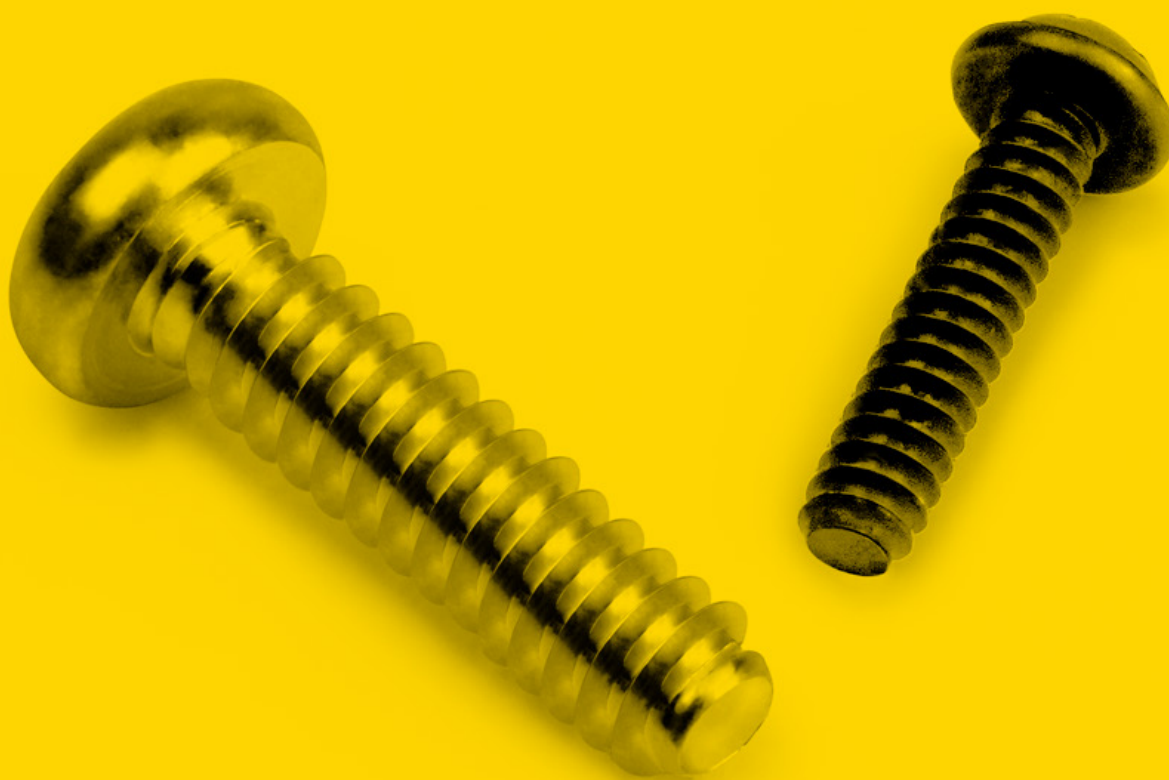


CELO

REMFORM® II F™

The solution for light alloys
and magnesium assemblies



REMFORM® II F™



REMFORM® II F™ (Fine Thread) screw is specifically recommended for the assembly of aluminum and magnesium die casting parts, extruded aluminum profiles, high content glass fiber reinforced plastics and other low ductility materials.

REMFORM® II F™ employs the same asymmetric thread design than REMFORM® II HS™ but with a smaller thread pitch.

1. Technical features

- Asymmetric thread design of 30° minimizes the disturbance of a low ductility nut member during thread forming and efficient material displacement **requires minimum energy during threading process.**
- The finer thread pitch of REMFORM® II F™ screws is perfectly suit to magnesium, soft aluminum, thermoset plastics, and other low ductility material. It provides larger shearing zone, increasing **resistance to pull-out** and **vibrational loosening.**
- In applications on magnesium, the hole diameter may have a wide spread, an inherent consequence of the magnesium injection process. The design of REMFORM® II F™ screw allows absorbing this variability in the diameter and **ensures thread forming in pilot holes with a wide tolerance.**
- The lead threads **facilitate alignment into the hole**, avoiding the possibility of blockage.
- Magnesium is in the lowest part of the galvanic series. Therefore, in contact with other metals, its corrosion is accelerated due to the potential difference of the materials. In some applications, it's necessary to use screws with **special coating to minimise the risk of galvanic corrosion of magnesium parts.** We recommend contacting our technical department for additional information.

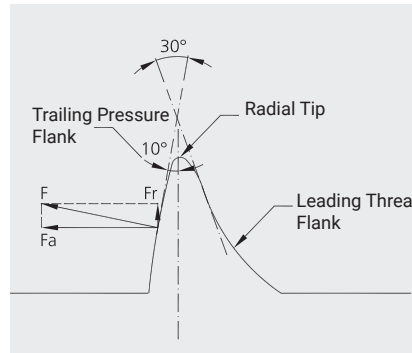
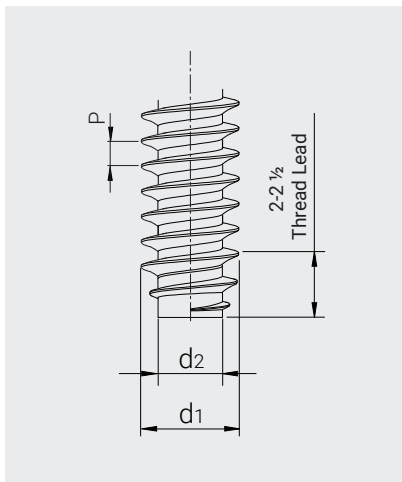


Fig.39. Asymmetric thread design of REMFORM® II F™. Trailing Pressure Flank minimizes radial stress (F_r) during threading and optimizes pull-out resistance.



2. Advantages

- Larger core diameter provides **higher torsional and tensile strength** and allows higher tightening torque.
- Tensile strength of over 1,000 N/mm² and reduced thread pitch **ensures high pull-out resistance.**
- **High stripping resistance.**
- Reduced length of engagement enables the assembly of plastic with low insertion depth **assuring high clamping and pull-out resistance.**
- Low thread forming torque and high stripping torque offer **optimal safety during assembly.**

3. Cost reduction

A screw represents only 15% of the total in-place cost. The remaining 85% corresponds to tapping operations, cleaning oil and chips, usage of additional elements to prevent vibration loosening and cross-threading, labor expenses and scrap.

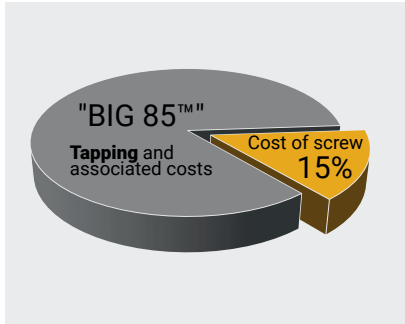
In the assembly of magnesium parts, REMFORM® II F™ screws provide important opportunities for cost saving:

- Thread design ensures thread forming in pilot holes with a wide tolerance, avoiding blockage and stripping problems.
- Progressive point ensures excellent screw alignment, avoiding blockage and ensuring thread forming in pilot holes with a wide tolerance.
- Eliminate tapping process and all associated costs: drilling, tapping, cleaning oil and chips, verification...

All of these technical advantages guarantee optimal assembly in automated lines and improved productivity resulting in reduction of line downtime and adjustments.

In the assembly of aluminum extruded profiles parts, REMFORM® II F™ screws also provide important opportunities for cost saving:

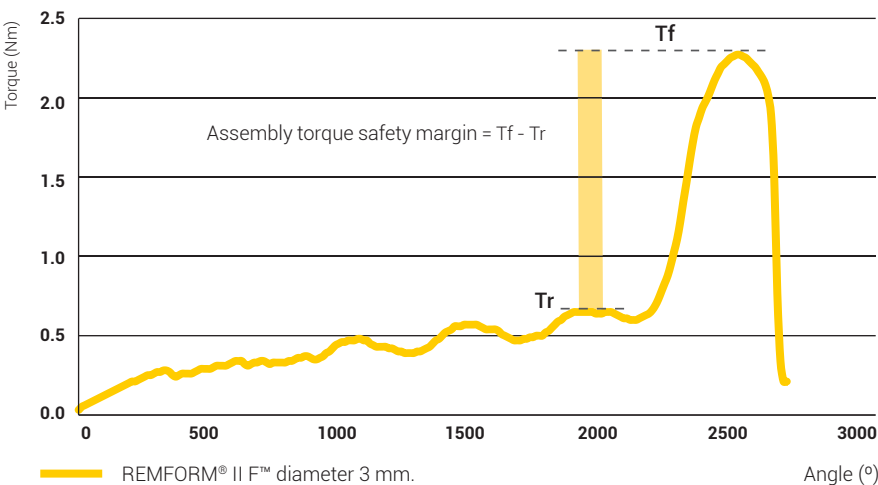
- 30° thread design minimizes radial stress and allows for bosses with thinner walls. In applications on extruded aluminum open hole, it ensures the stability of assembly process during screw insertion.
- Progressive point ensures excellent screw alignment, avoiding the tip to escape from the open hole.



4. Threading curve

The graph below shows the threading curve of REMFORM® II F™ in magnesium die casting part, pilot hole diameter 2.7 mm, engagement length 6 mm.

The difference between threading torque (Tr) and failure torque (Tf) guarantees a greater safety and an increased stability during screw installation.



| REMFORM® II F™ Minimum breaking torque | |
|---|-------------|
| d (mm) | Torque (Nm) |
| 2.5 | 0.92 |
| 3.0 | 1.56 |
| 3.5 | 2.45 |
| 4.0 | 3.51 |
| 5.0 | 6.97 |
| 6.0 | 12.6 |
| 8.0 | 31.8 |

The optimum tightening torque is determined based on threading curve tests in the laboratory.

5. Recommended hole diameter in light alloys die casting

The tables show the boss structure design recommendations for REMFORM® II F™ in aluminum and magnesium:

Table 1. Die casting parts with injected holes

| Screw diameter | Magnesium assemblies | | | | | |
|----------------|----------------------|-----------|-----------|------|-------|-------|
| | Øa | Tolerance | Øext min. | Øb | Le | P |
| 2.0 | 1.87 | ±0.04 | 3.80 | 2.70 | 5.00 | 5.70 |
| 2.5 | 2.32 | ±0.04 | 4.50 | 3.20 | 6.25 | 7.00 |
| 3.0 | 2.78 | ±0.04 | 5.30 | 3.90 | 7.50 | 8.25 |
| 3.5 | 3.22 | ±0.04 | 6.10 | 4.50 | 8.75 | 9.50 |
| 4.0 | 3.68 | ±0.04 | 7.00 | 5.20 | 10.00 | 10.75 |
| 5.0 | 4.61 | ±0.04 | 8.90 | 6.50 | 12.50 | 13.25 |

| Screw diameter | Aluminum assemblies | | | | | |
|----------------|---------------------|-----------|-----------|------|-------|-------|
| | Øa | Tolerance | Øext min. | Øb | Le | P |
| 2.0 | 1.89 | ±0.04 | 3.80 | 2.70 | 5.00 | 5.70 |
| 2.5 | 2.36 | ±0.04 | 4.50 | 3.20 | 6.25 | 7.00 |
| 3.0 | 2.88 | ±0.04 | 5.30 | 3.90 | 7.50 | 8.25 |
| 3.5 | 3.35 | ±0.04 | 6.10 | 4.50 | 8.75 | 9.50 |
| 4.0 | 3.87 | ±0.04 | 7.00 | 5.20 | 10.00 | 10.75 |
| 5.0 | 4.87 | ±0.04 | 8.90 | 6.50 | 12.50 | 13.25 |

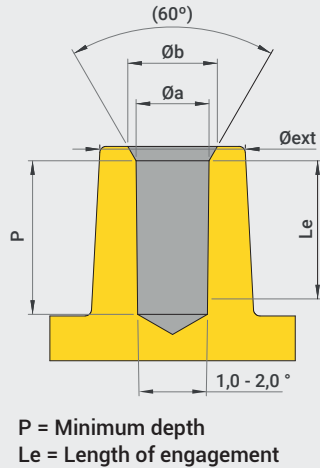


Table 2. Die casting parts with drilled holes

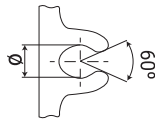
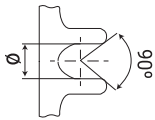
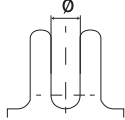
| Screw diameter | Magnesium assemblies | | | | |
|----------------|----------------------|-----------|--------|-------|-------|
| | Ø | Tolerance | H min. | Le | P |
| 2.0 | 1.78 | ±0.04 | 1.4 | 5.00 | 5.70 |
| 2.5 | 2.22 | ±0.04 | 1.8 | 6.25 | 7.00 |
| 3.0 | 2.66 | ±0.04 | 2.2 | 7.50 | 8.25 |
| 3.5 | 3.09 | ±0.04 | 2.6 | 8.75 | 9.50 |
| 4.0 | 3.53 | ±0.04 | 2.9 | 10.00 | 10.75 |
| 5.0 | 4.45 | ±0.04 | 3.6 | 12.50 | 13.25 |

| Screw diameter | Aluminum assemblies | | | | |
|----------------|---------------------|-----------|--------|-------|-------|
| | Ø | Tolerance | H min. | Le | P |
| 2.0 | 1.80 | ±0.04 | 1.4 | 5.00 | 5.70 |
| 2.5 | 2.25 | ±0.04 | 1.8 | 6.25 | 7.00 |
| 3.0 | 2.75 | ±0.04 | 2.2 | 7.50 | 8.25 |
| 3.5 | 3.20 | ±0.04 | 2.6 | 8.75 | 9.50 |
| 4.0 | 3.70 | ±0.04 | 2.9 | 10.00 | 10.75 |
| 5.0 | 4.65 | ±0.04 | 3.6 | 12.50 | 13.25 |

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

6. Recommended hole diameter in aluminum profiles

For assemblies in aluminium profiles please use the recommendations indicated in the following table:

| | | Open hole 60° | | Open hole 90° | | Open hole in U | |
|----------------|-------------|---|---------|---|---------|---|---------|
| | |  | |  | |  | |
| Screw diameter | Tolerance Ø | Ø | L | Ø | L | Ø | L |
| 2.5 | ±0.04 | 2.3 | 3 - 5 | 2.3 | 3 - 5 | 2.2 | 3 - 5 |
| 3.0 | ±0.04 | 2.75 | 4 - 6 | 2.75 | 4 - 6 | 2.65 | 4 - 6 |
| 3.5 | ±0.04 | 3.2 | 5 - 7 | 3.2 | 5 - 7 | 3.1 | 5 - 7 |
| 4.0 | ±0.05 | 3.65 | 6 - 8 | 3.6 | 6 - 8 | 3.55 | 6 - 8 |
| 5.0 | ±0.05 | 4.65 | 7 - 10 | 4.6 | 7 - 10 | 4.4 | 7 - 10 |
| 6.0 | ±0.07 | 5.55 | 9 - 12 | 5.5 | 9 - 12 | 5.3 | 9 - 12 |
| 8.0 | ±0.10 | 7.45 | 12 - 16 | 7.4 | 12 - 16 | 7.1 | 12 - 16 |

Dimensions in mm. This data is intended for guidance purposes. We recommend carrying out relevant tests on definitive parts to establish the precise values.
L = Length of engagement

7. Applications

REMFORM® II F™ screws are recommended for the assembly of:

- Magnesium and aluminum die casting parts with drilled or injected holes.
- Aluminum open profiles.



Fig.40. PCB assembly on magnesium housing with injected holes.

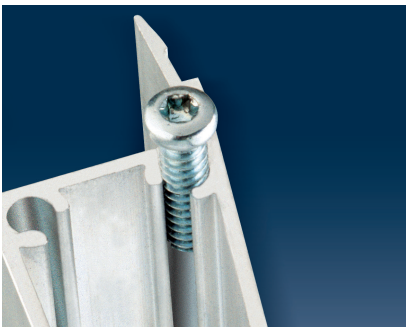
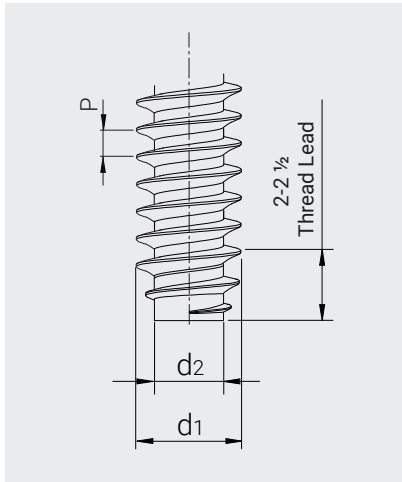


Fig.41. Aluminum profiles with open hole.



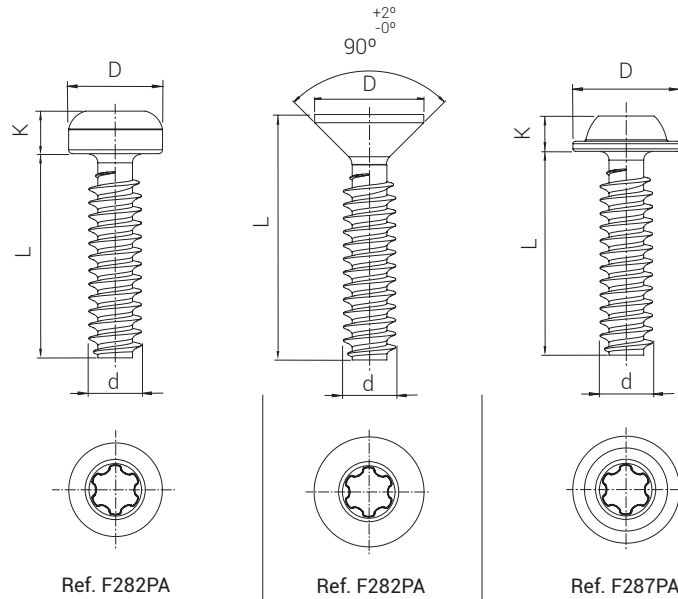
8. Technical data

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

To ensure the quality of the screw we apply baking process to reduce the risk of hydrogen embrittlement (more information in page 124).

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

| 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 |



Ref. F282PA

Ref. F282PA

Ref. F287PA

| d | d1 | d2 min. | P | Breaking Torque min. (Nm) | D h14 | K h14 | TORX Plus® AUTOSERT® | D h14 | TORX Plus® AUTOSERT® | D h15 | K h14 | TORX Plus® AUTOSERT® |
|-----|-----------|---------|------|---------------------------|-------|-------|----------------------|-------|----------------------|-------|-------|----------------------|
| 1.8 | 1.8 | 1.22 | 0.55 | 0.32 | 3.20 | 1.50 | 6 IP | | | 4.20 | 1.40 | 6 IP |
| 2.0 | 2.0 +0.10 | 1.33 | 0.60 | 0.48 | 3.40 | 1.60 | 6 IP | 4.00 | 6 IP | 4.30 | 1.50 | 6 IP |
| 2.5 | 2.5 +0.10 | 1.68 | 0.70 | 0.92 | 4.30 | 2.10 | 8 IP | 5.00 | 8 IP | 5.30 | 2.10 | 8 IP |
| 3.0 | 3.0 +0.10 | 2.02 | 0.80 | 1.56 | 5.30 | 2.30 | 10 IP | 6.00 | 10 IP | 6.30 | 2.20 | 10 IP |
| 3.5 | 3.5 +0.10 | 2.37 | 0.95 | 2.45 | 6.20 | 2.60 | 15 IP | 7.00 | 15 IP | 7.30 | 2.60 | 15 IP |
| 4.0 | 4.0 +0.10 | 2.71 | 1.05 | 3.51 | 7.00 | 3.10 | 20 IP | 8.00 | 20 IP | 8.30 | 2.90 | 20 IP |
| 5.0 | 5.0 +0.15 | 3.40 | 1.25 | 6.97 | 9.00 | 3.60 | 25 IP | 10.00 | 25 IP | 10.50 | 3.60 | 25 IP |
| 6.0 | 6.0 +0.15 | 4.09 | 1.40 | 12.60 | 10.80 | 4.20 | 30 IP | 12.00 | 30 IP | 12.50 | 4.00 | 30 IP |
| 8.0 | 8.0 +0.15 | 5.46 | 1.75 | 31.80 | 14.00 | 4.80 | 40 IP | | | 17.00 | 5.00 | 40 IP |

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

Need to get in touch? Contact us to discuss your application.

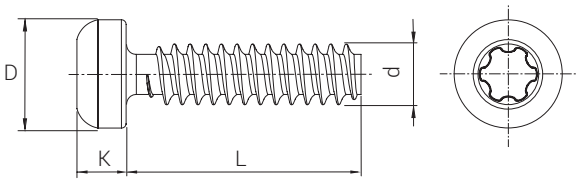
Contact us



F281PA

REMFORM® II F™

- Pan head
- TORX Plus® AUTOSERT® recess
- Zinc plated Cr (III) 5µm + Baking (144h NSS)



CAD Files and Samples available

[Go to product](#)

| d mm | 3.0 | 3.5 | 4.0 | 5.0 | 6.0 |
|----------------------|-------|-------|-------|-------|-------|
| D mm | 5.30 | 6.20 | 7.00 | 9.00 | 10.60 |
| K mm | 2.30 | 2.60 | 3.10 | 3.60 | 4.20 |
| TORX Plus® AUTOSERT® | 10 IP | 15 IP | 20 IP | 25 IP | 30 IP |

| L mm | Ø3.0 | Ø3.5 | Ø4.0 | Ø5.0 | Ø6.0 |
|------|------|------|------|------|------|
| 6 | ○ | ○ | ○ | — | — |
| 7 | ○ | ○ | ○ | ○ | — |
| 8 | ● | ○ | ○ | ○ | ○ |
| 10 | ● | ● | ● | ○ | ○ |
| 12 | ○ | ○ | ● | ○ | ○ |
| 16 | ○ | ○ | ○ | ○ | ○ |
| 18 | ○ | ○ | ○ | ○ | ○ |
| 20 | ● | ○ | ○ | ● | ○ |
| 25 | — | ○ | ○ | ○ | ○ |
| 30 | — | — | ○ | ○ | ○ |
| 35 | — | — | ○ | ○ | ○ |
| 40 | — | — | ○ | ○ | ○ |
| 50 | — | — | — | — | ○ |

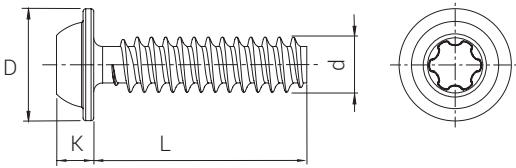
● Product available in stock. ○ Product available upon request.
For other plating, thread dimensions and head design, please contact our sales department. Information about packaging conditions in page 130.



F287PA

REMFORM® II F™

- Pan head flange
- TORX Plus® AUTOSERT® recess
- Zinc plated Cr (III) 8µm + Baking + Sealant (144h NSS)



CAD Files and Samples available

[Go to product](#)

| d mm | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 5.0 | 6.0 |
|----------------------|------|------|-------|-------|-------|-------|-------|
| D mm | 4.30 | 5.30 | 6.30 | 7.30 | 8.30 | 10.50 | 12.50 |
| K mm | 1.50 | 2.10 | 2.20 | 2.60 | 2.90 | 3.60 | 4.00 |
| TORX Plus® AUTOSERT® | 6 IP | 8 IP | 10 IP | 15 IP | 20 IP | 25 IP | 30 IP |

| L mm | Ø2.0 | Ø2.5 | Ø3.0 | Ø3.5 | Ø4.0 | Ø5.0 | Ø6.0 |
|------|------|------|------|------|------|------|------|
| 6 | ● | ○ | ● | — | — | — | — |
| 8 | ● | ● | ● | ○ | ○ | — | — |
| 10 | ● | ● | ● | ● | ● | ○ | — |
| 12 | ○ | ○ | ● | ○ | ○ | ○ | ○ |
| 13 | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 14 | ○ | ○ | ● | ○ | ○ | ○ | ○ |
| 15 | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 16 | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 18 | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 20 | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 22 | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 25 | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | — | — | — | ○ | ○ | ○ | ○ |
| 35 | — | — | — | ○ | ○ | ○ | ○ |
| 38 | — | — | — | ○ | ○ | ○ | ○ |
| 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.



Small Things Matter

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● Production plant ● Logistic hub ● Sales office