

EJOT®

The EJOT
DELTA OPT®
Fastener

Predictable
performance improvement
for thermoplastics



Authorised UK distributors for:



Benefits of the EJOT DELTA PT®

Minimal radial tension due to optimized flank angle

High clamp loads

High tensile and torsion strength

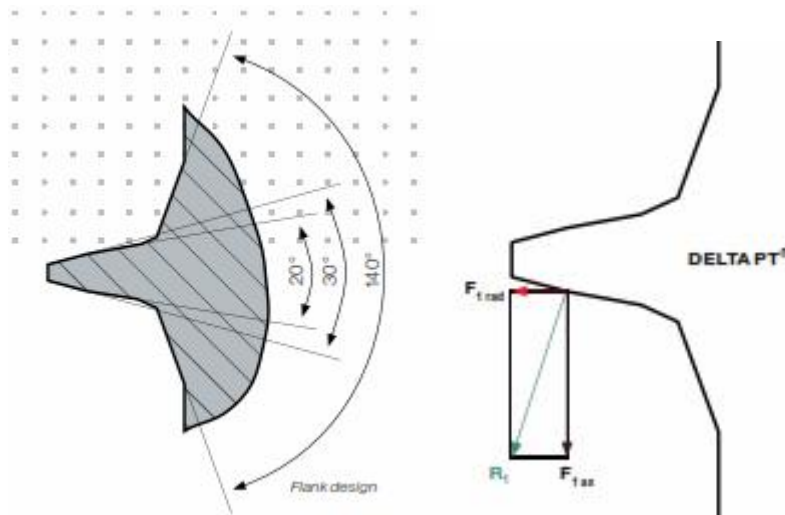
Increased cycle stress stability

High strength under vibration

DELTA PT® prognosis programme allows a clamp load oriented design.

Long lifetime of the joint

Minimization of hydrogen embrittlement by use of through hardened steel [PT10]



Minimal radial tension

The optimized thread flank angle of the EJOT DELTA PT® screw reduces the radial stress compared to common 60° flank angles of sheet metal screws.

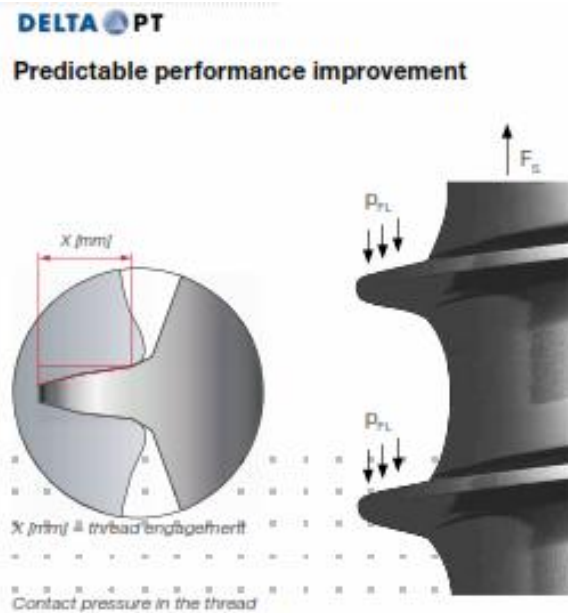
The 20° respectively 30° angle creates only minor radial tension and therefore allows thin-wall design.

The bigger force in axial direction allows an optimum flow of the displaced material.

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High clamp loads

The thread helix angle is engineered to optimize the highest possible clamp load and lowest contact pressure in the plastic material. This provides a higher flank coverage at equal installation depth, giving the possibility of material cost reduction.



High tensile and torsion strength

The enlarged core diameter increases the tensile and torsion strength. As a result of this, even in high-filled thermoplastics, higher tightening torques and better clamp loads are being achieved.



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Design recommendations

The precondition for a safe screw joint is the functional design of the components.

In principle, the boss design should correspond to the illustrated design recommendation.

The counterbore is of special importance, as it ensures a favourable edge stress reduction, thus preventing boss cracking. In addition, the counterbore acts as a lead-in and guidance during initial thread forming.

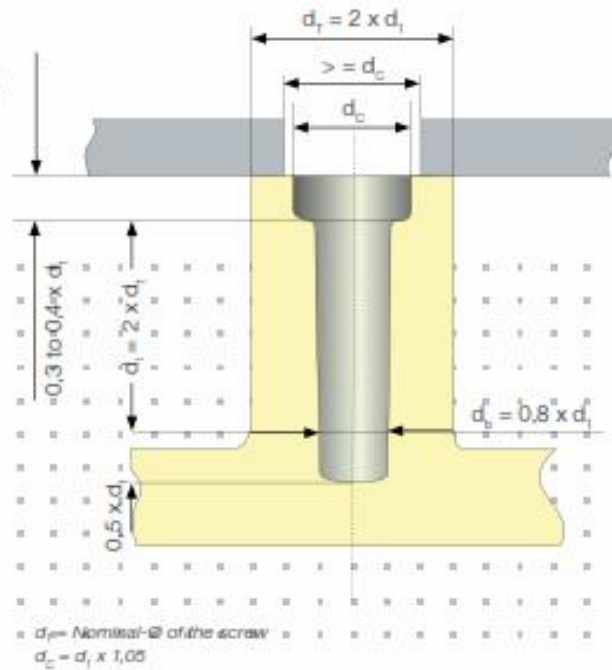
Boss design

The most favourable hole diameter has in most cases proven to be:

$$d_b = 0,8 \times d_s \pm \text{tolerance of screw diameter}$$

(see tolerance page 16)

For higher filled materials or materials with a bigger strength the hole diameter can be increased up to $d_b = 0,88 \times d_s$.



DELTA PT

Tolerances

Tolerance	Nominal value [mm]							
	to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50	over 50 to 80	over 80 to 120
h 14	0 -0,25	0 -0,30	0 -0,36	0 -0,43	0 -0,52			
h 15	0 -0,40	0 -0,48	0 -0,58	0 -0,70	0 -0,84			
js 14	± 0,12	± 0,15	± 0,18					
js 16	± 0,30	± 0,375	± 0,45	± 0,55	± 0,65	± 0,80	± 0,95	± 1,10
js 17			± 0,75	± 0,90	± 1,05	± 1,25	± 1,50	

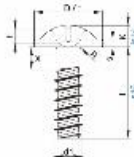
screw	10	12	14	16	18	20	22	25	
External- \varnothing d_s	1,4	1,2	1,4	1,6	1,8	2,0	2,2	2,5	
Tolerance	+0,08	+0,08	+0,08	+0,08	+0,08	+0,08	+0,08	+0,10	
screw	30	35	40	45	50	60	70	80	100
External- \varnothing d_s	3,0	3,5	4,0	4,5	5,0	6,0	7,0	8,0	10,0
Tolerance	+0,10	+0,10	+0,10	+0,10	+0,15	+0,15	+0,18	+0,18	+0,25

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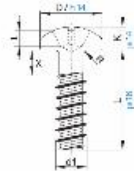
DELTA PT

Design

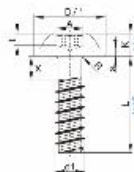
EJOT DELTA PT® Dimensions		10	12	14	16	18	20	22	25
External thread-Ø	d_e	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,50
Core-Ø	d_w	0,64	0,78	0,93	1,07	1,22	1,36	1,51	1,72
Thread pitch	P	0,44	0,51	0,57	0,64	0,71	0,78	0,85	0,95
Thread run-out	X_{max}	0,50	0,60	0,70	0,80	0,90	1,00	1,10	1,30



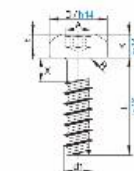
WN 5411		D	10	12	14	16	18	20	22	25		
Head-Ø	D				3,20	3,60	4,00	4,50	5,00	5,50		
Head height	K				1,15	1,20	1,35	1,40	1,60	1,80		
Washer thickness	s				0,50	0,60	0,60	0,60	0,60	0,70		
Radius	R_{max}							0,35	0,35	0,40		
H-cross-recess	Penetration depth	t	min.							0,51	0,68	0,82
				max.							0,97	1,14
Z-cross-recess	Penetration depth	t	min.								0,73	0,86
				max.							0,98	1,11
C-cross-recess	Penetration depth	t	min.		0,56	0,81	1,01					
				max.	0,84	1,10	1,31					
Cross size H/Z/C					0	0	0	1	1	1		



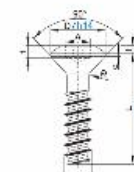
WN 5412		D	10	12	14	16	18	20	22	25		
Head-Ø	D							3,50	3,90	4,40		
Head height	K							1,60	1,60	1,90		
Radius	R_{max}							0,35	0,35	0,40		
H-cross-recess	Penetration depth	t	min.							0,64	0,74	0,92
				max.							1,10	1,20
Z-cross-recess	Penetration depth	t	min.								0,82	0,92
				max.							1,07	1,17
C-cross-recess	Penetration depth	t	min.									
				max.								
Cross size H/Z/C								1	1	1		



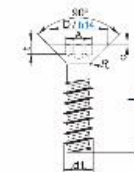
WN 5451		D	10	12	14	16	18	20	22	25	
Head-Ø	D				3,20	3,60	4,00	4,50	5,00	5,50	
Head height	K				1,15	1,20	1,35	1,60	1,60	1,90	
Washer thickness	s				0,50	0,60	0,60	0,60	0,60	0,70	
Radius	R_{max}				0,20	0,25	0,25	0,35	0,35	0,40	
TORX / AUTOSERT®					3IP	5IP	6IP	6IP	6IP	8IP	
					A_{Ref}	1,20	1,45	1,75	1,75	1,75	2,40
Penetration depth	t	min.							0,40	0,50	0,50
			max.							0,55	0,65



WN 5452		D	10	12	14	16	18	20	22	25	
Head-Ø	D	2,00	2,30	2,60	3,00	3,30	3,50	3,90	4,40		
Head height	K	0,80	0,95	1,05	1,20	1,30	1,60	1,60	1,90		
Radius	R_{max}	0,20	0,20	0,20	0,25	0,25	0,35	0,35	0,40		
TORX / AUTOSERT®											
											2IP
Penetration depth	t	min.	1,00	1,20	1,20	1,45	1,75	1,75	1,75	2,40	
			max.	0,30	0,35	0,35	0,50	0,50	0,65	0,65	0,80



WN 5453		D	10	12	14	16	18	20	22	25	
Head-Ø	D							4,00	4,40	5,00	
Cyl. head height	C_{max}							0,35	0,35	0,55	
Calotte height	h_f							0,40	0,40	0,50	
Radius	R_{max}							0,80	0,80	1,00	
TORX / AUTOSERT®								6IP	6IP	8IP	
								A_{Ref}	1,75	1,75	2,40
Penetration depth	t	min.							0,65	0,65	0,80
			max.							0,85	0,85



WN 5454		D	10	12	14	16	18	20	22	25	
Head-Ø	D	2,35	2,65	2,80	3,35	3,65	4,00	4,40	5,00		
Cyl. head height	C_{max}	0,20	0,25	0,30	0,35	0,35	0,35	0,35	0,55		
Radius	R_{max}	0,40	0,40	0,50	0,60	0,60	0,60	0,80	0,80	1,00	
TORX / AUTOSERT®											
											2IP
Penetration depth	t	min.	1,00	1,20	1,20	1,45	1,75	1,75	1,75	2,40	
			max.	0,30	0,35	0,35	0,50	0,50	0,50	0,50	0,70

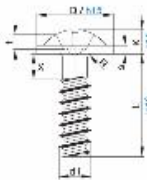
*DELTA PT® 14-18: h14
from DELTA PT® 20: h15




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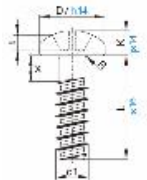
DELTA PT




Design

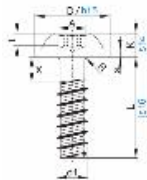
EJOT DELTAPT® Dimensions		30	35	40	45	50	60	70	80	100
External thread-Ø	d_1	3,00	3,50	4,00	4,50	5,00	6,00	7,00	8,00	10,00
Core-Ø	d_2	2,09	2,45	2,81	3,17	3,53	4,26	4,98	5,70	7,15
Thread pitch	P	1,12	1,29	1,46	1,63	1,80	2,14	2,48	2,82	3,50
Thread run-out	X_{max}	1,50	1,80	2,00	2,30	2,50	3,00	3,50	4,00	5,00




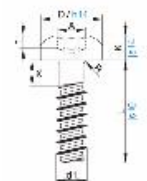
WN 5411		Head-Ø	D	6,50	7,50	9,00	10,00	11,00	13,50	15,50		
		Head height	K	2,10	2,40	2,50	2,50	3,20	4,00	4,60		
		Washer thickness	s	0,80	0,90	1,00	1,00	1,20	1,40	1,60		
		Radius	R_{max}	0,50	0,50	0,60	0,60	0,70	0,80	0,90		
	H-cross-recess	Penetration depth	t	min.	1,15	1,07	1,33	1,33	1,98	2,24	2,84	
				max.	1,61	1,70	1,96	1,96	2,61	2,90	3,50	
	Z-cross-recess	Penetration depth	t	min.	1,26	1,08	1,40	1,40	2,01	2,27	2,91	
				max.	1,51	1,54	1,86	1,86	2,47	2,73	3,37	
	C-cross-recess	Penetration depth	t	min.								
				max.								
		Cross size H/Z/C		1	2	2	2	2	3	3		




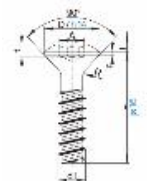
WN 5412		Head-Ø	D	5,30	6,10	7,00	7,50	8,80	10,50	12,30		
		Head height	K	2,30	2,70	3,10	3,20	3,50	4,20	5,10		
		Radius	R_{max}	0,50	0,50	0,60	0,60	0,70	0,80	0,90		
	H-cross-recess	Penetration depth	t	min.	1,19	1,23	1,51	1,51	2,12	2,44	3,00	
				max.	1,65	1,86	2,14	2,14	2,75	3,10	3,66	
	Z-cross-recess	Penetration depth	t	min.	1,36	1,26	1,62	1,62	2,23	2,57	3,14	
				max.	1,61	1,72	2,08	2,08	2,67	3,03	3,61	
	C-Kreuzschlitz	Penetration depth	t	min.								
				max.								
		Cross size H/Z/C		1	2	2	2	2	3	3		




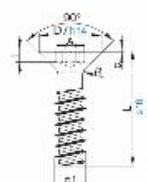
WN 5451		Head-Ø	D	6,50	7,50	9,00	10,00	11,00	13,50	15,50	18,00	
		Head-height	K	2,30	2,70	3,10	3,20	3,50	4,20	4,90	5,60	
		Washer thickness	s	0,80	0,90	1,00	1,10	1,20	1,40	1,60	1,80	
		Radius	R_{max}	0,50	0,50	0,60	0,60	0,70	0,80	0,90	1,00	
	TORXplus® / AUTOSERT®	Penetration depth	t	A_{Ref}	10IP	15IP	20IP	20IP	25IP	30IP	30IP	40IP
				min.	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75
				max.	1,00	1,10	1,40	1,40	1,50	1,90	2,30	2,60
					1,30	1,50	1,80	1,80	1,90	2,40	2,90	3,20




WN 5452		Head-Ø	D	5,30	6,10	7,00	7,50	8,80	10,50	12,30	14,10	17,00
		Head height	K	2,30	2,70	3,10	3,20	3,50	4,20	4,90	5,60	6,60
		Radius	R_{max}	0,50	0,50	0,60	0,60	0,70	0,80	0,90	1,00	1,10
	TORXplus® / AUTOSERT®	Penetration depth	t	A_{Ref}	10IP	15IP	20IP	20IP	25IP	30IP	30IP	40IP
				min.	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75
				max.	1,00	1,10	1,40	1,40	1,50	1,90	2,30	2,60
					1,30	1,50	1,80	1,80	1,90	2,40	2,90	3,20



WN 5453		Head-Ø	D	6,00	7,00	8,00	9,00	10,00	12,00	14,00	16,00	20,00
		Cyl. head height	c_{max}	0,55	0,65	0,70	0,70	0,75	0,85	0,90	0,95	1,10
		Calotte height	c_f	0,70	0,80	1,00	1,00	1,20	1,20	1,30	1,40	1,60
		Radius	R_{max}	1,20	1,40	1,60	1,80	2,00	2,40	2,60	3,20	4,50
	TORXplus® / AUTOSERT®	Penetration depth	t	A_{Ref}	10IP	15IP	20IP	20IP	25IP	30IP	30IP	40IP
				min.	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75
				max.	1,00	1,10	1,40	1,40	1,50	1,90	2,30	2,60
					1,30	1,50	1,80	1,80	1,90	2,40	2,90	3,20



WN 5454		Head-Ø	D	6,00	7,00	8,00	9,00	10,00	12,00	14,00	16,00	20,00
		Cyl. head height	c_{max}	0,55	0,65	0,70	0,70	0,75	0,85	0,90	0,95	1,10
		Radius	R_{max}	1,20	1,40	1,60	1,80	2,00	2,40	2,60	3,20	4,50
	TORXplus® / AUTOSERT®	Penetration depth	t	A_{Ref}	10IP	15IP	20IP	20IP	25IP	30IP	30IP	40IP
				min.	2,80	3,35	3,95	3,95	4,50	5,60	5,60	6,75
				max.	0,75	0,95	1,10	1,25	1,25	1,50	2,30	2,40
					1,00	1,30	1,45	1,70	1,65	2,00	2,90	2,90

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