

A technical line drawing of a screw, shown in a perspective view from the top-left. The drawing is composed of thin white lines on a yellow background. It shows the head of the screw at the top, followed by the threads of the shaft, and the pointed tip at the bottom. The drawing is partially cut off by the right edge of the page.

Screws for plastic

CELOspArk®



CELOSPARK® screw has been developed for the direct fastening into ductile and medium thermoplastics. CELOSPARK® special thread geometry provides high pull-out resistance, enables an easy assembly and prevents deformation of plastic bosses, greatly improving the technical properties of self-tapping screws.

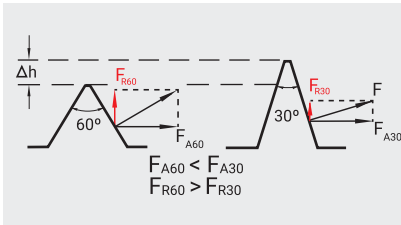


Fig.8. If we carry out a resolution of resultant forces, a 30° thread angle provides higher axial force (Fa) and lower radial force (Fr) when comparing with 60° thread angle.

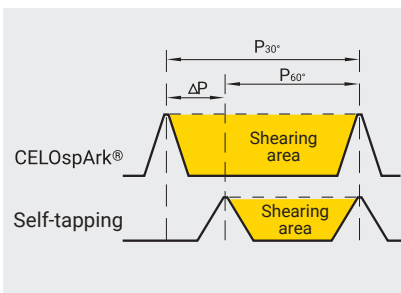


Fig.9. Increasing the screw thread pitch provides a larger shearing zone and a more resistant nut member in the plastic.

1. Technical features

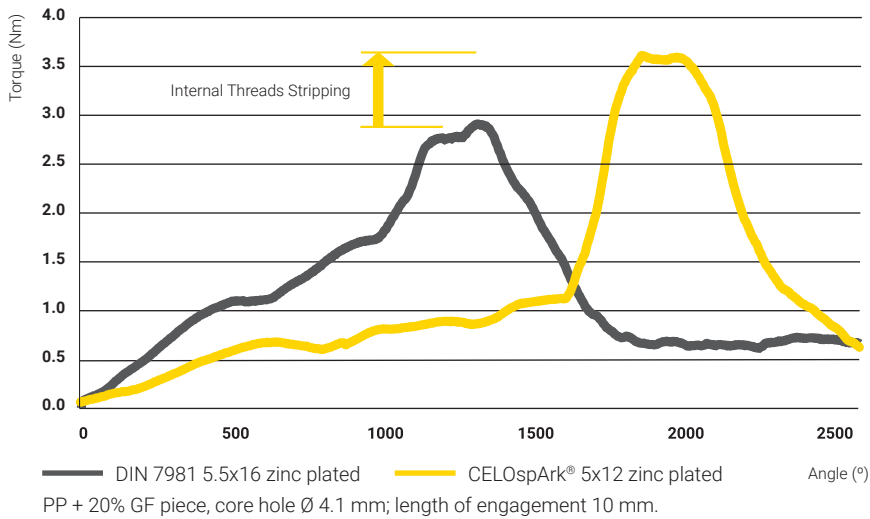
- 30° thread angle**
 During the threading process, the thread angle of 30° provides a 50% reduction in radial tension (Fr) when compared to self-tapping screws, reduces the problem of boss bursting and allows for bosses with smaller diameter.
- Increased thread height and thread pitch**
 Raising the height of the thread gives 26% more penetration in plastic materials. The volume of plastic in the shearing zone for CELOspArk® (area between thread flanks) is much bigger than for a self-tapping screw, resulting in a more resistant nut member and consequently, an increase in pull-out and stripping resistance.
- Progressive point**
 Allows for a quick alignment of the screw and improves material displacement during thread forming process.

2. Advantages

- Less radial tension in plastic.** Reduces the problem of boss bursting and allows for bosses with smaller diameter.
- Low thread forming torque** and high stripping torque provides a safer installation process.
- Higher pull-out and stripping resistance** enable its use in assemblies with demanding mechanical requirements.
- Quick alignment of the screw **reduces assembly time.**
- The increase of surface contact between threads and nut member improves **vibration loosening resistance.**
- Possibility to reuse the screw** due to its lower risk of stripping.

The technical advantages of CELOspArk® screw directly translate into a **more resistant assembly, greater safety** during threading and lower costs of the assembly process.

3. Threading curve



When comparing CELOspArk® screw and self-tapping screw threading curves, the larger difference between threading torque and failure torque of CELOspArk® screw provides greater safety during assembly.

The tightening torque depends on the screw breaking torque, friction coefficient, hole dimensions, length of engagement and screwdriver stability. The optimum tightening torque is determined based on threading curve tests in the laboratory.

4. Boss design recommendations

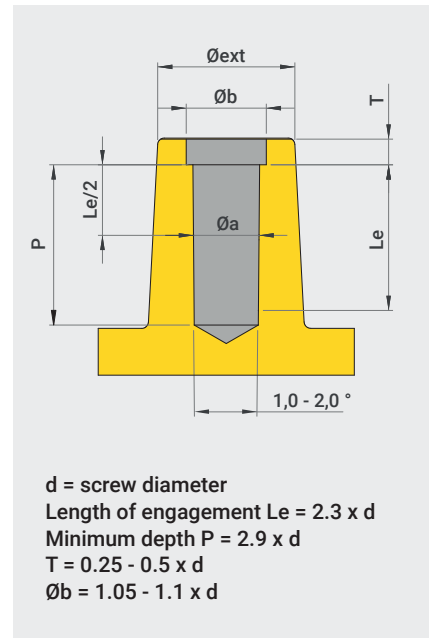
In order to ensure a strong fixing and guarantee the clamping of the assembly, it is relevant to pay attention to the boss design, as it must resist mold extraction and cooling tension, as well as tension created during screw installation.

The boss dimensions will vary based on the type of plastic. It's important to include a relief bore to prevent damaging the boss when starting thread forming. The relief bore also helps to align the screw during threading.

For additional information, please contact our technical department.

Material	$\varnothing a$	$\varnothing ext$	Material	$\varnothing a$	$\varnothing ext$
PTFE	0.73 x d	2.1 - 2.6 x d	PET	0.78 x d	2.0 - 2.5 x d
PE	0.75 x d	2.1 - 2.6 x d	PC + ABS	0.80 x d	2.0 - 2.5 x d
PA6 / PA66	0.75 x d	2.1 - 2.6 x d	PP + 15GF	0.80 x d	2.0 - 2.5 x d
PP	0.75 x d	2.1 - 2.6 x d	PC	0.82 x d	2.0 - 2.5 x d
PPO	0.75 x d	2.1 - 2.6 x d	PE + 30GF	0.82 x d	2.0 - 2.5 x d
ABS	0.75 x d	2.1 - 2.6 x d	PA6 + 15GF	0.82 x d	2.0 - 2.5 x d
ASA	0.78 x d	2.0 - 2.5 x d	PC + 10GF	0.83 x d	2.0 - 2.5 x d
PBT	0.78 x d	2.0 - 2.5 x d	PMMA	0.83 x d	2.0 - 2.5 x d
PS	0.78 x d	2.0 - 2.5 x d	PA66 + 15GF	0.83 x d	2.0 - 2.5 x d
POM	0.78 x d	2.0 - 2.5 x d	ABS + 20GF	0.83 x d	2.0 - 2.5 x d

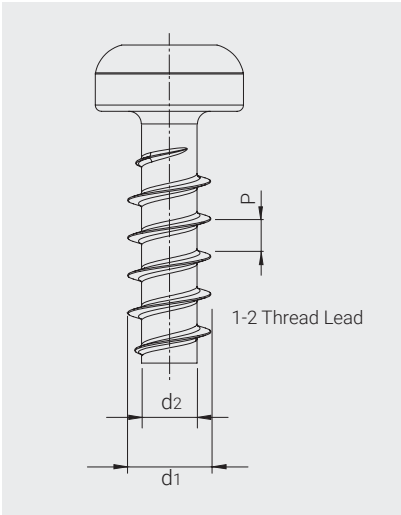
CELOspArk® Minimum breaking torque	
d (mm)	Torque (Nm)
1.8	0.25
2.0	0.30
2.3	0.34
2.5	0.40
3.0	1.20
3.5	2.00
4.0	2.80
4.5	3.50
5.0	4.20
6.0	7.00
7.0	10.00
8.0	13.00



This data is intended for guidance purposes. We recommend carrying out relevant tests on plastic parts to establish the precise values.

Suggested tolerances are:

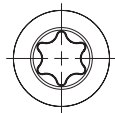
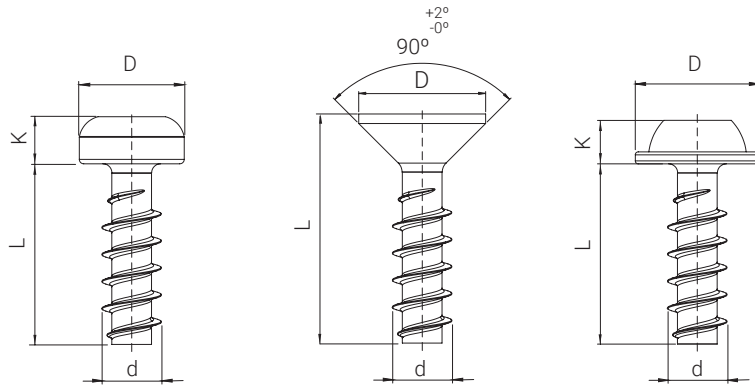
+0.08 mm for holes $\leq \varnothing 3.0$ mm
 +0.10 mm for holes $\varnothing 3.0 - \varnothing 4.5$ mm
 +0.12 mm for holes $> \varnothing 4.5$ mm



5. Technical data

CELOspArk® screws can be manufactured with different head types, recess, dimensions and coating configuration to fit your exact application requirements.

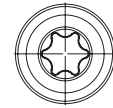
The table shows thread and head dimensions under CELO manufacturing standards. For different head design, recess or threaded length, contact our technical department.



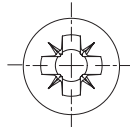
Ref. SP81T



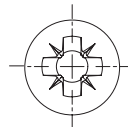
Ref. SP82T



Ref. SP87T



Ref. SP81Z



Ref. SP82Z






Ref. SP87Z




Nominal Value (mm)	Tolerance	
	h14	h15
To 3	0 -0.25	0 -0.40
Over 3 to 6	0 -0.30	0 -0.48
Over 6 to 10	0 -0.36	0 -0.58
Over 10 to 18	0 -0.43	0 -0.70

d	d1	d2 min.	P ± 0.05	Breaking torque min. (Nm)	D h14	K h14	Pozi	TORX® TORX Plus®	D h14	Pozi	TORX® TORX Plus®	D h15	K h14	Pozi	TORX® TORX Plus®
1.8	1.8+0.10	0.70	0.80	0.25	3.20	1.50	0	T5 / 5 IP				4.20	1.40		T5 / 5 IP
2.0	2.0+0.10	0.80	1.00	0.30	3.40	1.60	1	T6 / 6 IP	4.00	1	T6 / 6 IP	4.30	1.50	1	T6 / 6 IP
2.3	2.3+0.15	1.00	1.10	0.34	3.90	1.70	1	T7 / 7 IP	4.60	1	T7 / 7 IP	4.50	1.70	1	T7 / 7 IP
2.5	2.5+0.15	1.20	1.15	0.40	4.30	2.10	1	T8 / 8 IP	5.00	1	T8 / 8 IP	5.30	2.10	1	T8 / 8 IP
3.0	3.0+0.18	1.50	1.35	1.20	5.30	2.30	1	T10 / 10 IP	6.00	1	T10 / 10 IP	6.30	2.20	1	T10 / 10 IP
3.5	3.5+0.18	1.66	1.55	2.00	6.20	2.60	2	T15 / 15 IP	7.00	2	T15 / 15 IP	7.30	2.60	2	T15 / 15 IP
4.0	4.0+0.18	2.11	1.80	2.80	7.00	3.10	2	T20 / 20 IP	8.00	2	T20 / 20 IP	8.30	2.90	2	T20 / 20 IP
4.5	4.5+0.18	2.30	2.00	3.50	7.50	3.40	2	T20 / 20 IP							
5.0	5.0+0.18	2.64	2.24	4.20	9.00	3.60	2	T25 / 25 IP	10.00	2	T25 / 25 IP	10.50	3.60	2	T25 / 25 IP
6.0	6.0+0.22	3.20	2.70	7.00	10.80	4.20	3	T30 / 30 IP	12.00	3	T30 / 30 IP	12.50	4.00	3	T30 / 30 IP
7.0	7.0+0.23	3.70	3.15	10.00	12.50	4.80	3	T40 / 40 IP				15.00	4.80	3	T40 / 40 IP
8.0	8.0+0.24	4.65	3.60	13.00	14.00	4.80	3	T40 / 40 IP				17.00	5.00	3	T40 / 40 IP

Dimensions in mm. Unless expressly stated, the values shown are nominal. For tolerances and other data, please contact our technical department.

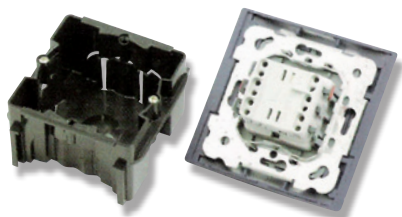
6. Products in stock

SP81T	SP81Z	SP87T
		
<ul style="list-style-type: none"> • Pan head • TORX® recess • Zinc plated Cr (III) 5µm 	<ul style="list-style-type: none"> • Pan head • POZI recess • Zinc plated Cr (III) 5µm 	<ul style="list-style-type: none"> • Pan head flange • TORX® recess • Zinc plated Cr (III) 5µm

SP87Z	SP82T	SP82Z
		
<ul style="list-style-type: none"> • Pan head flange • POZI recess • Zinc plated Cr (III) 5µm 	<ul style="list-style-type: none"> • Countersunk head • TORX® recess • Zinc plated Cr (III) 5µm 	<ul style="list-style-type: none"> • Countersunk head • POZI recess • Zinc plated Cr (III) 5µm

7. Applications

- Automotive
- Electric material
- Lighting
- Household appliances
- Industrial products

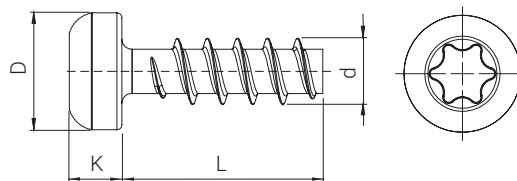




SP81T

CELOspArk®

- Pan head
- TORX® recess
- Zinc plated Cr (III) 5µm



d mm	1.8	2.0	2.3	2.5	3.0	3.5	4.0	4.5	5.0	6.0
D mm	3.20	3.40	3.90	4.30	5.30	6.20	7.00	7.50	9.00	10.80
K mm	1.50	1.60	1.70	2.10	2.30	2.60	3.10	3.40	3.60	4.20
TORX®	5 IP ¹	6 IP ¹	7 IP ¹	8 IP ¹	T 10	T 15	T 20	T 20	T 25	T 30

L mm	Ø1.8	Ø2.0	Ø2.3	Ø2.5	Ø3.0	Ø3.5	Ø4.0	Ø4.5	Ø5.0	Ø6.0
3	-	-	-	-	-	-	-	-	-	-
4	○	○	-	-	-	-	-	-	-	-
5	○	○	-	-	-	-	-	-	-	-
6	●	●	○	○	●	-	-	-	-	-
8	○	○	○	●	●	●	●	-	-	-
10	○	○	○	○	●	●	●	-	-	-
12	-	○	○	○	●	●	●	○	●	-
13	-	-	○	○	○	○	○	○	○	○
14	-	-	○	○	○	○	○	○	○	○
16	-	-	○	○	●	●	●	○	○	○
18	-	-	○	○	○	○	○	○	○	○
19	-	-	○	○	○	○	○	○	○	○
20	-	-	○	○	●	○	●	○	●	○
22	-	-	-	-	○	○	○	○	○	○
25	-	-	-	-	○	○	○	○	○	○
30	-	-	-	-	-	○	○	○	○	○
35	-	-	-	-	-	○	○	○	○	○
40	-	-	-	-	-	○	○	○	○	○
50	-	-	-	-	-	○	○	○	○	○

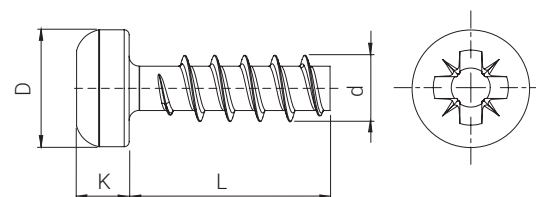
● Product available in stock. ○ Product available upon request. ¹ TORX PLUS®
 For other plating, thread dimensions and head design, please contact our sales department.
 Information about packaging conditions in page 130.



SP81Z

CELOspArk®

- Pan head
- POZI recess
- Zinc plated Cr (III) 5µm



d mm	1.8	2.0	2.3	2.5	3.0	3.5	4.0	4.5	5.0	6.0
D mm	3.20	3.40	3.90	4.30	5.30	6.20	7.00	7.50	9.00	10.80
K mm	1.50	1.60	1.70	2.10	2.30	2.60	3.10	3.40	3.60	4.20
POZI	Z 0	Z 1	Z 1	Z 1	Z 1	Z 2	Z 2	Z 2	Z 2	Z 3

L mm	Ø1.8	Ø2.0	Ø2.3	Ø2.5	Ø3.0	Ø3.5	Ø4.0	Ø4.5	Ø5.0	Ø6.0
3	–	–	–	–	–	–	–	–	–	–
4	○	○	–	–	–	–	–	–	–	–
5	○	○	–	–	–	–	–	–	–	–
6	○	○	●	●	●	–	–	–	–	–
8	○	○	●	●	●	●	–	–	–	–
10	○	○	●	●	●	●	●	–	–	–
12	–	○	●	●	●	●	●	○	○	–
13	–	–	○	○	○	●	○	○	○	–
14	–	–	○	○	○	○	○	○	○	–
16	–	–	○	●	●	●	●	●	●	–
18	–	–	○	○	●	○	○	○	○	–
19	–	–	○	○	○	○	○	○	○	○
20	–	–	○	○	●	●	●	●	●	○
22	–	–	–	–	○	○	●	○	○	○
25	–	–	–	–	○	○	●	○	○	○
30	–	–	–	–	–	○	●	○	●	●
35	–	–	–	–	–	○	○	○	○	○
40	–	–	–	–	–	○	○	○	○	○
50	–	–	–	–	–	○	○	○	○	○

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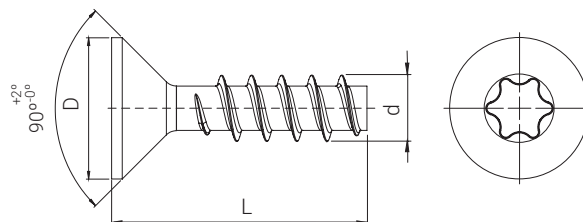
Information about packaging conditions in page 130.



SP82T

CELOspArk®

- Countersunk head
- TORX® recess
- Zinc plated Cr (III) 5µm



d mm	2.3	2.5	3.0	3.5	4.0	5.0	6.0
D mm	4.60	5.00	6.00	7.00	8.00	10.00	12.00
TORX®	7 IP ¹	8 IP ¹	T 10	T 15	T 20	T 25	T 30

L mm	Ø2.3	Ø2.5	Ø3.0	Ø3.5	Ø4.0	Ø5.0	Ø6.0
6	○	○	●	-	-	-	-
8	○	○	●	○	-	-	-
10	○	○	○	●	○	-	-
12	○	○	●	●	●	-	-
13	○	○	○	○	○	-	-
14	○	○	○	○	○	-	-
16	○	○	●	○	●	○	-
18	○	○	○	○	○	○	-
19	○	○	○	○	○	○	○
20	○	○	○	○	○	○	○
22	-	-	○	○	○	○	○
25	-	-	○	○	○	○	○
30	-	-	○	○	○	○	○
35	-	-	-	○	○	○	○
40	-	-	-	○	○	○	○
50	-	-	-	○	○	○	○

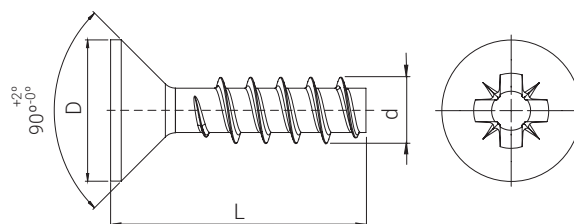
● Product available in stock. ○ Product available upon request. ¹ TORX PLUS®
 For other plating, thread dimensions and head design, please contact our sales department.
 Information about packaging conditions in page 130.



SP82Z

CELOspArk®

- Countersunk head
- POZI recess
- Zinc plated Cr (III) 5µm



d mm	2.3	2.5	3.0	3.5	4.0	5.0	6.0
D mm	4.60	5.00	6.00	8.00	8.00	10.00	12.00
POZI	Z 1	Z 1	Z 1	Z 2	Z 2	Z 2	Z 3

L mm	Ø2.3	Ø2.5	Ø3.0	Ø3.5	Ø4.0	Ø5.0	Ø6.0
6	○	○	○	–	–	–	–
8	○	○	●	●	–	–	–
10	○	●	●	●	○	–	–
12	○	○	●	○	●	–	–
13	○	○	○	○	○	–	–
14	○	○	○	○	○	–	–
16	○	○	○	●	●	○	–
18	○	○	○	○	○	○	–
19	○	○	○	○	○	○	○
20	○	○	○	○	○	○	○
22	–	–	○	○	○	○	○
25	–	–	○	○	○	○	○
30	–	–	–	○	●	○	○
35	–	–	–	○	○	○	○
40	–	–	–	○	○	○	○
50	–	–	–	○	○	○	○

● Product available in stock. ○ Product available upon request.

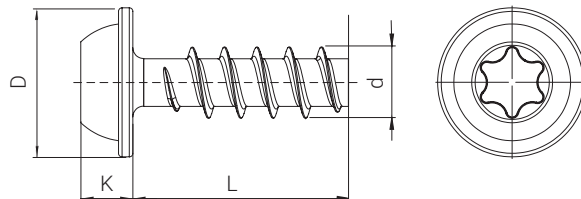
For other plating, thread dimensions and head design, please contact our sales department.
Information about packaging conditions in page 130.



SP87T

CELOspArk®

- Pan head flange
- TORX® recess
- Zinc plated Cr (III) 5µm



	2.5	3.0	3.5	4.0	5.0	6.0
d mm	2.5	3.0	3.5	4.0	5.0	6.0
D mm	5.30	6.30	7.30	8.30	10.50	12.50
K mm	2.10	2.20	2.60	2.90	3.60	4.00
TORX®	8IP ¹	T 10	T 15	T 20	T 25	T 30

L mm	Ø2.5	Ø3.0	Ø3.5	Ø4.0	Ø5.0	Ø6.0
6	○	–	–	–	–	–
8	●	●	○	–	–	–
10	○	●	○	○	–	–
12	○	●	●	●	○	–
13	○	○	○	○	○	–
14	○	○	○	○	○	–
16	○	○	○	●	○	○
18	○	○	○	○	○	○
19	○	○	○	○	○	○
20	○	○	○	●	●	●
22	–	○	○	○	○	○
25	–	○	○	○	○	○
30	–	–	○	○	○	●
35	–	–	○	○	○	○
40	–	–	○	○	○	○
50	–	–	○	○	○	○

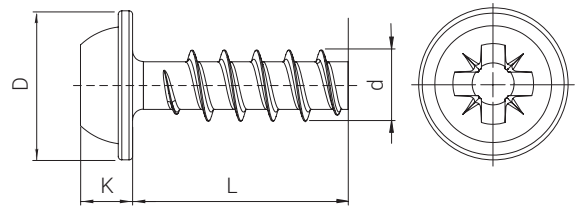
● Product available in stock. ○ Product available upon request. ¹ TORX PLUS®
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 Information about packaging conditions in page 130.



SP87Z

CELOspArk®

- Pan head flange
- POZI recess
- Zinc plated Cr (III) 5µm



	2.5	3.0	3.5	4.0	5.0	6.0
d mm	2.5	3.0	3.5	4.0	5.0	6.0
D mm	5.30	6.30	7.30	8.30	10.50	12.50
K mm	2.10	2.20	2.60	2.90	3.60	4.00
POZI	Z 1	Z 1	Z 2	Z 2	Z 2	Z 3

L mm	Ø2.5	Ø3.0	Ø3.5	Ø4.0	Ø5.0	Ø6.0
6	○	●	–	–	–	–
8	○	●	●	–	–	–
10	○	●	●	○	–	–
12	○	○	○	○	○	–
13	○	○	○	○	○	–
14	○	○	○	○	○	–
16	○	○	○	○	○	○
18	○	○	○	○	○	○
19	○	○	○	○	○	○
20	○	●	○	○	○	○
22	–	○	○	○	○	○
25	–	○	○	○	○	○
30	–	–	○	○	○	○
35	–	–	○	○	○	○
40	–	–	○	○	○	○
50	–	–	○	○	○	○

● Product available in stock. ○ Product available upon request.

For other plating, thread dimensions and head design, please contact our sales department.
Information about packaging conditions in page 130.

Packaging of products in stock

The screw references available in stock are packed in plastic bags. The quantity per bag will depend on the dimensions and weight of the screw.

The screw reference and production batch number are printed on the bag label, allowing for a perfect traceability of the pieces.

The screw references under special production, the packaging will depend on the conditions agreed and confirmed in purchase order. The quantity per box and its dimensions will depend on the dimensions and weight of the screw.

For additional information, please contact our sales department.

References: SP81T, SP81Z, SP82T, SP82Z, HS81PA, HS82PA, F281PA

L (mm)	Screw diameter (mm)								
	1.8	2.0 - 2.3	2.5	3.0	3.5	4.0	4.5	5.0	6.0
6	●	●	●	●	●				
8	●	●	●	●	●	○			
10	●	●	●	●	●	○			
12	●	●	●	●	○	○	+	+	
13	●	●	●	●	○	○	+	+	
14	●	●	●	○	○	○	+	+	
16	●	●	●	○	○	○	+	+	◇
18	○	○	○	○	○	+	+	+	◇
20	○	○	○	○	○	+	+	+	◇
22							+	+	-
25							+	+	-
30							-	-	-
35							-	-	◇
40								◇	◇
50								◇	◇

● 5,000 PCS / ○ 2,500 PCS / + 1,250 PCS / - 1,000 PCS / ◇ 500 PCS

References: SP87T, SP87Z, TP88Z, HS87PA, F287PA

L (mm)	Screw diameter (mm)						
	2.0 - 2.3	2.5	3.0	3.5	4.0	4.5	5.0
6	●	●	●				
8	●	●	●	●			
10	●	●	●	●	○		
12	●	●	●	○	○	○	
14	●	●	●	○	○	○	
16	●	●	●	○	+	+	-
18	●	●	○	○	+	+	-
20	●	●	○	+	+	+	-
22			○	+	+	+	-
25			○	+	+	+	-
30				+	+	+	◇
35				+	+	+	◇
40				+	+	+	◇
50				+	+	+	◇

● 5,000 PCS / ○ 2,500 PCS / + 1,250 PCS / - 1,000 PCS / ◇ 500 PCS

References: TT85T, TT85Z, TT65T, TT65Z, TT12, TT78, TT22T, NT85T, PL78T, FT85T, FT85Z, EX85T, PG, FTA85Z

L (mm)	Screw diameter (mm)						
	2.0	2.5	3.0	4.0	5.0	6.0	8.0
3	●	●	●	●			
4	●	●	●	●			
5	●	●	●	●			
6	●	●	●	○	○		
7	●	●	●	○	○		
8	●	●	●	○	+	+	
10	●	●	●	○	+	+	
12	●	●	●	○	+	-	
15	●	●	●	○	+	-	◇
16	●	●	●	○	+	-	#
18	●	●	○	○	+	◇	#
20	●	●	○	+	-	◇	#
22			○	+	-	◇	#
25			○	+	-	◇	#
28			○	-	-	◇	#
30			○	-	-	◇	#
35			○	-	◇	◇	#

● 5,000 PCS / ○ 2,500 PCS / + 1,250 PCS / - 1,000 PCS / ◇ 500 PCS / # 250 PCS

Small Things Matter

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