

① Spiral Fluted Tap Series for blind hole

| Overall length | Chamfer+ full thread | Thread length | Thread + Neck length | Shank length | Shank dia. | Size of square | Length of square |
|----------------|----------------------|---------------|----------------------|--------------|------------|----------------|------------------|
| L | ℓt | ℓ | ℓn | ℓs | Ds | K | ℓk |

JIS

① Spiral Fluted Taps (for blind hole)

② Spiral Fluted Taps (for through hole)

③ Spiral Pointed Taps (for through hole)

④ Hand Taps

⑤ Cemented Carbide Taps

⑥ Roll Taps

⑦ Special Thread Taps Simple Inspection Tools

⑧ Pipe Taps

⑨ Thread Mills Premium Thread Mills

Dies

⑩

⑪ Center Drills Centering Tools

⑫ Precision Machinery/Metal Surgical Instruments

JIS

①-163

ZET-B

Spiral Fluted Taps for Titanium Alloys



Specification



Tapping Speeds depending on Materials

Titanium alloys
チタン合金
5~10
(m/min)

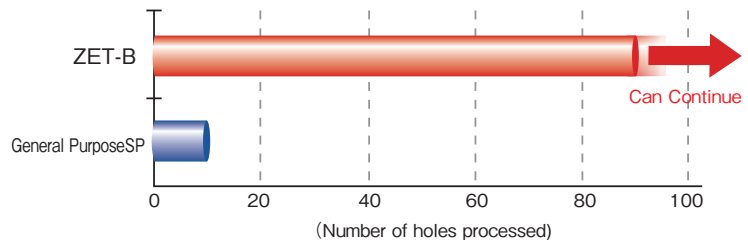
Product Features

- The tap is produced from a high grade powder high speed steel that is excellent for heat resistance and wear resistance.
- The cutting edge geometry helps prevent material shrinkage. The the spiral flute design helps pull the chips ou of the hole to allow the cutting heat to be carried out.
- Appropriate flute shape for titanium alloy is utilized and the ejection of the chips is smooth.
- A nitride surface treatment is performed for added wear resistance.
- Considering the shrinkage of the internal screw thread, the tap is produced to a moderate oversize condition.

Tapping Data

Tapping Conditions [M6×1]

| | |
|---------------------|-----------------------------|
| Work Piece Material | Ti-6Al ₄ -4V |
| Bored Hole Size | φ5.0 |
| Tapping Length | 12mm |
| Tapping Speed | 8m/min |
| Machinery Type | CNC tapping center |
| Tapping Fluid | Water soluble cutting fluid |



Characteristics of titanium alloy

It is mainly composed of titanium that has a high strength and is light weight. It has excellent heat resistance. There are various types of titanium alloys such as Ti - 5Al - 2.5Sn, Ti - 5Ta, and the most popular Ti - 6Al₄ - 4V which is commonly used due to its good characteristics.

Examples of problems in tapping

- Titanium alloys have high temperature strength and the thermal diffusion is small, so abrupt abrasion occurs on the tap.
- The spring back on internal screw threads may cause diameters to shrink and the tap may be crimped causing breakage.
- Chip welding occurs easily on the cutting chamfer of the tap and the threads flank surface. The finished thread surface of the internal screw thread also becomes rough and coarse.

| Overall length | Chamfer+ full thread | Thread length | Thread + Neck length | Shank length | Shank dia. | Size of square | Length of square |
|----------------|----------------------|---------------|----------------------|--------------|------------|----------------|------------------|
| L | ℓ_t | ℓ | ℓ_n | ℓ_s | Ds | K | ℓ_k |

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JIS

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(for blind hole) ①Spiral Fluted Taps
(for through hole) ②Spiral Pointed Taps
(for through hole) ③

Hand Taps ④

Cemented Carbide Taps ⑤

Roll Taps ⑥

Special Thread Taps
Simple Inspection Tools ⑦

Pipe Taps ⑧

Thread Mills
Premium Thread Mills ⑨

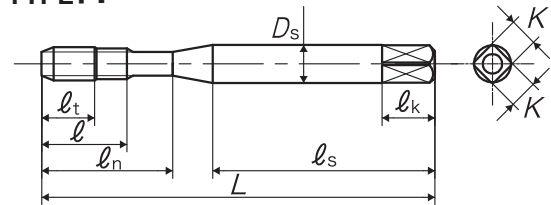
Dies ⑩

Center Drills
Centering Tools ⑪Precision Machinery/
Metal Surgical Instruments ⑫

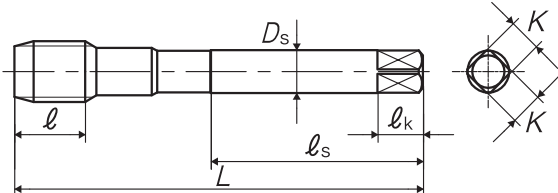
JIS

①-164

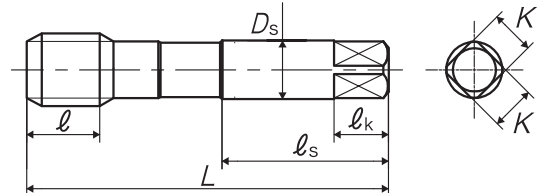
TYPE: 1



TYPE: 2



TYPE: 3



Segment : 1D

| Size | Class | Code | Chamfer | L (mm) | ℓ_t (mm) | ℓ (mm) | ℓ_n (mm) | ℓ_s (mm) | Ds (mm) | K (mm) | ℓ_k (mm) | No. of flutes | TYPE | MSRP |
|---------------------|-------|-------------|---------|-----------|------------------|----------------|------------------|------------------|------------|-----------|------------------|------------------|------|------------|
| For Metric Threads | | | | | | | | | | | | | | |
| M3 × 0.5 | P2 | ZETBMQ3.0G | 3P | 46 | 5 | 9 | 14 | 26 | 4 | 3.2 | 6 | 3 | 1 | ¥ 2,880 |
| M4 × 0.7 | P3 | ZETBMR4.0I | 3P | 52 | 7 | 11 | 17 | 29 | 5 | 4 | 7 | 3 | 1 | ¥ 2,880 |
| M5 × 0.8 | P3 | ZETBMR5.0K | 3P | 60 | 9 | 13 | 22 | 33 | 5.5 | 4.5 | 7 | 3 | 1 | ¥ 2,900 |
| M6 × 1 | P3 | ZETBMR6.0M | 3P | 62 | 11 | 15 | 26 | 33 | 6 | 4.5 | 7 | 3 | 1 | ¥ 3,200 |
| M8 × 1.25 | P3 | ZETBMR8.0N | 3P | 70 | - | 12 | - | 36 | 6.2 | 5 | 8 | 3 | 2 | ¥ 4,460 |
| M10 × 1.5 | P3 | ZETBMR10.0O | 3P | 75 | - | 13 | - | 38 | 7 | 5.5 | 8 | 3 | 2 | ¥ 5,670 |
| M10 × 1.25 | P3 | ZETBMR10.1N | 3P | 75 | - | 13 | - | 38 | 7 | 5.5 | 8 | 3 | 2 | ¥ 5,670 |
| M12 × 1.75 | P3 | ZETBMR12.1P | 3P | 82 | - | 15 | - | 42 | 8.5 | 6.5 | 9 | 3 | 2 | ¥ 8,030 |
| M12 × 1.5 | P3 | ZETBMR12.1O | 3P | 82 | - | 15 | - | 42 | 8.5 | 6.5 | 9 | 3 | 2 | ¥ 8,030 * |
| M12 × 1.25 | P3 | ZETBMR12.1N | 3P | 82 | - | 15 | - | 42 | 8.5 | 6.5 | 9 | 3 | 2 | ¥ 8,030 * |
| M14 × 2 | P3 | ZETBMR14.1Q | 3P | 88 | - | 18 | - | 45 | 10.5 | 8 | 11 | 3 | 2 | ¥ 11,000 * |
| M14 × 1.5 | P3 | ZETBMR14.1O | 3P | 88 | - | 14 | - | 45 | 10.5 | 8 | 11 | 3 | 2 | ¥ 11,000 * |
| M16 × 2 | P3 | ZETBMR16.1Q | 3P | 95 | - | 18 | - | 48 | 12.5 | 10 | 13 | 4 | 2 | ¥ 14,800 * |
| M16 × 1.5 | P3 | ZETBMR16.1O | 3P | 95 | - | 14 | - | 48 | 12.5 | 10 | 13 | 4 | 2 | ¥ 14,800 * |
| M18 × 2.5 | P4 | ZETBMS18.1R | 3P | 100 | - | 20 | - | 51 | 14 | 11 | 14 | 4 | 2 | ¥ 19,700 * |
| M18 × 1.5 | P3 | ZETBMR18.1O | 3P | 100 | - | 14 | - | 51 | 14 | 11 | 14 | 4 | 2 | ¥ 19,700 * |
| M20 × 2.5 | P4 | ZETBMS20.1R | 3P | 105 | - | 20 | - | 50 | 15 | 12 | 15 | 4 | 3 | ¥ 26,700 * |
| M20 × 1.5 | P4 | ZETBMS20.1O | 3P | 105 | - | 14 | - | 50 | 15 | 12 | 15 | 4 | 3 | ¥ 26,700 * |
| M27 × 3 | P4 | ZETBMS27.1S | 3P | 130 | - | 25 | - | 60 | 20 | 15 | 18 | 4 | 3 | ¥ 59,700 * |
| M30 × 3.5 | P5 | ZETBMT30.1T | 3P | 135 | - | 30 | - | 62 | 23 | 17 | 20 | 4 | 3 | ¥ 76,100 * |
| For Unified Threads | | | | | | | | | | | | | | |
| No.4-40UNC | P2 | ZETBMQUN4H | 3P | 46 | 5 | 9 | 14 | 25 | 4 | 3.2 | 6 | 3 | 1 | ¥ 3,630 * |
| No.6-32UNC | P3 | ZETBMRUN6J | 3P | 52 | 7 | 11 | 17 | 27 | 5 | 4 | 7 | 3 | 1 | ¥ 3,380 * |
| No.8-32UNC | P3 | ZETBMRUN8J | 3P | 60 | 7 | 13 | 22 | 31 | 5.5 | 4.5 | 7 | 3 | 1 | ¥ 3,400 * |
| No.10-24UNC | P3 | ZETBMRUNAM | 3P | 60 | 9 | 13 | 22 | 32 | 5.5 | 4.5 | 7 | 3 | 1 | ¥ 3,400 * |
| No.10-32UNF | P3 | ZETBMRUNAJ | 3P | 60 | 9 | 13 | 22 | 32 | 5.5 | 4.5 | 7 | 3 | 1 | ¥ 3,400 * |
| 1/4-20UNC | P3 | ZETBMRU04N | 3P | 62 | 11 | 15 | 26 | 33 | 6 | 4.5 | 7 | 3 | 1 | ¥ 3,650 * |
| 1/4-28UNF | P3 | ZETBMRU04K | 3P | 62 | 11 | 15 | 26 | 33 | 6 | 4.5 | 7 | 3 | 1 | ¥ 3,650 * |
| 5/16-18UNC | P3 | ZETBMRU05O | 3P | 70 | - | 12 | - | 36 | 6.2 | 5 | 8 | 3 | 2 | ¥ 5,130 * |
| 5/16-24UNF | P3 | ZETBMRU05M | 3P | 70 | - | 12 | - | 36 | 6.2 | 5 | 8 | 3 | 2 | ¥ 5,130 * |
| 3/8-16UNC | P3 | ZETBMRU06P | 3P | 75 | - | 13 | - | 38 | 7 | 5.5 | 8 | 3 | 2 | ¥ 6,570 * |
| 3/8-24UNF | P3 | ZETBMRU06M | 3P | 75 | - | 13 | - | 38 | 7 | 5.5 | 8 | 3 | 2 | ¥ 6,570 * |

* = Specified Distribution Items. Made to order products.

 Think threads with
YAMAWA

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|----------------|----------------------|---------------|----------------------|--------------|------------|----------------|------------------|
| L | ℓt | ℓ | ℓn | ℓs | Ds | K | ℓk |

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| Size | Class | Code | Chamfer | L (mm) | ℓt (mm) | ℓ (mm) | ℓn (mm) | ℓs (mm) | Ds (mm) | K (mm) | ℓk (mm) | No. of flutes | TYPE | MSRP |
|------------|-------|------------|---------|--------|---------|--------|---------|---------|---------|--------|---------|---------------|------|------------|
| 7/16-14UNC | P3 | ZETBMRU07Q | 3P | 82 | - | 13 | - | 42 | 8.5 | 6.5 | 9 | 3 | 2 | ¥ 9,260 ※ |
| 7/16-20UNF | P3 | ZETBMRU07N | 3P | 82 | - | 13 | - | 42 | 8.5 | 6.5 | 9 | 3 | 2 | ¥ 9,260 ※ |
| 1/2-13UNC | P3 | ZETBMRU08R | 3P | 88 | - | 15 | - | 45 | 10.5 | 8 | 11 | 3 | 2 | ¥ 9,820 ※ |
| 1/2-20UNF | P3 | ZETBMRU08N | 3P | 88 | - | 15 | - | 45 | 10.5 | 8 | 11 | 3 | 2 | ¥ 9,820 ※ |
| 5/8-11UNC | P3 | ZETBMRU10U | 3P | 95 | - | 18 | - | 48 | 12.5 | 10 | 13 | 4 | 2 | ¥ 14,800 ※ |
| 5/8-18UNF | P3 | ZETBMRU10O | 3P | 95 | - | 14 | - | 48 | 12.5 | 10 | 13 | 4 | 2 | ¥ 14,800 ※ |
| 3/4-10UNC | P4 | ZETBMSU12V | 3P | 105 | - | 20 | - | 50 | 15 | 12 | 15 | 4 | 3 | ¥ 26,700 ※ |
| 3/4-16UNF | P4 | ZETBMSU12P | 3P | 105 | - | 14 | - | 50 | 15 | 12 | 15 | 4 | 3 | ¥ 26,700 ※ |

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