.90	1.90 2.40	2.30 2.90	2.60 3.20	3.00 3.50

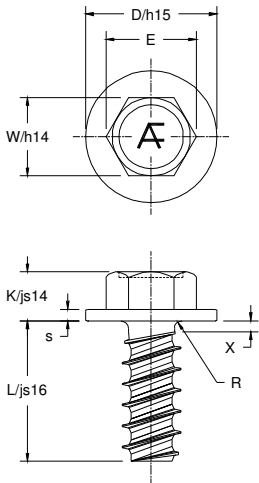
Torx Plus® Flat Countersunk Head														
	Head diameter	D	4.00	4.40	5.00	6.00	7.00	8.00	9.00	10.00	12.00	14.00	16.00	20.00
	Cyl. head height	c max.	0.35	0.35	0.55	0.55	0.65	0.70	0.70	0.75	0.85	0.90	0.95	1.10
	Radius	R max.	0.80	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.40	2.60	3.20	4.50
	Torx Plus®/Autosert® size		6 IP	6 IP	8 IP	10 IP	15 IP	20 IP	20 IP	25 IP	30 IP	30IP	40 IP	50 IP
	Recess width	A ref.	1.75	1.75	2.40	2.80	3.35	3.95	3.95	4.50	5.60	5.60	6.75	8.95
	Recess penetration depth	t min. max.	0.50 0.65	0.50 0.65	0.70 0.90	0.75 1.00	0.95 1.30	1.10 1.45	1.25 1.70	1.25 1.65	1.50 2.00	2.30 2.90	2.40 2.90	3.00 3.50

Material:
1022 or 10B21 steel,
Neutral hardened to RC 33-39

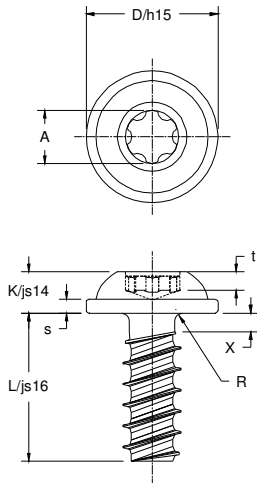
Different materials and special designs available upon request

Head and Length Tolerances

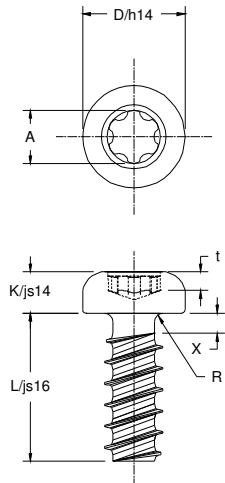
WN 5447



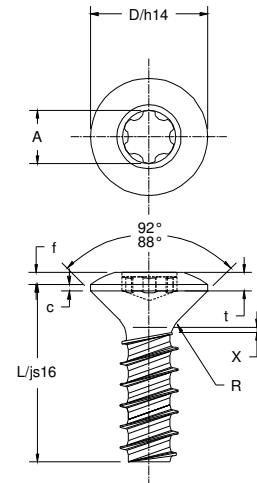
WN 5451



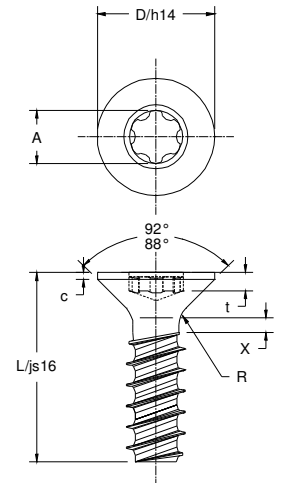
WN 5452



WN 5453



WN 5454



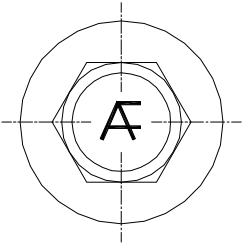
Tolerance	Nominal Measurement Range (mm)							
		over 3	over 6	over 10	over 18	over 30	over 50	over 80
	to 3	to 6	to 10	to 18	to 30	to 50	to 80	to 120
h14	+0.00 -0.25	+0.00 -0.30	+0.00 -0.36	+0.00 -0.43	+0.00 -0.52			
h15	+0.00 -0.40	+0.00 -0.48	+0.00 -0.58	+0.00 -0.70	+0.00 -0.84			
js14	±0.12	±0.15	±0.18					
js16	±0.30	±0.375	±0.45	±0.55	±0.65	±0.80	±0.95	±1.10

Diameter Tolerances

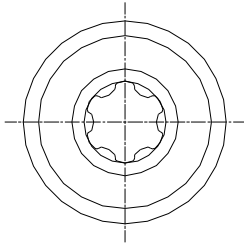
DELTA PT [®] Screw Size											
20	22	25	30	35	40	45	50	60	70	80	100
+0.08	+0.08	+0.10	+0.10	+0.10	+0.10	+0.10	+0.15	+0.15	+0.18	+0.18	+0.25
-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00

Drives

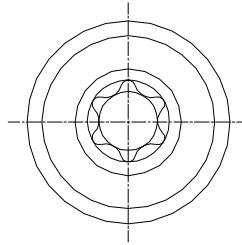
Hex



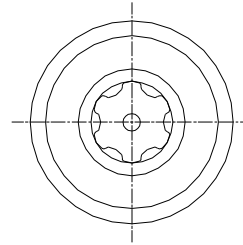
Torx Plus[®] with Autosert[®]



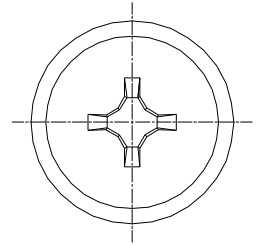
Torx[®]



Tamper Resistant Torx Plus[®]

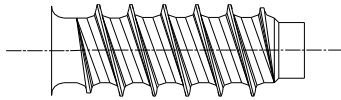


Cross Recess

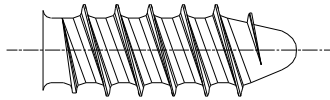


Special Points

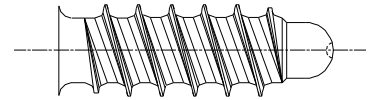
Dog Point



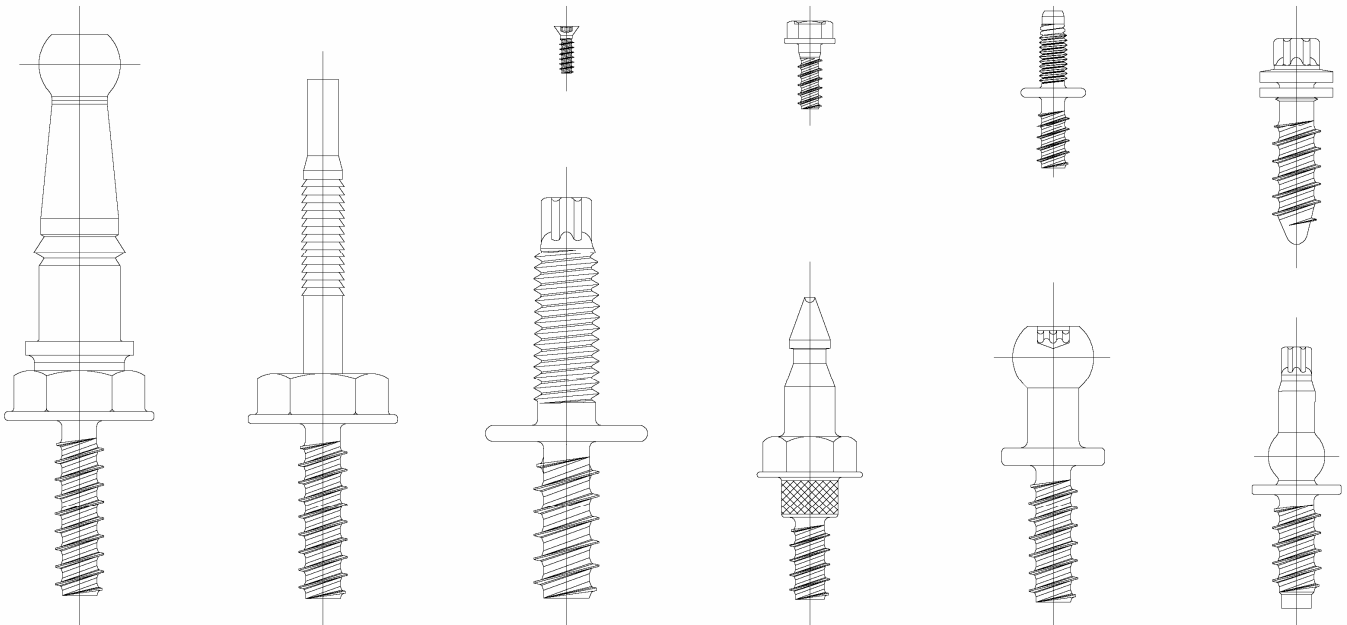
Pilot Point



Spherical Point



Possible Configurations



Applications Laboratory Services

The design of a joint is sometimes considered to be of low importance. However, is it the fastener that holds components together to make a finished product. With this in mind, the design engineer should consider which fastening method to use during the design conception stage to avoid expensive design changes late in the design process.

To assist our customers in this process, ATF offers support during the design stage through comprehensive applications engineering services and testing in our A2LA accredited laboratory. These services provide accurate information on product performance and result in design recommendations that can be used safely on the production line.

Applications laboratory services include:

- Drive, strip, and prevailing torque testing
- Tensile testing
- Clamp load testing
- Environmental testing
- Installation torque recommendations
- Boss design recommendations
- Other testing and analysis upon request

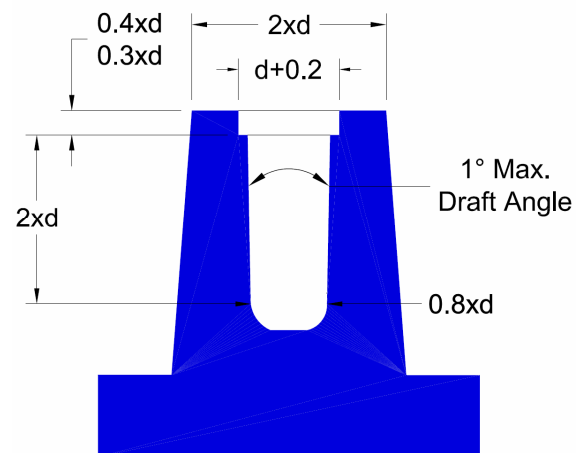
The ATF Applications Lab will provide detailed test reports at the conclusion of testing.

Boss Recommendations

Boss design recommendations for the DELTA PT[®] have been worked out on the basis of extensive laboratory testing. The most favorable hole diameter has, in most cases, proven to be $0.8 \times d$, where d is the major diameter of the fastener. For some materials, the hole diameter may range from 0.72 to $0.88 \times d$. Deviations from the $0.8 \times d$ recommendation may occur due to:

- local textures caused by additives and filling
- processing conditions of the material
- design of the injection molding tool
- distance to the injection point
- formation of welding lines
- variations in application components

The counterbore is of special importance, as it ensures a favorable edge stress reduction and prevents boss cracking. In addition, the counterbore acts as a guide during installation.



d: major diameter of fastener

Some typical DELTA PT® applications might include:



Manifold Cover



Center Console



Headlamp



Side Mirror

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Textron, Rockford, IL*

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