

# GÜHRING

- Taps for metric, metric-fine, UNC, UNF and PT threads
- For universal applications, stainless steel, cast iron and aluminium as well as for hard machining
- HSS-E-PM high-performance taps with new TiAlN-coating for improved chip evacuation and short chip generation



## Threading tools to JIS standard

GÜHRING – YOUR WORLD-WIDE PARTNER

# Your Perfect Choice

## JIS Taps and Fluteless Taps Made by Guhring



### Green ring taps

- ▶ for universal applications
- ▶ M, MF, UNC, UNF and PT
- ▶ additional long versions



### Blue ring taps

- ▶ for stainless steel and acid-resistant steels
- ▶ M, MF



### High performance HSS-E-PM

- ▶ blue ring taps with new TiAlN-coating for improved chip evacuation



### Cast iron and AISi taps

- ▶ universal thanks to IC for short chips in GG, Al and steel



### Hard machining taps

- ▶ for hardened steel (45–55 HRC)



### Fluteless taps

- ▶ for chipless threading in a wide range of materials





## Our expertise

- High quality cutting tools made in Germany
- Optimal cutting materials and coatings
- High precision grinding machines for finest tool geometries

## Your benefits

- Long tool life
- Best threading results
- Optimal cost-performance-ratio



# Comparison yellow ring, green ring and blue ring

## Conventional tapping with compensation chucks

Improved guidance with reduced relief angle for less rigid machines



## Universal tapping with Synchro chucks or rigid collets

Improved tool life, increased relief angle and back taper for stronger machines



## Hard machining taps for hardened steel (45 - 55 HRC)

For tapping operations in materials with a tensile strength in excess of 1200 N/mm<sup>2</sup> we have developed a HSS-E-PM tap with TiCN coating.

The special design makes the process reliable production of threads in hard materials possible and provides excellent tool life.

Suitable for applications in the mold and die industry as well as for various machine or automotive components following heat treatment.

Recommended cutting speed  $v_c = 2 - 8$  m/min dependent on the hardness of the component.







## High performance HSS-E-PM blue ring taps with new TiAlN-coating for improved chip evacuation

### Wide range of applications:

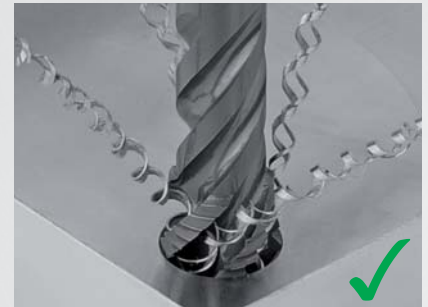
- ▶ stainless steel (martensitic / austenitic)
- ▶ steel materials max. 1300 N/m<sup>2</sup>
- ▶ copper-aluminum alloys and cast aluminium alloys

Thread systems M, MF and G.

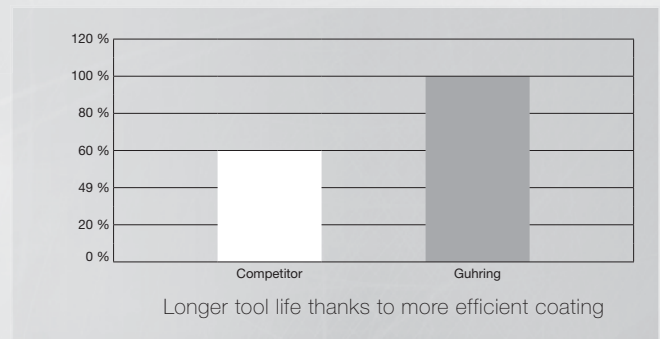
Improved chip evacuation thanks to special geometry and coating.



Thread chips can cause tool breakage

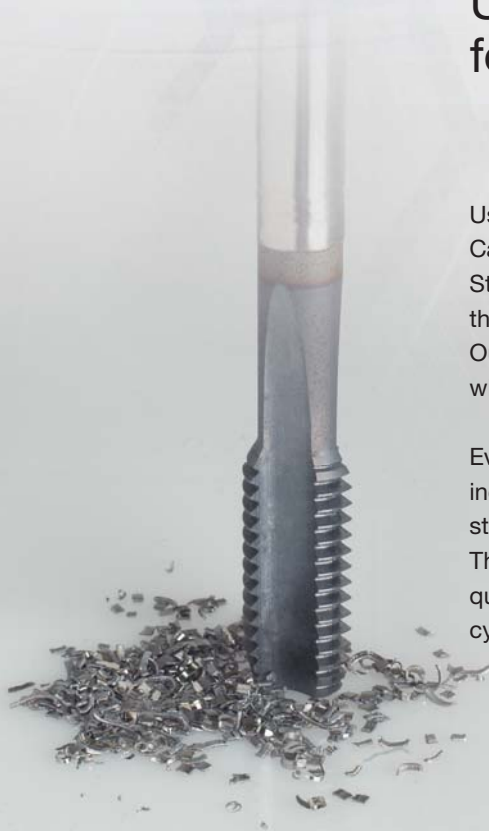


Controlled chip evacuation with Guhring VA taps



Significantly longer tool life and increased performance thanks to the combination of TiAlN wear-protection coating and WC/C slide coating

## Universal taps with coolant ducts for short-chipping materials (GG, Al, steel)



Usually, with a tap the chips are evacuated from a blind hole via the spiral flutes. Cast iron, AlSi-alloys, brass and copper alloys are short-chipping materials. Straight-fluted taps are applied for such materials. With taps with coolant ducts, the coolant evacuates the short chips from the blind hole. Our new straight-fluted M taps (Guhring no. 4448) and MF taps (Guhring no. 4472) with coolant ducts are especially suitable for short-chipping materials.

Evacuating long chips from steel components via the spiral flutes is an increasing problem. Consequently, the aim is to produce short chips with straight-fluted taps and evacuate them from the blind hole with the cooling lubricant. The tap with IC in the machine spindle achieves an improved tool life and surface quality of the thread. Typical applications are the machining of gearboxes, cylinder blocks and heads, crankshafts, pump housings, hydraulic components etc.



Through holes



Blind holes

Thread depth  
Tool material  
Type/form  
Surface finish  
Cooling

|              |          |          |              |         |          |          |
|--------------|----------|----------|--------------|---------|----------|----------|
| <b>≤3xD</b>  |          |          |              |         |          |          |
| <b>HSS-E</b> |          |          |              |         |          |          |
| N/B          | N/B      | N/B      | N/B          | N R40/C | N R40/C  | N R40/C  |
| ○            | <b>S</b> | <b>C</b> | ○            | ○       | <b>S</b> | <b>C</b> |
| ☒            | ☒        | ☒        | ☒            | ☒       | ☒        | ☒        |
|              |          |          | long version |         |          |          |
| ○            | ○        |          | ○            | ○       | ○        |          |
|              |          |          |              |         |          |          |



Tools with colour-ring

| Thread type | Tol. zone         | Dim. to             | Article no.                                 |   |                                    |   |  |   |                                    |
|-------------|-------------------|---------------------|---|---|------------------------------------|---|--|---|------------------------------------|
|             |                   |                     | Ø-range                                     |   |                                    |   |  |   |                                    |
| <b>M</b>    | <b>Class 1 OH</b> | <b>JIS B 4430</b>   | <b>1014</b><br>M2 – M20<br>page 12          | <b>1015</b><br>M2 – M20<br>page 12          | <b>7778</b><br>M3 – M20<br>page 14 | <b>4460</b><br>M3 – M20<br>page 28          | <b>1012</b><br>M1.2 – M30<br>page 19       | <b>1013</b><br>M2 – M20<br>page 20          | <b>7777</b><br>M3 – M20<br>page 22 |
|             | <b>Class 2 OH</b> |                     | <b>4420</b><br>M2 – M20<br>page 13          | <b>4421</b><br>M2 – M20<br>page 13          |                                    |   | <b>4426</b><br>M2 – M20<br>page 21         | <b>4427</b><br>M2 – M20<br>page 21          |                                    |
| <b>MF</b>   | <b>Class 1 OH</b> | <b>JIS B 4430</b>   | <b>4434</b><br>M6x0.75 – M20x1.5<br>page 34 | <b>4435</b><br>M6x0.75 – M20x1.5<br>page 34 |                                    | <b>4461</b><br>M6x0.75 – M20x1.5<br>page 41 | <b>4438</b><br>M4x0.5 – M22x1.5<br>page 37 | <b>4439</b><br>M6x0.75 – M20x1.5<br>page 38 |                                    |
| <b>UNC</b>  | <b>Class 1 OH</b> | <b>~ JIS B 4430</b> | <b>4465</b><br>6-32 – 1-8<br>page 47        |   |                                    |   | <b>4454</b><br>2-56 – 1-8<br>page 48       |   |                                    |
| <b>UNF</b>  | <b>Class 1 OH</b> | <b>~ JIS B 4430</b> | <b>4455</b><br>6-40 – 1-12<br>page 49       |   |                                    |   | <b>4457</b><br>6-40 – 1-12<br>page 50      |   |                                    |
| <b>PT</b>   | <b>JIS 2</b>      | <b>WN</b>           |   |   |                                    |   |  |   |                                    |

| Universal                       |              |
|---------------------------------|--------------|
| Material no. to DIN EN 10 027   | Abbreviation |
| <b>common structural steels</b> |              |
| 1.0035                          | S185 (St33)  |
| 1.0421                          | St 52.0      |
| 1.0067                          | RSt 37-1     |
| 1.0425                          | P265GH       |
| <b>free-cutting steels</b>      |              |
| 1.0711                          | 9S20         |
| 1.0718                          | 11SMnPb30    |
| 1.0727                          | 46S20        |
| 1.0728                          | (60 S 20)    |
| <b>case hardened steels</b>     |              |
| 1.7131                          | 16MnCr5      |
| 1.6523                          | 21NiCrMo2-2  |
| 1.7321                          | 20MoCr4      |
| 1.7325                          | 25MoCr4      |

| Universal                              |               |
|--|---------------|
| Material no. to DIN EN 10 027          | Abbreviation  |
| <b>unalloyed heat-treatable steels</b> |               |
| 1.0402                                 | C22           |
| 1.1151                                 | C22E          |
| 1.0503                                 | C45           |
| 1.0601                                 | C60           |
| <b>nitriding steels</b>                |               |
| 1.8504                                 | 34CrAl6       |
| 1.8507                                 | 34CrAlMo5     |
| 1.8509                                 | 41CrAlMo7     |
| 1.8515                                 | 31CrMo12      |
| 1.8550                                 | 34CrAlNi4     |
| <b>spheroidal graphite iron</b>        |               |
| 0.7040                                 | EN-GJS-400-15 |
| 0.7060                                 | EN-GJS-600-3  |

| Acid./stainl. resist. steels        |                  |
|-------------------------------------|------------------|
| Material no. to DIN EN 10 027       | Abbreviation     |
| <b>sulphured stainless steels</b>   |                  |
| 1.4005                              | X 12 CrS 13      |
| 1.4104                              | X 14 CrMo S 17   |
| 1.4105                              | X 6 CrMo S 17    |
| 1.4305                              | X 8 CrNi S 18-9  |
| <b>austenitic stainless steels</b>  |                  |
| 1.4300                              | X 12 CrNi 18-8   |
| 1.4301                              | X 5 CrNi 18-10   |
| 1.4541                              | X 6 CrNiTi 18-10 |
| <b>martensitic stainless steels</b> |                  |
| 1.4057                              | X 17 CrNi 16-2   |
| 1.4112                              | X 90 CrMoV 18    |
| 1.4006                              | X 12 Cr 13       |

|          |                         |
|----------|-------------------------|
| ○        | bright                  |
| <b>A</b> | TiAlN                   |
| <b>C</b> | TiCN                    |
| <b>S</b> | TiN                     |
| ☒        | external coolant        |
| <b>r</b> | internal radial coolant |
| <b>a</b> | internal axial coolant  |
|          | through hole            |
|          | blind hole              |



Through holes



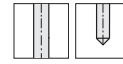
Blind holes

≤3xD

| HSS-E                              |                                    |  |   |  |  | HSS-E-PM                                       |  | HSS-E  |
|------------------------------------|------------------------------------|--|---|--|--|--|--|--|
| N R40/E                            | N R40/E                            | N R40/C  | N R25/C   | VA/B   | VA/B   | N/B  | N/B  | VA R40/C                                       |
|                                    |                                    |  |   |  |  |  |  |  |
|                                    |                                    |  |   |  |  |  |  |  |
|                                    |                                    | long version                                   |   |  |  |  |  |  |
|                                    |                                    |  |   |  |  |  |  |  |
|                                    |                                    |  |   |  |  |  |  |  |
| Article no.                        |                                    |  |   |  |  |  |  |  |
| Ø-range                            |                                    |  |   |  |  |  |  |  |
| <b>4432</b><br>M2 – M20<br>page 23 | <b>4433</b><br>M2 – M20<br>page 23 | <b>4462</b><br>M2 – M20<br>page 29             |   | <b>4422</b><br>M2 – M20<br>page 15             | <b>4423</b><br>M2 – M20<br>page 15             | <b>4468</b><br>M2 – M20<br>page 17             | <b>4470</b><br>M2 – M20<br>page 18             | <b>4428</b><br>M2 – M20<br>page 24             |
|                                    |                                    |  |   | <b>4424</b><br>M2 – M20<br>page 16             | <b>4425</b><br>M2 – M20<br>page 16             |  |  | <b>4430</b><br>M2 – M20<br>page 25             |
|                                    |                                    | <b>4463</b><br>M6x0.75 –<br>M20x1.5<br>page 42 |   | <b>4436</b><br>M6x0.75 –<br>M20x1.5<br>page 35 | <b>4437</b><br>M6x0.75 –<br>M20x1.5<br>page 35 | <b>4469</b><br>M6x0.75 –<br>M20x1.5<br>page 36 | <b>4471</b><br>M6x0.75 –<br>M20x1.5<br>page 36 | <b>4440</b><br>M6x0.75 –<br>M20x1.5<br>page 39 |
|                                    |                                    |  |   |  |  |  |  |  |
|                                    |                                    |  |   |  |  |  |  |  |
|                                    |                                    |  | <b>4464</b><br>PT 1/16-28 –<br>PT 1-11<br>page 51 |  |  |  |  |  |



Blind holes



Through holes and blind holes

Thread depth  
Tool material  
Type/form  
Surface finish  
Cooling

| $\leq 3 \times D$ |          |          |         |          |       |          |
|-------------------|----------|----------|---------|----------|-------|----------|
| HSS-E             | HSS-E-PM |          | HSS-E   | HSS-E-PM | HSS-E | HSS-E-PM |
| VA R40/C          | N R45/C  | N R45/C  | N R40/C | H/D      | H/C   | H/C      |
| <b>S</b>          | ○        | <b>A</b> | ○       | <b>C</b> | ○     | <b>C</b> |
| ☒                 | ☒        | ☒        | ☒       | ☒        | ☒     | <b>a</b> |
| ○                 |          |          | ○       |          | ○     |          |
|                   |          |          |         |          |       |          |



Tools with colour-ring

| Thread type | Tol. zone  | Dim. to      | Article no.                                 |   |   |   |  |   |   |
|-------------|------------|--------------|---|---|---|---|--|---|---|
|             |            |              | Ø-range                                     |   |   |   |  |   |   |
| M           | Class 1 OH | JIS B 4430   | <b>4429</b><br>M2 – M20<br>page 24          | <b>4466</b><br>M2 – M20<br>page 26          | <b>4449</b><br>M2 – M20<br>page 27          | <b>4456</b><br>M2 – M20<br>page 30          | <b>4453</b><br>M3 – M12<br>page 31     | <b>4452</b><br>M2 – M20<br>page 32          | <b>4448</b><br>M5 – M20<br>page 33          |
|             | Class 2 OH |              | <b>4431</b><br>M2 – M20<br>page 25          |   |   |   |  |   |   |
| MF          | Class 1 OH | JIS B 4430   | <b>4441</b><br>M6x0.75 – M20x1.5<br>page 39 | <b>4467</b><br>M6x0.75 – M20x1.5<br>page 40 | <b>4450</b><br>M6x0.75 – M20x1.5<br>page 40 | <b>4458</b><br>M6x0.75 – M20x1.5<br>page 43 | <b>4459</b><br>M8x1 – M12x1<br>page 44 | <b>4451</b><br>M6x0.75 – M20x1.5<br>page 45 | <b>4472</b><br>M6x0.75 – M20x1.5<br>page 46 |
| UNC         | Class 1 OH | ~ JIS B 4430 |   |   |   |   |  |   |   |
| UNF         | Class 1 OH | ~ JIS B 4430 |   |   |   |   |  |   |   |
| PT          | JIS 2      | WN           |   |   |   |   |  |   |   |

| Universal                              |                  |
|--|------------------|
| Material no. to DIN EN 10 027          | Abbreviation     |
| <b>unalloyed heat-treatable steels</b> |                  |
| 1.4005                                 | X 12 CrS 13      |
| 1.4104                                 | X 14 CrMo S 17   |
| 1.4105                                 | X 6 CrMo S 17    |
| 1.4305                                 | X 8 CrNi S 18-9  |
| <b>nitriding steels</b>                |                  |
| 1.4300                                 | X 12 CrNi 18-8   |
| 1.4301                                 | X 5 CrNi 18-10   |
| 1.4541                                 | X 6 CrNiTi 18-10 |
| <b>spheroidal graphite iron</b>        |                  |
| 1.4057                                 | X 17 CrNi 16-2   |
| 1.4112                                 | X 90 CrMoV 18    |
| 1.4006                                 | X 12 Cr 13       |

| General steels                         |                 |
|--|-----------------|
| Material no. to DIN EN 10 027          | Abbreviation    |
| <b>Common structural steels</b>        |                 |
| 1.0035                                 | S 185 (St 33)   |
| 1.0039                                 | S 235 JRH       |
| 1.0036                                 | S 235JRG1+CR    |
| 1.0060                                 | E 335 (St 60-2) |
| <b>Free-cutting steels</b>             |                 |
| 1.0718                                 | 11SMnPb30       |
| 1.0721                                 | 10S20           |
| 1.0758                                 | 60SPb20         |
| 1.0726                                 | 35S20           |
| <b>Case hardened steels</b>            |                 |
| 1.0401                                 | (C 15)          |
| 1.7016                                 | 17 CR3          |
| 1.7131                                 | 16MnCr5         |
| 1.5919                                 | 15CrNi6         |
| <b>Unalloyed heat-treatable steels</b> |                 |
| 1.0402                                 | C 22            |
| 1.1151                                 | C22E (Ck 22)    |
| 1.0503                                 | C 45            |
| 1.1191                                 | C45E (Ck 45)    |

| Cast materials                            |                |
|---|----------------|
| Material no.                              | Abbreviation   |
| <b>Cast iron</b>                          |                |
| 0.6015 (GG15)                             | EN-GJL-150     |
| 0.6025 (GG25)                             | EN-GJL-250     |
| 0.6040 (GG40)                             | EN-JLZ         |
| <b>Spher. graph. iron mall. cast iron</b> |                |
| 0.7040 (GGG40)                            | EN-GJS-400-15  |
| 0.7060 (GGG60)                            | EN-GJS-600-3   |
| 0.8035                                    | EN-GJMW-350-4  |
| 0.8135                                    | EN-GJMB-350-10 |
| <b>Compacted graphite iron</b>            |                |
| -   | EN-GJV250      |
|   | EN-GJV350      |
|   | EN-GJV400      |
|   | EN-GJV500      |


|          |                         |
|----------|-------------------------|
| ○        | bright                  |
| <b>A</b> | TiAlN                   |
| <b>C</b> | TiCN                    |
| <b>S</b> | TiN                     |
| ☒        | external coolant        |
| <b>r</b> | internal radial coolant |
| <b>a</b> | internal axial coolant  |
|          | through hole            |
|          | blind hole              |


















 Through holes and blind holes

|                |   |   |   |  |
|----------------|---|---|---|--|
| Tool material  | HSS-E   |   |   | Solid carbide  |
| Type/form      | N/C   | N/C   | N/C   | N/C  |
| Surface finish |  |  |  |  |
| Cooling        |  |  |  |  |
|                |   |   | with oil groove   |  |
|                |  |  |  |  |

|   |
|---|
|  |
| Fluteless taps  |
| Material examples   |
| Structural steels   |
| Free-cutting steels   |
| Case hardened steels  |
| Heat-treatable steels   |
| Nitriding steels  |
| Unalloyed case hardened steels  |
| Unalloyed heat-treatable steels   |
| Alloyed case hardened steels  |
| Alloyed heat-treatable steels   |
| Alloyed tool steels   |
| High speed tool steels  |
| Aluminium and Al-alloys   |
| Al wrought alloys   |
| Al cast alloys ≤ 10 % Si  |
| Al cast alloys > 10 % Si  |
| Cast iron   |
| Spheroidal graphite iron  |
| Malleable cast iron   |
| Stainless- and acid-resistant steels sulphured, austenitic and martensitic          |
| Brass, short-chipping   |
| Brass, long-chipping  |
| Plastics  |
| Magnesium-alloys  |
| Titanium and Ti-alloys  |
| Ni-alloys   |

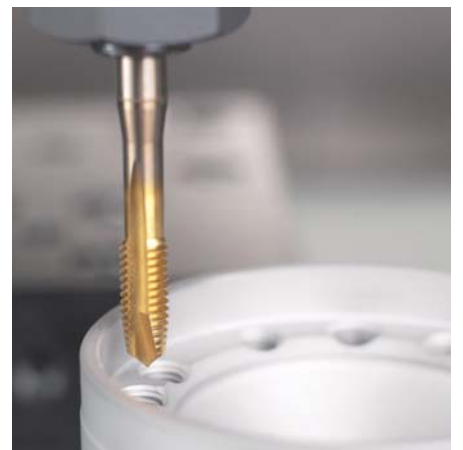
| Thread type | Tol. zone  | Dim. to    | Article no.                                 |   |                                    |                                    |
|-------------|------------|------------|---|---|------------------------------------|------------------------------------|
|             |            |            | Ø-range                                     |   |                                    |                                    |
| M           | Class 1 RH | JIS B 4430 |   | <b>4442</b><br>M4 – M20<br>page 53          |                                    |                                    |
|             | Class 2 RH |            | <b>1017</b><br>M1 – M20<br>page 52          | <b>4443</b><br>M4 – M20<br>page 54          | <b>4446</b><br>M5 – M20<br>page 57 | <b>4447</b><br>M5 – M20<br>page 58 |
| MF          | Class 1 RH | JIS B 4430 |   | <b>4444</b><br>M6x0.75 – M20x1.5<br>page 55 |                                    |                                    |
|             | Class 2 RH |            | <b>4445</b><br>M6x0.75 – M20x1.5<br>page 56 |   |                                    |                                    |

|   |  | HSS-E   |   |   |  |   |   |   |   |   |    |
|---|--|---|---|---|--|---|---|---|---|---|----|
|   |  | N/B   | N/B   | N/B   | N/B  | N R40/C   | N R40/C   | N R40/C   | N R40/E   | N R40/E   |    |
|   |  | ○   | Ⓢ   | ⓐ   | ○  | ○   | Ⓢ   | ⓐ   | ○   | Ⓢ   |    |
|   |  | ⊠   | ⊠   | ⊠   | ⊠  | ⊠   | ⊠   | ⊠   | ⊠   | ⊠   |    |
|   |  | ○   | ○   |   | ○  | ○   | ○   |   | ○   | ○   |    |
|   |  |  |  |  |  |  |  |  |  |  |    |
| Thread  |  | Ø-range on page   |   |   |  |   |   |   |   |   |    |
| M   |  | 12,13   | 12,13   | 14  | 28   | 19,21   | 20,21   | 22  | 23  | 23  |    |
| MF  |  | 34  | 34  |   | 41   | 37  | 38  |   |   |   |    |
| UNC   |  | 47  |   |   |  | 48  |   |   |   |   |    |
| UNF   |  | 49  |   |   |  | 50  |   |   |   |   |    |
| PT  |  |   |   |   |  |   |   |   |   |   |    |
| Material / ISO Material                                       |  | Hardness N/mm <sup>2</sup>  | Recommended cutting speed v <sub>c</sub> m/min                                    |   |  |   |   |   |   |   |    |
| Struct./free-cutt./unall. heat-treat./case hard. steels       |  | ≤ 800   | 10  | 15  | 18   | 10  | 10  | 15  | 18  | 10  | 15 |
| P Free-cutting steels, unall. case hard. steels, nitr. steels |  | 800 - 1 000   | 8   | 12  | 15   | 8   | 8   | 12  | 15  | 8   | 12 |
| Alloyed heat-treatable, tool and high speed steels            |  | 800 - 1200  | 6   | 8   | 10   | 6   | 6   | 8   | 10  | 6   | 8  |
| M Stainless steel - easy to machine / sulphured               |  | ≤ 750   | 6   | 8   | 10   | 6   | 6   | 8   | 10  | 6   | 8  |
| Stainless steel - moderately difficult to machine             |  | 750 - 950   | 6   | 8   | 10   | 6   | 6   | 8   | 10  | 6   | 6  |
| K Cast iron, grey cast iron, spher. graph./mall. cast iron    |  |   | 10  | 12  | 16   | 10  | 10  | 12  | 18  | 10  | 12 |
| N Aluminium, Al-wrought alloys, Al-alloys                     |  | ≤ 6% Si   | 10  | x   | 18   | 10  | x   | 10  | 18  | x   | x  |
| Aluminium-cast alloys   |  | ≥ 6% Si   | 8   | 10  | 18   | 8   | 10  | 8   | 18  | 10  | 10 |
| S Titanium, Ti-alloys   |  |   | x   | 2   | 2  | x   | x   | 2   | 2   | x   | 2  |
| Ni-alloys   |  |   | x   | x   | x  | x   | x   | x   | x   | x   | x  |
| H Hardened steels   |  | 45 - 55 HRC   | x   | x   | x  | x   | x   | x   | x   | x   | x  |
| Hardened steels   |  | 55 - 62 HRC   | x   | x   | x  | x   | x   | x   | x   | x   | x  |

|   |  | HSS-E   |   |  | Solid carbide   |    |
|---|--|---|---|--|---|----|
|   |  | N/C   | N/C   | N/C  | N/C   |    |
|   |  | Ⓢ   | Ⓢ   | Ⓢ  | ⓐ   |    |
|   |  | ⊠   | ⊠   | Ⓛ  | Ⓛ   |    |
|   |  |  |  |  |  |    |
| Thread  |  | Ø-range on page   |   |  |   |    |
| M   |  | 52  | 53,54   | 57   | 58  |    |
| MF  |  |   | 55,56   |  |   |    |
| UNC   |  |   |   |  |   |    |
| UNF   |  |   |   |  |   |    |
| PT  |  |   |   |  |   |    |
| Material / ISO Material                                       |  | Hardness N/mm <sup>2</sup>  | Recommended cutting speed v <sub>c</sub> m/min                                      |  |   |    |
| Struct./free-cutt./unall. heat-treat./case hard. steels       |  | ≤ 800   | 10  | 12   | 15  | 25 |
| P Free-cutting steels, unall. case hard. steels, nitr. steels |  | 800 - 1 000   | 10  | 12   | 15  | 25 |
| Alloyed heat-treatable, tool and high speed steels            |  | 800 - 1200  | 8   | 10   | 12  | 20 |
| M Stainless steel - easy to machine / sulphured               |  | ≤ 750   | 4   | 8  | 10  | 15 |
| Stainless steel - moderately difficult to machine             |  | 750 - 950   | 4   | 8  | 10  | 15 |
| K Cast iron, grey cast iron, spher. graph./mall. cast iron    |  |   | 15  | 15   | 20  | 30 |
| N Aluminium, Al-wrought alloys, Al-alloys                     |  | ≤ 6% Si   | 15  | 20   | 25  | 40 |
| Aluminium-cast alloys   |  | ≥ 6% Si   | 15  | 20   | 25  | 40 |
| S Titanium, Ti-alloys   |  |   | 4   | 4  | 6   | 15 |
| Ni-alloys   |  |   | 4   | 4  | 6   | 12 |
| H Hardened steels   |  | 45 - 55 HRC   | x   | x  | x   | x  |
| Hardened steels   |  | 55 - 62 HRC   | x   | x  | x   | x  |



| HSS-E                                 |         |       |       | HSS-E-PM |     | HSS-E    |          | HSS-E-PM |       | HSS-E   | HSS-E-PM | HSS-E | HSS-E-PM |
|---------------------------------------|---------|-------|-------|----------|-----|----------|----------|----------|-------|---------|----------|-------|----------|
| N R40/E                               | N R25/C | VA/B  | VA/B  | N/B      | N/B | VA R40/C | VA R40/C | N R45    | N R45 | N R40/C | H/D      | H/C   | H/C      |
| ○                                     | ○       | ○     | Ⓢ     | ○        | ⓐ   | ○        | Ⓢ        | ○        | ⓐ     | ○       | ⓐ        | ○     | ⓐ        |
| ⊠                                     | ⊠       | ⊠     | ⊠     | ⊠        | ⊠   | ⊠        | ⊠        | ⊠        | ⊠     | ⊠       | ⊠        | ⊠     | ⊠        |
| ○                                     | ○       | ○     | ○     |          |     | ○        | ○        |          |       | ○       |          | ○     |          |
|                                       |         |       |       |          |     |          |          |          |       |         |          |       |          |
| Ø-range on page                       |         |       |       |          |     |          |          |          |       |         |          |       |          |
| 29                                    |         | 15,16 | 15,16 | 17       | 18  | 24,25    | 24,25    | 26       | 27    | 30      | 31       | 32    | 33       |
| 42                                    |         | 35    | 35    | 36       | 36  | 39       | 39       | 40       | 40    | 43      | 44       | 45    | 46       |
|                                       |         |       |       |          |     |          |          |          |       |         |          |       |          |
|                                       | 51      |       |       |          |     |          |          |          |       |         |          |       |          |
| Recommended cutting speed $v_c$ m/min |         |       |       |          |     |          |          |          |       |         |          |       |          |
| 10                                    | 10      | 10    | 15    | 12       | 20  | 10       | 15       | 12       | 20    | 10      | x        | x     | x        |
| 8                                     | 8       | 8     | 12    | 12       | 18  | 8        | 12       | 12       | 18    | 4       | x        | x     | 15       |
| 6                                     | 6       | 6     | 8     | 8        | 15  | 6        | 8        | 8        | 15    | x       | x        | x     | 12       |
| 6                                     | 6       | 8     | 10    | 10       | 12  | 8        | 10       | 10       | 12    | x       | x        | x     | x        |
| 6                                     | 6       | 8     | 10    | 10       | 12  | 8        | 10       | 10       | 12    | x       | x        | x     | x        |
| 10                                    | 10      | 10    | 12    | 12       | 20  | 10       | 12       | 12       | 20    | 6       | 15       | 20    | 25       |
| 10                                    | x       | 10    | x     | 12       | 20  | 10       | x        | 12       | 20    | 10      | x        | x     | x        |
| 8                                     | 10      | 8     | 10    | 12       | 20  | 8        | 10       | 12       | 20    | x       | 15       | 15    | 25       |
| x                                     | x       | x     | 2     | x        | 2   | x        | 2        | x        | 2     | x       | x        | x     | x        |
| x                                     | x       | x     | x     | x        | 2   | x        | x        | x        | 2     | x       | x        | x     | x        |
| x                                     | x       | x     | x     | x        | x   | x        | x        | x        | x     | x       | 4        | x     | x        |
| x                                     | x       | x     | x     | x        | x   | x        | x        | x        | x     | x       | x        | x     | x        |



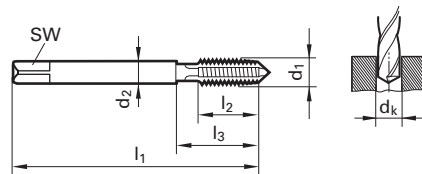


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | N          | N          |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **1014** **1015**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M 7   | 1.00 | OH2       | 6.200  | 5.00  | 6.000  | 65.00  | 16.00 | 33.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M 9   | 1.25 | OH2       | 7.000  | 5.50  | 7.800  | 72.00  | 17.00 | 38.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 26.00 | 48.00 |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |



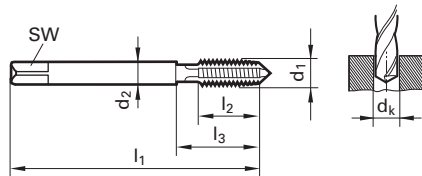


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | N          | N          |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **4420** **4421**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH4       | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | OH4       | 3.000  | 2.50  | 2.050  | 44.00  | 0.8β  | 16.00 |
| M 3   | 0.50 | OH4       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | OH4       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | OH4       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | OH4       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M 8   | 1.25 | OH5       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10   | 1.50 | OH5       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | OH5       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M14   | 2.00 | OH5       | 10.500 | 8.00  | 12.000 | 88.00  | 26.00 | 48.00 |
| M16   | 2.00 | OH5       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M18   | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 |
| M20   | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |

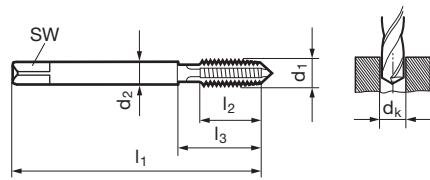


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>C</b>     |
| Type              | N            |
| Form              | B            |
| Cutting direction | right-hand   |



Article no. **7778**

| d1  | P     | Tolerance | d2     | SW     | dk    | l1      | l2     | l3     |
|-----|-------|-----------|--------|--------|-------|---------|--------|--------|
|     | mm    |           | mm     |        | mm    | mm      | mm     | mm     |
| M3  | 0.500 | OH2       | 4.000  | 3.200  | 2.50  | 46.000  | 10.000 | 19.000 |
| M4  | 0.700 | OH3       | 5.000  | 4.000  | 3.30  | 52.000  | 12.000 | 20.000 |
| M5  | 0.800 | OH3       | 5.500  | 4.500  | 4.20  | 60.000  | 14.000 | 24.000 |
| M6  | 1.000 | OH3       | 6.000  | 4.500  | 5.00  | 62.000  | 16.000 | 29.000 |
| M8  | 1.250 | OH3       | 6.200  | 5.000  | 6.80  | 70.000  | 17.000 | 37.000 |
| M10 | 1.500 | OH3       | 7.000  | 5.500  | 8.50  | 75.000  | 20.000 | 41.000 |
| M12 | 1.750 | OH4       | 8.500  | 6.500  | 10.20 | 82.000  | 24.000 | 48.000 |
| M14 | 2.000 | OH4       | 10.500 | 8.000  | 12.00 | 88.000  | 26.000 | 48.000 |
| M16 | 2.000 | OH4       | 12.500 | 10.000 | 14.00 | 95.000  | 26.000 | 52.000 |
| M18 | 2.500 | OH5       | 14.000 | 11.000 | 15.50 | 100.000 | 30.000 | 55.000 |
| M20 | 2.500 | OH5       | 15.000 | 12.000 | 17.50 | 105.000 | 32.000 | 58.000 |

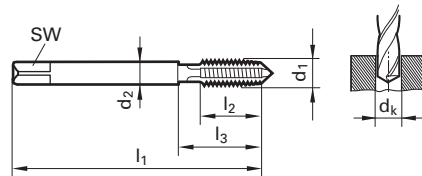


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | VA         | VA         |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **4422** **4423**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 26.00 | 48.00 |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |

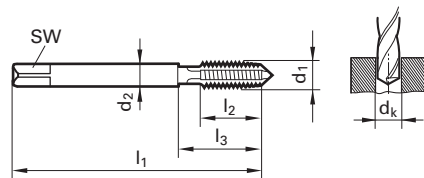


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | VA         | VA         |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **4424** **4425**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH4       | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | OH4       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M 3   | 0.50 | OH4       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | OH4       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | OH4       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | OH4       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M 8   | 1.25 | OH5       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10   | 1.50 | OH5       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | OH5       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M14   | 2.00 | OH5       | 10.500 | 8.00  | 12.000 | 88.00  | 26.00 | 48.00 |
| M16   | 2.00 | OH5       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M18   | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 |
| M20   | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |



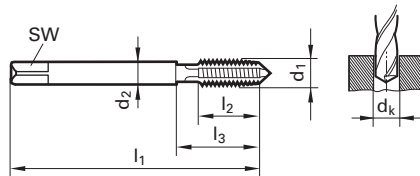


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | ○               |
| Type              | N               |
| Form              | B               |
| Cutting direction | right-hand      |



Article no. **4468**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH1.5     | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | OH3       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | OH3       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | OH4       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M16   | 2.00 | OH4       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M20   | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |

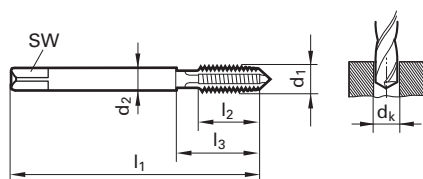


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | <b>A</b>        |
| Type              | N               |
| Form              | B               |
| Cutting direction | right-hand      |



Article no. **4470**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH1.5     | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | OH3       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | OH3       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | OH4       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M14   | 2.00 | OH4       | 10.500 | 8.00  | 12.000 | 88.00  | 26.00 | 48.00 |
| M16   | 2.00 | OH4       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M18   | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 |
| M20   | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |

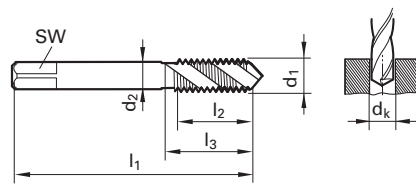


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |

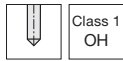


Article no. **1012**

| d1   | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|------|------|-----------|--------|-------|--------|--------|-------|-------|
|      | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M1.2 | 0.25 | OH1       | 3.000  | 2.50  | 0.950  | 36.00  | 9.00  | 9.00  |
| M1.4 | 0.30 | OH1       | 3.000  | 2.50  | 1.100  | 36.00  | 11.00 | 11.00 |
| M1.6 | 0.35 | OH1       | 3.000  | 2.50  | 1.250  | 36.00  | 13.00 | 13.00 |
| M1.7 | 0.35 | OH1       | 3.000  | 2.50  | 1.300  | 36.00  | 13.00 | 13.00 |
| M2   | 0.40 | OH1       | 3.000  | 2.50  | 1.600  | 40.00  | 15.00 | 15.00 |
| M2.3 | 0.40 | OH1       | 3.000  | 2.50  | 1.900  | 44.00  | 15.00 | 15.00 |
| M2.5 | 0.45 | OH1       | 3.000  | 2.50  | 2.050  | 44.00  | 16.00 | 16.00 |
| M2.6 | 0.45 | OH1       | 3.000  | 2.50  | 2.100  | 44.00  | 16.00 | 16.00 |
| M3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 19.00 | 19.00 |
| M3.5 | 0.60 | OH2       | 4.000  | 3.20  | 2.900  | 48.00  | 19.00 | 19.00 |
| M4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 20.00 | 20.00 |
| M5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 24.00 | 24.00 |
| M6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 29.00 | 29.00 |
| M7   | 1.00 | OH2       | 6.200  | 5.00  | 6.000  | 65.00  | 33.00 | 33.00 |
| M8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 37.00 | 37.00 |
| M9   | 1.25 | OH2       | 7.000  | 5.50  | 7.800  | 72.00  | 38.00 | 38.00 |
| M10  | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 41.00 | 41.00 |
| M12  | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 48.00 | 48.00 |
| M14  | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 48.00 | 48.00 |
| M16  | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 52.00 | 52.00 |
| M18  | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 55.00 | 55.00 |
| M20  | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 58.00 | 58.00 |
| M22  | 2.50 | OH4       | 17.000 | 13.00 | 19.500 | 115.00 | 63.00 | 63.00 |
| M24  | 3.00 | OH4       | 19.000 | 15.00 | 21.000 | 120.00 | 66.00 | 66.00 |
| M30  | 3.50 | OH4       | 23.000 | 17.00 | 16.500 | 135.00 | 74.00 | 74.00 |

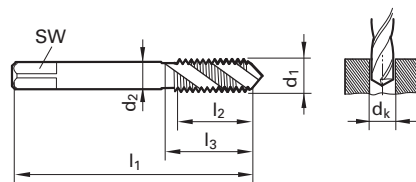


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



Article no. **1013**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 19.00 |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 20.00 |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 29.00 |
| M 7   | 1.00 | OH2       | 6.200  | 5.00  | 6.000  | 65.00  | 16.00 | 33.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 37.00 |
| M 9   | 1.25 | OH2       | 7.000  | 5.50  | 7.800  | 72.00  | 17.00 | 38.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 41.00 |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 48.00 |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 48.00 |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 52.00 |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 55.00 |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 58.00 |



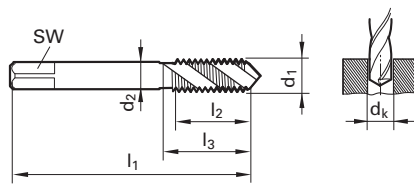


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | N R40      | N R40      |
| Form              | C          | C          |
| Cutting direction | right-hand | right-hand |



Article no. **4426** **4427**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH4       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 15.00 |
| M 2.5 | 0.45 | OH4       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 16.00 |
| M 3   | 0.50 | OH4       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 19.00 |
| M 4   | 0.70 | OH4       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 20.00 |
| M 5   | 0.80 | OH4       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 24.00 |
| M 6   | 1.00 | OH4       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 29.00 |
| M 8   | 1.25 | OH5       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 37.00 |
| M10   | 1.50 | OH5       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 41.00 |
| M12   | 1.75 | OH5       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 48.00 |
| M14   | 2.00 | OH5       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 48.00 |
| M16   | 2.00 | OH5       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 52.00 |
| M18   | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 55.00 |
| M20   | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 58.00 |

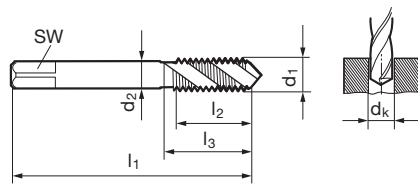


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>C</b>     |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |

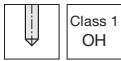


Article no. **7777**

| d1  | P     | Tolerance | d2     | SW     | dk    | l1      | l2     | l3     |
|-----|-------|-----------|--------|--------|-------|---------|--------|--------|
|     | mm    |           | mm     |        | mm    | mm      | mm     | mm     |
| M3  | 0.500 | OH2       | 4.000  | 3.200  | 2.50  | 46.000  | 6.000  | 19.000 |
| M4  | 0.700 | OH3       | 5.000  | 4.000  | 3.30  | 52.000  | 7.500  | 20.000 |
| M5  | 0.800 | OH3       | 5.500  | 4.500  | 4.20  | 60.000  | 8.500  | 24.000 |
| M6  | 1.000 | OH3       | 6.000  | 4.500  | 5.00  | 62.000  | 11.000 | 29.000 |
| M8  | 1.250 | OH3       | 6.200  | 5.000  | 6.80  | 70.000  | 14.000 | 37.000 |
| M10 | 1.500 | OH3       | 7.000  | 5.500  | 8.50  | 75.000  | 16.000 | 41.000 |
| M12 | 1.750 | OH4       | 8.500  | 6.500  | 10.20 | 82.000  | 18.500 | 48.000 |
| M14 | 2.000 | OH4       | 10.500 | 8.000  | 12.00 | 88.000  | 20.000 | 48.000 |
| M16 | 2.000 | OH4       | 12.500 | 10.000 | 14.00 | 95.000  | 20.000 | 52.000 |
| M18 | 2.500 | OH5       | 14.000 | 11.000 | 15.50 | 100.000 | 25.000 | 55.000 |
| M20 | 2.500 | OH5       | 15.000 | 12.000 | 17.50 | 105.000 | 25.000 | 58.000 |

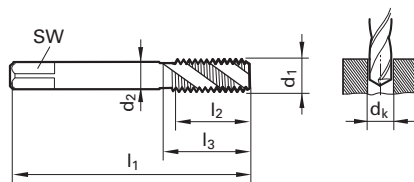


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | N R40      | N R40      |
| Form              | E          | E          |
| Cutting direction | right-hand | right-hand |



Article no. **4432** **4433**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 19.00 |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 20.00 |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 29.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 37.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 41.00 |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 48.00 |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 48.00 |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 52.00 |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 55.00 |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 58.00 |

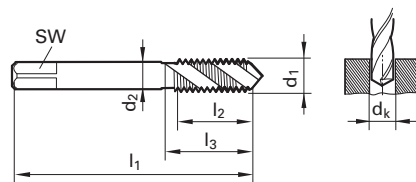


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | VA R40     | VA R40     |
| Form              | C          | C          |
| Cutting direction | right-hand | right-hand |



Article no. **4428** **4429**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 15.00 |
| M 2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 16.00 |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 19.00 |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 20.00 |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 24.00 |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 29.00 |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 37.00 |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 41.00 |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 48.00 |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 48.00 |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 52.00 |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 55.00 |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 58.00 |

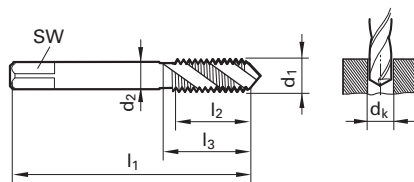


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | VA R40     | VA R40     |
| Form              | C          | C          |
| Cutting direction | right-hand | right-hand |



Article no. **4430** **4431**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 2   | 0.40 | OH4       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 4.50  |
| M 2.5 | 0.45 | OH4       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 5.00  |
| M 3   | 0.50 | OH4       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 6.00  |
| M 4   | 0.70 | OH4       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 7.50  |
| M 5   | 0.80 | OH4       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 8.50  |
| M 6   | 1.00 | OH4       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 11.00 |
| M 8   | 1.25 | OH5       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 14.00 |
| M10   | 1.50 | OH5       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 16.00 |
| M12   | 1.75 | OH5       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 18.50 |
| M14   | 2.00 | OH5       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 20.00 |
| M16   | 2.00 | OH5       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 20.00 |
| M18   | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 25.00 |
| M20   | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 25.00 |

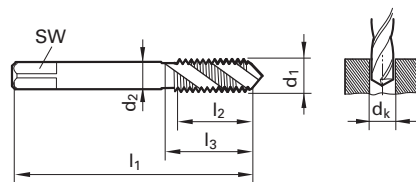


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | ○               |
| Type              | N R45           |
| Form              | C               |
| Cutting direction | right-hand      |



Article no. **4466**

| d1   | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|------|------|-----------|--------|-------|--------|--------|-------|-------|
|      | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M2   | 0.40 | OH1.5     | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M4   | 0.70 | OH3       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M5   | 0.80 | OH3       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M6   | 1.00 | OH3       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M8   | 1.25 | OH3       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10  | 1.50 | OH3       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12  | 1.75 | OH4       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M16  | 2.00 | OH4       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M20  | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |



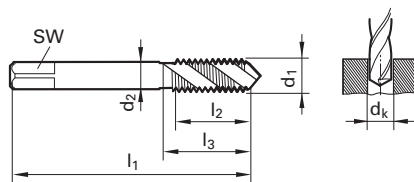


JIS machine taps for ISO metric threads



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | <b>A</b>        |
| Type              | N R45           |
| Form              | C               |
| Cutting direction | right-hand      |



Article no. **4449**

| d1   | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|------|------|-----------|--------|-------|--------|--------|-------|-------|
|      | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M2   | 0.40 | OH1.5     | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 |
| M4   | 0.70 | OH3       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 |
| M5   | 0.80 | OH3       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 |
| M6   | 1.00 | OH3       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 |
| M8   | 1.25 | OH3       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 |
| M10  | 1.50 | OH3       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 |
| M12  | 1.75 | OH4       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 |
| M14  | 2.00 | OH4       | 10.500 | 9.00  | 12.000 | 88.00  | 26.00 | 48.00 |
| M16  | 2.00 | OH4       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 |
| M18  | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 |
| M20  | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 |

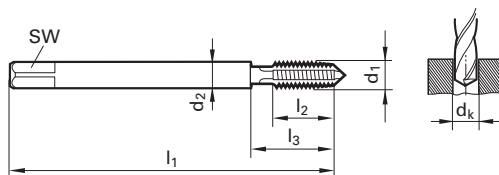


**JIS machine taps with long shank for ISO metric threads**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N            |
| Form              | B            |
| Cutting direction | right-hand   |



Article no. **4460**

| Code no. | d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|----------|-----|------|-----------|--------|-------|--------|--------|-------|-------|
|          |     | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| 3.000    | M3  | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 100.00 | 10.00 | 19.00 |
| 4.000    | M4  | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 100.00 | 12.00 | 21.00 |
| 5.000    | M5  | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 100.00 | 14.00 | 25.00 |
| 6.000    | M6  | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 150.00 | 16.00 | 29.00 |
| 8.000    | M8  | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 150.00 | 17.00 | 37.00 |
| 10.000   | M10 | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 150.00 | 20.00 | 41.00 |
| 12.000   | M12 | 1.75 | OH2       | 8.500  | 6.50  | 10.200 | 150.00 | 24.00 | 48.00 |
| 14.000   | M14 | 2.00 | OH2       | 10.500 | 8.00  | 12.000 | 150.00 | 26.00 | 48.00 |
| 16.000   | M16 | 2.00 | OH2       | 12.500 | 10.00 | 14.000 | 150.00 | 26.00 | 52.00 |
| 20.000   | M20 | 2.50 | OH3       | 15.000 | 12.00 | 17.500 | 200.00 | 32.00 | 58.00 |

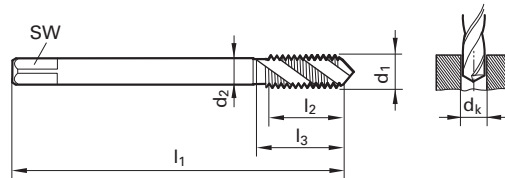


JIS machine taps with long shank for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



Article no. **4462**

| Code no. | d1   | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|----------|------|------|-----------|--------|-------|--------|--------|-------|-------|
|          |      | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| 2.000    | M2   | 0.40 | OH1       | 3.000  | 2.50  | 1.600  | 100.00 | 4.50  | 15.00 |
| 2.500    | M2.5 | 0.45 | OH1       | 3.000  | 2.50  | 2.050  | 100.00 | 5.00  | 16.00 |
| 3.000    | M3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 100.00 | 6.00  | 19.00 |
| 3.010    | M3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 150.00 | 6.00  | 19.00 |
| 4.000    | M4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 100.00 | 7.50  | 20.00 |
| 4.010    | M4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 150.00 | 7.50  | 20.00 |
| 5.000    | M5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 100.00 | 8.00  | 25.00 |
| 5.010    | M5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 150.00 | 8.00  | 25.00 |
| 6.000    | M6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 100.00 | 11.00 | 29.00 |
| 6.010    | M6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 150.00 | 11.00 | 29.00 |
| 8.000    | M8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 100.00 | 14.00 | 37.00 |
| 8.010    | M8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 150.00 | 14.00 | 37.00 |
| 10.000   | M10  | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 100.00 | 16.00 | 41.00 |
| 10.010   | M10  | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 150.00 | 16.00 | 41.00 |
| 12.000   | M12  | 1.75 | OH2       | 8.500  | 6.50  | 10.200 | 100.00 | 18.50 | 48.00 |
| 12.010   | M12  | 1.75 | OH2       | 8.500  | 6.50  | 10.200 | 150.00 | 18.50 | 48.00 |
| 14.010   | M14  | 2.00 | OH2       | 10.500 | 8.00  | 12.000 | 150.00 | 20.00 | 48.00 |
| 16.010   | M16  | 2.00 | OH2       | 12.500 | 10.00 | 14.000 | 150.00 | 20.00 | 52.00 |
| 18.000   | M18  | 2.50 | OH3       | 14.000 | 11.00 | 15.500 | 200.00 | 25.00 | 55.00 |
| 20.010   | M20  | 2.50 | OH3       | 15.000 | 12.00 | 17.500 | 150.00 | 27.00 | 58.00 |
| 20.000   | M20  | 2.50 | OH3       | 15.000 | 12.00 | 17.500 | 200.00 | 25.00 | 58.00 |

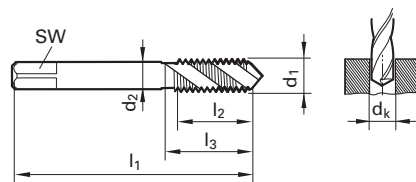


JIS machine taps for ISO metric threads and less rigid machines



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |

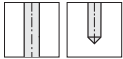


Article no. **4456**

| d1   | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|------|------|-----------|--------|-------|--------|--------|-------|-------|
|      | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 15.00 |
| M2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 16.00 |
| M3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 19.00 |
| M4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 20.00 |
| M5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 24.00 |
| M6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 29.00 |
| M8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 37.00 |
| M10  | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 41.00 |
| M12  | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 48.00 |
| M14  | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 48.00 |
| M16  | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 52.00 |
| M18  | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 55.00 |
| M20  | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 58.00 |

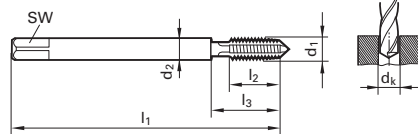


JIS machine taps for ISO metric threads and for hardened steel (42-45 HRC)



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | <b>C</b>        |
| Type              | H               |
| Form              | D               |
| Cutting direction | right-hand      |

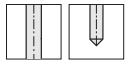


Article no. **4453**

| d1  | P    | Tolerance | d2    | SW   | dk     | l1    | l2    | l3    |
|-----|------|-----------|-------|------|--------|-------|-------|-------|
|     | mm   |           | mm    |      | mm     | mm    | mm    | mm    |
| M3  | 0.50 | OH3       | 4.000 | 3.20 | 2.600  | 46.00 | 11.00 | 19.00 |
| M4  | 0.70 | OH3       | 5.000 | 4.00 | 3.400  | 52.00 | 13.00 | 21.00 |
| M5  | 0.80 | OH3       | 5.500 | 4.50 | 4.300  | 60.00 | 16.00 | 24.00 |
| M6  | 1.00 | OH3       | 6.000 | 4.50 | 5.100  | 62.00 | 19.00 | 29.00 |
| M8  | 1.25 | OH3       | 6.200 | 5.00 | 6.900  | 70.00 | 22.00 |       |
| M10 | 1.50 | OH3       | 7.000 | 5.50 | 8.600  | 75.00 | 24.00 |       |
| M12 | 1.75 | OH3       | 8.500 | 6.50 | 10.400 | 82.00 | 29.00 |       |

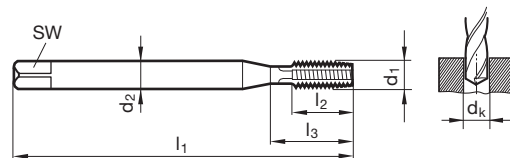


**JIS machine taps for ISO metric threads and cast iron**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | H            |
| Form              | C            |
| Cutting direction | right-hand   |



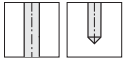
Article no. **4452**

| d1   | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|------|------|-----------|--------|-------|--------|--------|-------|-------|
|      | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 |
| M2.5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 |
| M3   | 0.50 | OH3       | 4.000  | 3.20  | 2.500  | 46.00  | 11.00 | 19.00 |
| M4   | 0.70 | OH3       | 5.000  | 4.00  | 3.300  | 52.00  | 13.00 | 20.00 |
| M5   | 0.80 | OH3       | 5.500  | 4.50  | 4.200  | 60.00  | 16.00 | 24.00 |
| M6   | 1.00 | OH3       | 6.000  | 4.50  | 5.000  | 62.00  | 19.00 | 29.00 |
| M8   | 1.25 | OH4       | 6.200  | 5.00  | 6.800  | 70.00  | 22.00 | 37.00 |
| M10  | 1.50 | OH4       | 7.000  | 5.50  | 8.500  | 75.00  | 24.00 | 41.00 |
| M12  | 1.75 | OH5       | 8.500  | 6.50  | 10.200 | 82.00  | 29.00 | 48.00 |
| M14  | 2.00 | OH5       | 10.500 | 8.00  | 12.000 | 88.00  | 30.00 | 48.00 |
| M16  | 2.00 | OH5       | 12.500 | 10.00 | 14.000 | 95.00  | 32.00 | 52.00 |
| M18  | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 37.00 | 55.00 |
| M20  | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 37.00 | 58.00 |



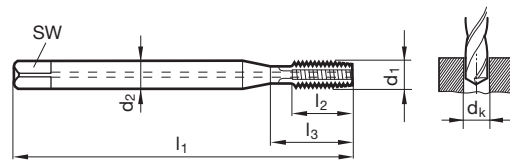


JIS machine taps with IC for ISO metric threads and cast iron



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | <b>C</b>        |
| Type              | H               |
| Form              | C               |
| Cutting direction | right-hand      |



Article no. **4448**

| d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-----|------|-----------|--------|-------|--------|--------|-------|-------|
|     | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M5  | 0.80 | OH3       | 5.500  | 4.50  | 4.200  | 60.00  | 16.00 | 24.00 |
| M6  | 1.00 | OH3       | 6.000  | 4.50  | 5.000  | 62.00  | 19.00 | 29.00 |
| M8  | 1.25 | OH4       | 6.200  | 5.00  | 6.800  | 70.00  | 22.00 | 37.00 |
| M10 | 1.50 | OH4       | 7.000  | 5.50  | 8.500  | 75.00  | 24.00 | 41.00 |
| M12 | 1.75 | OH5       | 8.500  | 6.50  | 10.200 | 82.00  | 29.00 | 48.00 |
| M14 | 2.00 | OH5       | 10.500 | 8.00  | 12.000 | 88.00  | 30.00 | 48.00 |
| M16 | 2.00 | OH5       | 12.500 | 10.00 | 14.000 | 95.00  | 32.00 | 52.00 |
| M18 | 2.50 | OH5       | 14.000 | 11.00 | 15.500 | 100.00 | 37.00 | 55.00 |
| M20 | 2.50 | OH5       | 15.000 | 12.00 | 17.500 | 105.00 | 37.00 | 58.00 |

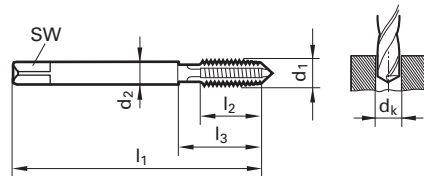


JIS machine taps for ISO metric fine threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | N          | N          |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **4434** **4435**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|--------|-------|-------|
|          |          |           | mm     |       | mm     | mm     | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00  | 13.00 | 30.00 |
| 8.005    | M8x1     | OH2       | 6.200  | 5.00  | 7.000  | 70.00  | 16.00 | 35.00 |
| 10.005   | M10x1    | OH2       | 7.000  | 5.50  | 9.000  | 70.00  | 16.00 | 35.00 |
| 10.006   | M10x1.25 | OH2       | 7.000  | 5.50  | 8.800  | 75.00  | 20.00 | 39.00 |
| 12.005   | M12x1    | OH2       | 8.500  | 6.50  | 11.000 | 70.00  | 20.00 | 40.00 |
| 12.006   | M12x1.25 | OH2       | 8.500  | 6.50  | 10.800 | 80.00  | 20.00 | 40.00 |
| 12.007   | M12x1.5  | OH2       | 8.500  | 6.50  | 10.500 | 82.00  | 20.00 | 40.00 |
| 14.007   | M14x1.5  | OH2       | 10.500 | 8.00  | 12.500 | 88.00  | 20.00 | 40.00 |
| 16.007   | M16x1.5  | OH2       | 12.500 | 10.00 | 14.500 | 95.00  | 22.00 | 44.00 |
| 18.007   | M18x1.5  | OH2       | 14.000 | 11.00 | 16.500 | 100.00 | 25.00 | 55.00 |
| 20.007   | M20x1.5  | OH2       | 14.000 | 12.00 | 18.500 | 95.00  | 25.00 | 44.00 |

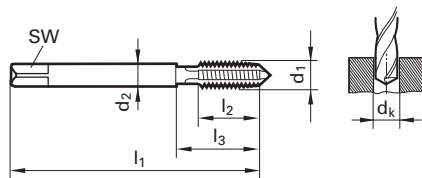


JIS machine taps for ISO metric fine threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | VA         | VA         |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **4436** **4437**

| Code no. | d1 X P    | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|-----------|-----------|--------|-------|--------|-------|-------|-------|
|          |           |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6 x0,75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00 | 13.00 | 30.00 |
| 8.005    | M8 x1     | OH2       | 6.200  | 5.00  | 7.000  | 70.00 | 16.00 | 35.00 |
| 10.005   | M10 x1    | OH2       | 7.000  | 5.50  | 9.000  | 70.00 | 16.00 | 35.00 |
| 10.006   | M10 x1,25 | OH2       | 7.000  | 5.50  | 8.800  | 75.00 | 20.00 | 39.00 |
| 12.005   | M12 x1    | OH2       | 8.500  | 6.50  | 11.000 | 70.00 | 20.00 | 40.00 |
| 12.006   | M12 x1,25 | OH2       | 8.500  | 6.50  | 10.800 | 80.00 | 20.00 | 40.00 |
| 12.007   | M12 x1,5  | OH2       | 8.500  | 6.50  | 10.500 | 82.00 | 20.00 | 40.00 |
| 14.007   | M14 x1,5  | OH2       | 10.500 | 8.00  | 12.500 | 88.00 | 20.00 | 40.00 |
| 16.007   | M16 x1,5  | OH2       | 12.500 | 10.00 | 14.500 | 95.00 | 22.00 | 44.00 |
| 20.007   | M20 x1,5  | OH2       | 15.000 | 12.00 | 18.500 | 95.00 | 25.00 | 44.00 |

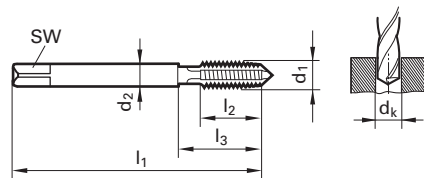


JIS machine taps for ISO metric fine threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E-PM   |            |
| Surface finish    | ○          | ⓐ          |
| Type              | N          | N          |
| Form              | B          | B          |
| Cutting direction | right-hand | right-hand |



Article no. **4469** **4471**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|-------|-------|-------|
|          |          |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00 | 13.00 | 30.00 |
| 8.005    | M8x1     | OH3       | 6.200  | 5.00  | 7.000  | 70.00 | 16.00 | 35.00 |
| 10.005   | M10x1    | OH3       | 7.000  | 5.50  | 9.000  | 70.00 | 16.00 | 35.00 |
| 10.006   | M10x1.25 | OH3       | 7.000  | 5.50  | 8.800  | 75.00 | 20.00 | 39.00 |
| 12.005   | M12x1    | OH3       | 8.500  | 6.50  | 11.000 | 70.00 | 20.00 | 40.00 |
| 12.006   | M12x1.25 | OH3       | 8.500  | 6.50  | 10.800 | 80.00 | 20.00 | 40.00 |
| 12.007   | M12x1.5  | OH3       | 8.500  | 6.50  | 10.500 | 82.00 | 20.00 | 40.00 |
| 14.007   | M14x1.5  | OH3       | 10.500 | 8.00  | 12.500 | 88.00 | 20.00 | 40.00 |
| 16.007   | M16x1.5  | OH3       | 12.500 | 10.00 | 14.500 | 95.00 | 22.00 | 44.00 |
| 20.007   | M20x1.5  | OH4       | 14.000 | 12.00 | 18.500 | 95.00 | 25.00 | 44.00 |

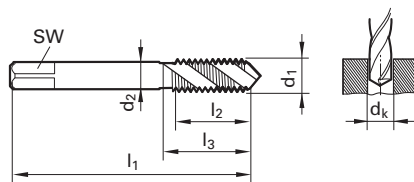


**JIS machine taps for ISO metric fine threads**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



Article no. **4438**

| Code no. | d1 X P   | Tolerance | d2     | SW     | dk     | l1     | l2    | l3    |
|----------|----------|-----------|--------|--------|--------|--------|-------|-------|
|          |          |           | mm     |        | mm     | mm     | mm    | mm    |
| 4.003    | M4x0.5   | OH2       | 5.000  | 4.00   | 3.500  | 52.00  | 5.00  | 20.00 |
| 5.003    | M5x0.5   | OH2       | 5.500  | 4.50   | 4.500  | 60.00  | 5.00  | 25.00 |
| 6.003    | M6x0.5   | OH2       | 6.000  | 4.50   | 5.500  | 62.00  | 8.00  | 30.00 |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50   | 5.200  | 62.00  | 8.00  | 30.00 |
| 8.004    | M8x0.75  | OH2       | 6.200  | 5.00   | 7.200  | 70.00  | 11.00 | 35.00 |
| 8.005    | M8x1     | OH2       | 6.200  | 5.00   | 7.000  | 70.00  | 11.00 | 35.00 |
| 10.005   | M10x1    | OH2       | 7.000  | 5.50   | 9.000  | 70.00  | 11.00 | 35.00 |
| 10.006   | M10x1.25 | OH2       | 7.000  | 5.50   | 8.800  | 75.00  | 14.00 | 39.00 |
| 12.005   | M12x1    | OH2       | 8.500  | 6.50   | 11.000 | 70.00  | 11.00 | 40.00 |
| 12.006   | M12x1.25 | OH2       | 8.500  | 6.50   | 10.800 | 80.00  | 16.00 | 40.00 |
| 12.007   | M12x1.5  | OH2       | 8.500  | 6.50   | 10.500 | 82.00  | 16.00 | 40.00 |
| 14.007   | M14x1.5  | OH2       | 10.500 | 8.00   | 12.500 | 88.00  | 15.00 | 40.00 |
| 16.007   | M16x1.5  | OH2       | 12.500 | 10.00  | 14.500 | 95.00  | 15.00 | 44.00 |
| 18.007   | M18x1.5  | OH2       | 14.000 | 11.00  | 16.500 | 100.00 | 16.00 | 55.00 |
| 20.007   | M20x1.5  | OH2       | 14.000 | 12.00  | 18.500 | 95.00  | 16.00 | 44.00 |
| 22.007   | M22x1.5  | OH2       | 17.000 | 13.000 | 20.500 | 115.00 | 16.00 | 63.00 |

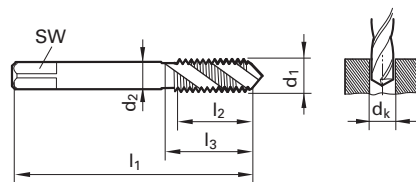


JIS machine taps for ISO metric fine threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



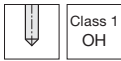
Article no. **4439**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|--------|-------|-------|
|          |          |           | mm     |       | mm     | mm     | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00  | 8.00  | 30.00 |
| 8.005    | M8x1     | OH2       | 6.200  | 5.00  | 7.000  | 70.00  | 11.00 | 35.00 |
| 10.005   | M10x1    | OH2       | 7.000  | 5.50  | 9.000  | 70.00  | 11.00 | 35.00 |
| 10.006   | M10x1.25 | OH2       | 7.000  | 5.50  | 8.800  | 75.00  | 14.00 | 39.00 |
| 12.005   | M12x1    | OH2       | 8.500  | 6.50  | 11.000 | 70.00  | 11.00 | 40.00 |
| 12.006   | M12x1.25 | OH2       | 8.500  | 6.50  | 10.800 | 80.00  | 16.00 | 40.00 |
| 12.007   | M12x1.5  | OH2       | 8.500  | 6.50  | 10.500 | 82.00  | 16.00 | 40.00 |
| 14.007   | M14x1.5  | OH2       | 10.500 | 8.00  | 12.500 | 88.00  | 15.00 | 40.00 |
| 16.007   | M16x1.5  | OH2       | 12.500 | 10.00 | 14.500 | 95.00  | 15.00 | 44.00 |
| 18.007   | M18x1.5  | OH2       | 14.000 | 11.00 | 16.500 | 100.00 | 16.00 | 55.00 |
| 20.007   | M20x1.5  | OH2       | 14.000 | 12.00 | 18.500 | 95.00  | 16.00 | 44.00 |



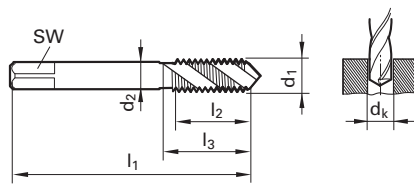


JIS machine taps for ISO metric fine threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E      |            |
| Surface finish    | ○          | Ⓢ          |
| Type              | VA R40     | VA R40     |
| Form              | C          | C          |
| Cutting direction | right-hand | right-hand |



Article no. **4440** **4441**

| Code no. | d1 X P    | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|-----------|-----------|--------|-------|--------|-------|-------|-------|
|          |           |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6 x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00 | 8.00  | 30.00 |
| 8.005    | M8 x1     | OH2       | 6.200  | 5.00  | 7.000  | 70.00 | 11.00 | 35.00 |
| 10.005   | M10 x1    | OH2       | 7.000  | 5.50  | 9.000  | 70.00 | 11.00 | 35.00 |
| 10.006   | M10 x1.25 | OH2       | 7.000  | 5.50  | 8.800  | 75.00 | 14.00 | 39.00 |
| 12.005   | M12 x1    | OH2       | 8.500  | 6.50  | 11.000 | 70.00 | 11.00 | 40.00 |
| 12.006   | M12 x1.25 | OH2       | 8.500  | 6.50  | 10.800 | 80.00 | 16.00 | 40.00 |
| 12.007   | M12 x1.5  | OH2       | 8.500  | 6.50  | 10.500 | 82.00 | 16.00 | 40.00 |
| 14.007   | M14 x1.5  | OH2       | 10.500 | 8.00  | 12.500 | 88.00 | 15.00 | 40.00 |
| 16.007   | M16 x1.5  | OH2       | 12.500 | 10.00 | 14.500 | 95.00 | 15.00 | 44.00 |
| 20.007   | M20 x1.5  | OH2       | 15.000 | 12.00 | 18.500 | 95.00 | 16.00 | 44.00 |

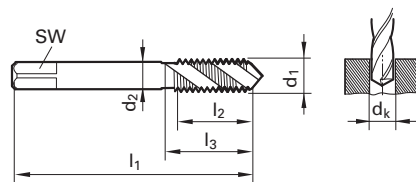


JIS machine taps for ISO metric fine threads



Cutting Data page 10-11

|                   |            |            |
|-------------------|------------|------------|
| Tool material     | HSS-E-PM   |            |
| Surface finish    | ○          | ⓐ          |
| Type              | N R45      | N R45      |
| Form              | C          | C          |
| Cutting direction | right-hand | right-hand |



Article no. **4467** **4450**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|-------|-------|-------|
|          |          |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00 | 8.00  | 30.00 |
| 8.005    | M8x1     | OH3       | 6.200  | 5.00  | 7.000  | 70.00 | 11.00 | 35.00 |
| 10.005   | M10x1    | OH3       | 7.000  | 5.50  | 9.000  | 70.00 | 11.00 | 35.00 |
| 10.006   | M10x1.25 | OH3       | 7.000  | 5.50  | 8.800  | 75.00 | 14.00 | 39.00 |
| 12.005   | M12x1    | OH3       | 8.500  | 6.50  | 11.000 | 70.00 | 11.00 | 40.00 |
| 12.006   | M12x1.25 | OH3       | 8.500  | 6.50  | 10.800 | 80.00 | 16.00 | 40.00 |
| 12.007   | M12x1.5  | OH3       | 8.500  | 6.50  | 10.500 | 82.00 | 16.00 | 40.00 |
| 14.007   | M14x1.5  | OH3       | 10.500 | 8.00  | 12.500 | 88.00 | 15.00 | 40.00 |
| 16.007   | M16x1.5  | OH3       | 12.500 | 10.00 | 14.500 | 95.00 | 15.00 | 44.00 |
| 20.007   | M20x1.5  | OH4       | 14.000 | 12.00 | 18.500 | 95.00 | 16.00 | 44.00 |

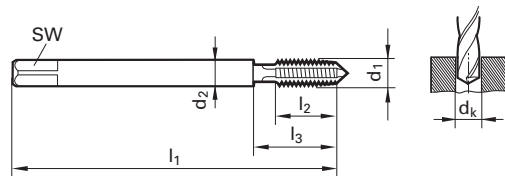


JIS machine taps with long shank for ISO metric fine threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N            |
| Form              | B            |
| Cutting direction | right-hand   |



Article no. **4461**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|--------|-------|-------|
|          |          |           | mm     |       | mm     | mm     | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 150.00 | 13.00 | 30.00 |
| 8.005    | M8x1     | OH2       | 6.200  | 5.00  | 7.000  | 150.00 | 16.00 | 35.00 |
| 10.005   | M10x1    | OH2       | 7.000  | 5.50  | 9.000  | 150.00 | 16.00 | 35.00 |
| 10.006   | M10x1.25 | OH2       | 7.000  | 5.50  | 8.800  | 150.00 | 20.00 | 39.00 |
| 12.005   | M12x1    | OH2       | 8.500  | 6.50  | 11.000 | 150.00 | 20.00 | 40.00 |
| 12.006   | M12x1.25 | OH2       | 8.500  | 6.50  | 10.800 | 150.00 | 20.00 | 40.00 |
| 12.007   | M12x1.5  | OH2       | 8.500  | 6.50  | 10.500 | 150.00 | 20.00 | 40.00 |
| 14.007   | M14x1.5  | OH2       | 10.500 | 8.00  | 12.500 | 150.00 | 20.00 | 40.00 |
| 16.007   | M16x1.5  | OH2       | 12.500 | 10.00 | 14.500 | 150.00 | 22.00 | 44.00 |
| 20.007   | M20x1.5  | OH2       | 14.000 | 12.00 | 18.500 | 200.00 | 25.00 | 44.00 |

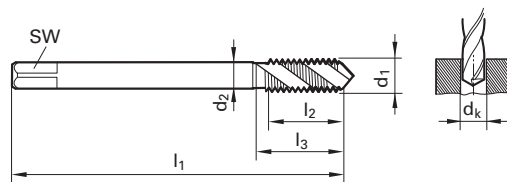


JIS machine taps with long shank for ISO metric fine threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



Article no. **4463**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|--------|-------|-------|
|          |          |           | mm     |       | mm     | mm     | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 150.00 | 8.00  | 30.00 |
| 8.005    | M8x1     | OH2       | 6.200  | 5.00  | 7.000  | 150.00 | 11.00 | 35.00 |
| 10.005   | M10x1    | OH2       | 7.000  | 5.50  | 9.000  | 150.00 | 11.00 | 35.00 |
| 10.006   | M10x1.25 | OH2       | 7.000  | 5.50  | 8.800  | 150.00 | 14.00 | 39.00 |
| 12.005   | M12x1    | OH2       | 8.500  | 6.50  | 11.000 | 150.00 | 11.00 | 40.00 |
| 12.006   | M12x1.25 | OH2       | 8.500  | 6.50  | 10.800 | 150.00 | 16.00 | 40.00 |
| 12.007   | M12x1.5  | OH2       | 8.500  | 6.50  | 10.500 | 150.00 | 16.00 | 40.00 |
| 14.007   | M14x1.5  | OH2       | 10.500 | 8.00  | 12.500 | 150.00 | 15.00 | 40.00 |
| 16.007   | M16x1.5  | OH2       | 12.500 | 10.00 | 14.500 | 150.00 | 15.00 | 44.00 |
| 20.007   | M20x1.5  | OH2       | 14.000 | 12.00 | 18.500 | 200.00 | 16.00 | 44.00 |

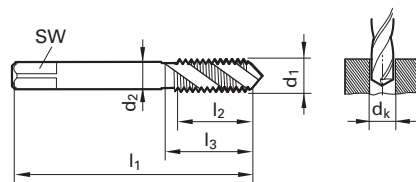


JIS machine taps for ISO metric fine threads and less rigid machines



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |

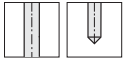


Article no. **4458**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|-------|-------|-------|
|          |          |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6x0.75  | OH2       | 6.000  | 4.50  | 5.200  | 62.00 | 8.00  | 30.00 |
| 8.005    | M8x1     | OH3       | 6.200  | 5.00  | 7.000  | 70.00 | 11.00 | 35.00 |
| 10.005   | M10x1    | OH3       | 7.000  | 5.50  | 9.000  | 70.00 | 11.00 | 35.00 |
| 10.006   | M10x1.25 | OH3       | 7.000  | 5.50  | 8.800  | 75.00 | 14.00 | 39.00 |
| 12.005   | M12x1    | OH3       | 8.500  | 6.50  | 11.000 | 70.00 | 11.00 | 40.00 |
| 12.006   | M12x1.25 | OH3       | 8.500  | 6.50  | 10.800 | 80.00 | 16.00 | 40.00 |
| 12.007   | M12x1.5  | OH3       | 8.500  | 6.50  | 10.500 | 82.00 | 16.00 | 40.00 |
| 14.007   | M14x1.5  | OH3       | 10.500 | 8.00  | 12.500 | 88.00 | 15.00 | 40.00 |
| 16.007   | M16x1.5  | OH3       | 12.500 | 10.00 | 14.500 | 95.00 | 15.00 | 44.00 |
| 20.007   | M20x1.5  | OH4       | 14.000 | 12.00 | 18.500 | 95.00 | 16.00 | 44.00 |

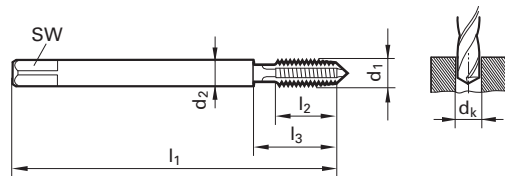


JIS machine taps for ISO metric fine threads and for hardened steel (45-55 HRC)



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | <b>C</b>        |
| Type              | H               |
| Form              | D               |
| Cutting direction | right-hand      |



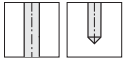
Article no. **4459**

| Code no. | d1 X P   | Tolerance | d2    | SW   | dk     | l1    | l2    | l3 |
|----------|----------|-----------|-------|------|--------|-------|-------|----|
|          |          |           | mm    |      | mm     | mm    | mm    | mm |
| 8.005    | M8x1     | OH3       | 6.200 | 5.00 | 7.100  | 70.00 | 19.00 |    |
| 10.005   | M10x1    | OH3       | 7.000 | 5.50 | 9.100  | 75.00 | 24.00 |    |
| 10.006   | M10x1.25 | OH3       | 7.000 | 5.50 | 8.900  | 75.00 | 24.00 |    |
| 12.006   | M12x1.25 | OH4       | 8.500 | 6.50 | 10.900 | 82.00 | 29.00 |    |
| 12.007   | M12x1.5  | OH3       | 8.500 | 6.50 | 10.600 | 82.00 | 29.00 |    |



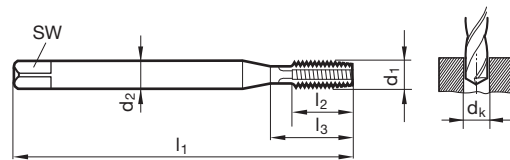


JIS machine taps for ISO metric fine threads and cast iron



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | H            |
| Form              | C            |
| Cutting direction | right-hand   |

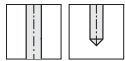


Article no. **4451**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|-------|-------|-------|
|          |          |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6x0.75  | OH3       | 6.000  | 4.50  | 5.200  | 62.00 | 13.00 | 30.00 |
| 8.005    | M8x1     | OH3       | 6.200  | 5.00  | 7.000  | 70.00 | 16.00 | 35.00 |
| 10.005   | M10x1    | OH3       | 7.000  | 5.50  | 9.000  | 70.00 | 16.00 | 35.00 |
| 10.006   | M10x1.25 | OH4       | 7.000  | 5.50  | 8.800  | 75.00 | 20.00 | 39.00 |
| 12.005   | M12x1    | OH3       | 8.500  | 6.50  | 11.000 | 70.00 | 20.00 | 40.00 |
| 12.006   | M12x1.25 | OH4       | 8.500  | 6.50  | 10.800 | 80.00 | 20.00 | 40.00 |
| 12.007   | M12x1.5  | OH4       | 8.500  | 6.50  | 10.500 | 82.00 | 20.00 | 40.00 |
| 14.007   | M14x1.5  | OH4       | 10.500 | 8.00  | 12.500 | 88.00 | 20.00 | 40.00 |
| 16.007   | M16x1.5  | OH4       | 12.500 | 10.00 | 14.500 | 95.00 | 22.00 | 44.00 |
| 20.007   | M20x1.5  | OH4       | 15.000 | 12.00 | 18.500 | 95.00 | 25.00 | 44.00 |

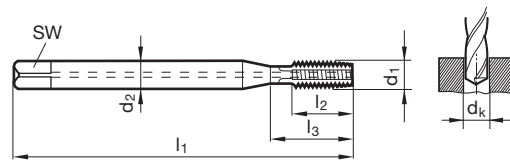


JIS machine taps with IC for ISO metric fine threads and cast iron



Cutting Data page 10-11

|                   |                 |
|-------------------|-----------------|
| Tool material     | <b>HSS-E-PM</b> |
| Surface finish    | ○               |
| Type              | H               |
| Form              | C               |
| Cutting direction | right-hand      |



Article no. **4472**

| Code no. | d1 X P   | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|----------|-----------|--------|-------|--------|-------|-------|-------|
|          |          |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6x0.75  | OH3       | 6.000  | 4.50  | 5.200  | 62.00 | 13.00 | 30.00 |
| 8.005    | M8x1     | OH3       | 6.200  | 5.00  | 7.000  | 70.00 | 16.00 | 35.00 |
| 9.005    | M9x1     | OH3       | 7.000  | 5.50  | 8.000  | 70.00 | 16.00 | 35.00 |
| 10.005   | M10x1    | OH3       | 7.000  | 5.50  | 9.000  | 70.00 | 16.00 | 35.00 |
| 10.006   | M10x1.25 | OH4       | 7.000  | 5.50  | 8.800  | 75.00 | 20.00 | 39.00 |
| 12.005   | M12x1    | OH3       | 8.500  | 6.50  | 11.000 | 70.00 | 20.00 | 40.00 |
| 12.006   | M12x1.25 | OH4       | 8.500  | 6.50  | 10.800 | 80.00 | 20.00 | 40.00 |
| 12.007   | M12x1.5  | OH4       | 8.500  | 6.50  | 10.500 | 82.00 | 20.00 | 40.00 |
| 14.007   | M14x1.5  | OH4       | 10.500 | 8.00  | 12.500 | 88.00 | 20.00 | 40.00 |
| 16.007   | M16x1.5  | OH4       | 12.500 | 10.00 | 14.500 | 95.00 | 22.00 | 44.00 |
| 20.007   | M20x1.5  | OH4       | 15.000 | 12.00 | 18.500 | 95.00 | 25.00 | 44.00 |

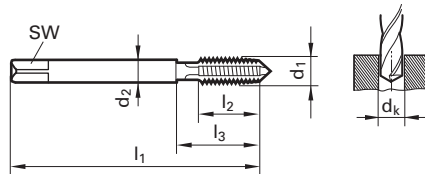


JIS machine taps for UNC threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N            |
| Form              | B            |
| Cutting direction | right-hand   |



Article no. **4465**

| Code no. | d1 X P   | Tolerance | d2    | SW    | dk    | l1     | l2    | l3    |
|----------|----------|-----------|-------|-------|-------|--------|-------|-------|
|          |          |           | mm    |       | mm    | mm     | mm    | mm    |
| 3.505    | No.6-32  | OH2       | 4.00  | 3.20  | 2.85  | 48.00  | 12.00 | 21.00 |
| 4.166    | No.8-32  | OH2       | 5.00  | 4.00  | 3.50  | 52.00  | 12.00 | 21.00 |
| 4.826    | No.10-24 | OH2       | 5.50  | 4.50  | 3.90  | 60.00  | 14.00 | 25.00 |
| 5.486    | No.12-24 | OH2       | 5.50  | 4.50  | 4.50  | 60.00  | 16.00 | 25.00 |
| 6.350    | 1/4-20   | OH3       | 6.00  | 4.50  | 5.10  | 62.00  | 16.00 | 29.00 |
| 7.938    | 5/16-18  | OH3       | 6.10  | 5.00  | 6.60  | 70.00  | 18.00 | 37.00 |
| 9.525    | 3/8-16   | OH3       | 7.00  | 5.50  | 8.00  | 75.00  | 20.00 | 41.00 |
| 11.113   | 7/16-14  | OH3       | 8.00  | 6.00  | 9.40  | 80.00  | 22.00 | 48.00 |
| 12.700   | 1/2-13   | OH3       | 9.00  | 7.00  | 10.80 | 85.00  | 25.00 | 48.00 |
| 14.288   | 9/16-12  | OH3       | 10.50 | 8.00  | 12.20 | 90.00  | 28.00 | 48.00 |
| 15.875   | 5/8-11   | OH3       | 12.00 | 9.00  | 13.50 | 95.00  | 30.00 | 52.00 |
| 19.050   | 3/4-10   | OH3       | 14.00 | 11.00 | 16.50 | 105.00 | 33.00 | 58.00 |
| 22.225   | 7/8-9    | OH4       | 17.00 | 13.00 | 19.50 | 115.00 | 35.00 | 63.00 |
| 25.400   | 1-8      | OH4       | 20.00 | 15.00 | 22.25 | 125.00 | 38.00 | 68.00 |

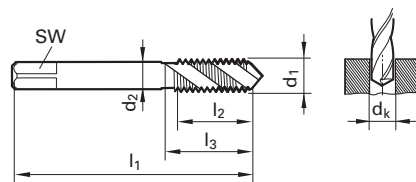


JIS machine taps for UNC threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



Article no. **4454**

| Code no. | d1 X P   | Tolerance | d2    | SW    | dk    | l1     | l2    | l3    |
|----------|----------|-----------|-------|-------|-------|--------|-------|-------|
|          |          |           | mm    |       | mm    | mm     | mm    | mm    |
| 2.184    | No.2-56  | OH1       | 3.00  | 2.50  | 1.85  | 42.00  | 5.00  | 21.00 |
| 2.845    | No.4-40  | OH1       | 3.00  | 2.50  | 2.35  | 44.00  | 7.00  | 21.00 |
| 3.175    | No.5-40  | OH1       | 4.00  | 3.20  | 2.65  | 46.00  | 7.00  | 21.00 |
| 3.505    | No.6-32  | OH2       | 4.00  | 3.20  | 2.85  | 48.00  | 8.00  | 21.00 |
| 4.166    | No.8-32  | OH2       | 5.00  | 4.00  | 3.50  | 52.00  | 8.00  | 21.00 |
| 4.826    | No.10-24 | OH2       | 5.50  | 4.50  | 3.90  | 60.00  | 11.00 | 25.00 |
| 5.486    | No.12-24 | OH2       | 5.50  | 4.50  | 4.50  | 60.00  | 11.00 | 25.00 |
| 6.350    | 1/4-20   | OH3       | 6.00  | 4.50  | 5.10  | 62.00  | 13.00 | 29.00 |
| 7.938    | 5/16-18  | OH3       | 6.10  | 5.00  | 6.60  | 70.00  | 14.00 | 37.00 |
| 9.525    | 3/8-16   | OH3       | 7.00  | 5.50  | 8.00  | 75.00  | 16.00 | 41.00 |
| 11.113   | 7/16-14  | OH3       | 8.00  | 6.00  | 9.40  | 80.00  | 18.00 | 48.00 |
| 12.700   | 1/2-13   | OH3       | 9.00  | 7.00  | 10.80 | 85.00  | 20.00 | 48.00 |
| 14.288   | 9/16-12  | OH3       | 10.50 | 8.00  | 12.20 | 90.00  | 21.00 | 48.00 |
| 15.875   | 5/8-11   | OH3       | 12.00 | 9.00  | 13.50 | 95.00  | 24.00 | 52.00 |
| 19.050   | 3/4-10   | OH3       | 14.00 | 11.00 | 16.50 | 105.00 | 25.00 | 58.00 |
| 22.225   | 7/8-9    | OH4       | 17.00 | 13.00 | 19.50 | 115.00 | 28.00 | 63.00 |
| 25.400   | 1-8      | OH4       | 20.00 | 15.00 | 22.25 | 125.00 | 32.00 | 68.00 |

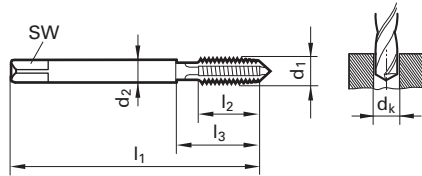


JIS machine taps for UNF threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N            |
| Form              | B            |
| Cutting direction | right-hand   |



Article no. **4455**

| Code no. | d1 X P   | Tolerance | d2    | SW    | dk    | l1     | l2    | l3    |
|----------|----------|-----------|-------|-------|-------|--------|-------|-------|
|          |          |           | mm    |       | mm    | mm     | mm    | mm    |
| 3.505    | No.6-40  | OH2       | 4.00  | 3.20  | 2.95  | 48.00  | 11.00 | 21.00 |
| 4.166    | No.8-36  | OH2       | 5.00  | 4.00  | 3.50  | 52.00  | 12.00 | 21.00 |
| 4.826    | No.10-32 | OH2       | 5.50  | 4.50  | 4.10  | 60.00  | 14.00 | 25.00 |
| 5.486    | No.12-28 | OH2       | 5.50  | 4.50  | 4.60  | 60.00  | 16.00 | 25.00 |
| 6.350    | 1/4_28   | OH2       | 6.00  | 4.50  | 5.50  | 62.00  | 16.00 | 29.00 |
| 7.938    | 5/16-24  | OH3       | 6.10  | 5.00  | 6.90  | 70.00  | 18.00 | 37.00 |
| 9.525    | 3/8_24   | OH3       | 7.00  | 5.50  | 8.50  | 75.00  | 18.00 | 41.00 |
| 11.113   | 7/16-20  | OH3       | 8.00  | 6.00  | 9.90  | 80.00  | 22.00 | 48.00 |
| 12.700   | 1/2-20   | OH3       | 9.00  | 7.00  | 11.50 | 85.00  | 20.00 | 48.00 |
| 14.288   | 9/16-18  | OH3       | 10.50 | 8.00  | 12.90 | 90.00  | 22.00 | 48.00 |
| 15.875   | 5/8-18   | OH3       | 12.00 | 9.00  | 14.50 | 95.00  | 22.00 | 52.00 |
| 19.050   | 3/4-16   | OH3       | 14.00 | 11.00 | 17.50 | 105.00 | 25.00 | 58.00 |
| 22.225   | 7/8-14   | OH3       | 17.00 | 13.00 | 20.40 | 115.00 | 25.00 | 63.00 |
| 25.400   | 1-12     | OH3       | 20.00 | 15.00 | 23.25 | 125.00 | 28.00 | 68.00 |

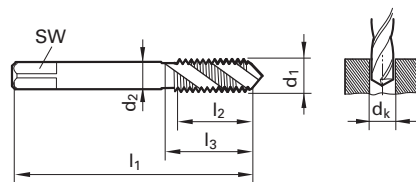


**JIS machine taps for UNF threads**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R40        |
| Form              | C            |
| Cutting direction | right-hand   |



Article no. **4457**

| Code no. | d1 X P   | Tolerance | d2    | SW    | dk    | l1     | l2    | l3    |
|----------|----------|-----------|-------|-------|-------|--------|-------|-------|
|          |          |           | mm    |       | mm    | mm     | mm    | mm    |
| 3.505    | No.6-40  | OH2       | 4.00  | 3.20  | 2.95  | 48.00  | 6.50  | 21.00 |
| 4.166    | No.8-36  | OH2       | 5.00  | 4.00  | 3.50  | 52.00  | 7.00  | 21.00 |
| 4.826    | No.10-32 | OH2       | 5.50  | 4.50  | 4.10  | 60.00  | 8.50  | 25.00 |
| 5.486    | No.12-28 | OH2       | 5.50  | 4.50  | 4.60  | 60.00  | 9.00  | 25.00 |
| 6.350    | 1/4-28   | OH2       | 6.00  | 4.50  | 5.50  | 62.00  | 9.00  | 29.00 |
| 7.938    | 5/16-24  | OH3       | 6.10  | 5.00  | 6.90  | 70.00  | 11.00 | 37.00 |
| 9.525    | 3/8-24   | OH3       | 7.00  | 5.50  | 8.50  | 75.00  | 11.00 | 41.00 |
| 11.113   | 7/16-20  | OH3       | 8.00  | 6.00  | 9.90  | 80.00  | 13.00 | 48.00 |
| 12.700   | 1/2-20   | OH3       | 9.00  | 7.00  | 11.50 | 85.00  | 13.00 | 48.00 |
| 14.288   | 9/16-18  | OH3       | 10.50 | 8.00  | 12.90 | 90.00  | 14.00 | 48.00 |
| 15.875   | 5/8-18   | OH3       | 12.00 | 9.00  | 14.50 | 95.00  | 15.00 | 52.00 |
| 19.050   | 3/4-16   | OH3       | 14.00 | 11.00 | 17.50 | 105.00 | 16.00 | 58.00 |
| 22.225   | 7/8-14   | OH3       | 17.00 | 13.00 | 20.40 | 115.00 | 19.00 | 63.00 |
| 25.400   | 1-12     | OH3       | 20.00 | 15.00 | 23.25 | 125.00 | 22.00 | 68.00 |

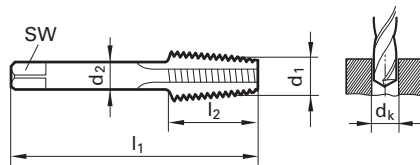


JIS machine taps for PT threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | ○            |
| Type              | N R25        |
| Form              | C            |
| Cutting direction | right-hand   |

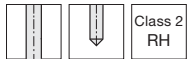


Article no. **4464**

| Code no. | d1 X P    | Tolerance | d2    | SW    | dk    | l1    | l2    | l3 |
|----------|-----------|-----------|-------|-------|-------|-------|-------|----|
|          |           |           | mm    |       | mm    | mm    | mm    | mm |
| 7.723    | PT1/16-28 | JIS2      | 8.000 | 6.00  | 6.20  | 55.00 | 18.00 |    |
| 9.728    | PT1/8-28  | JIS2      | 8.000 | 6.00  | 8.20  | 55.00 | 19.00 |    |
| 13.157   | PT1/4-19  | JIS2      | 11.00 | 9.00  | 10.90 | 62.00 | 28.00 |    |
| 16.662   | PT3/8-19  | JIS2      | 14.00 | 11.00 | 14.40 | 65.00 | 28.00 |    |
| 20.955   | PT1/2-14  | JIS2      | 18.00 | 14.00 | 18.00 | 80.00 | 35.00 |    |
| 26.441   | PT3/4-14  | JIS2      | 23.00 | 17.00 | 23.00 | 85.00 | 35.00 |    |
| 33.249   | PT1-11    | JIS2      | 26.00 | 21.00 | 29.00 | 95.00 | 45.00 |    |

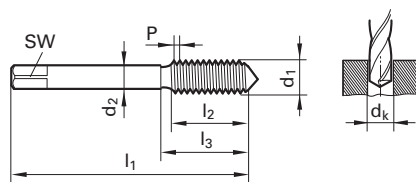


JIS fluteless taps w/o oil grooves for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N            |
| Form              | C            |
| Cutting direction | right-hand   |



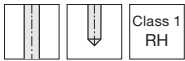
Article no. **1017**

| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|
|       | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 1   | 0.25 | RH4       | 3.000  | 2.50  | 0.900  | 36.00  | 4.00  |       |
| M 1.2 | 0.25 | RH4       | 3.000  | 2.50  | 1.100  | 36.00  | 4.80  |       |
| M 1.4 | 0.30 | RH4       | 3.000  | 2.50  | 1.250  | 36.00  | 5.60  |       |
| M 1.6 | 0.35 | RH4       | 3.000  | 2.50  | 1.450  | 36.00  | 6.40  |       |
| M 1.7 | 0.35 | RH4       | 3.000  | 2.50  | 1.550  | 36.00  | 6.80  |       |
| M 1.8 | 0.35 | RH4       | 3.000  | 2.50  | 1.650  | 36.00  | 7.20  |       |
| M 2   | 0.40 | RH4       | 3.000  | 2.50  | 1.850  | 40.00  | 8.00  | 15.00 |
| M 2.5 | 0.45 | RH4       | 3.000  | 2.50  | 2.300  | 44.00  | 9.00  | 16.00 |
| M 3   | 0.50 | RH5       | 4.000  | 3.20  | 2.800  | 46.00  | 10.00 | 19.00 |
| M 4   | 0.70 | RH6       | 5.000  | 4.00  | 3.700  | 52.00  | 12.00 | 20.00 |
| M 5   | 0.80 | RH6       | 5.500  | 4.50  | 4.650  | 60.00  | 14.00 | 24.00 |
| M 6   | 1.00 | RH7       | 6.000  | 4.50  | 5.550  | 62.00  | 16.00 | 29.00 |
| M 8   | 1.25 | RH7       | 6.200  | 5.00  | 7.400  | 70.00  | 17.00 | 37.00 |
| M10   | 1.50 | RH7       | 7.000  | 5.50  | 9.300  | 75.00  | 20.00 | 41.00 |
| M12   | 1.75 | RH8       | 8.500  | 6.50  | 11.200 | 82.00  | 24.00 | 48.00 |
| M14   | 2.00 | RH10      | 10.500 | 8.00  | 13.100 | 88.00  | 26.00 | 48.00 |
| M16   | 2.00 | RH10      | 12.500 | 10.00 | 15.100 | 95.00  | 26.00 | 52.00 |
| M18   | 2.50 | RH11      | 14.000 | 11.00 | 16.900 | 100.00 | 30.00 | 55.00 |
| M20   | 2.50 | RH11      | 15.000 | 12.00 | 18.900 | 105.00 | 32.00 | 58.00 |



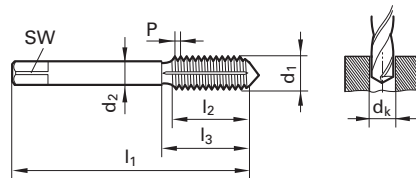


**JIS fluteless taps with oil grooves for ISO metric threads**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N            |
| Form              | C            |
| Cutting direction | right-hand   |

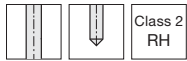


Article no. **4442**

| d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-----|------|-----------|--------|-------|--------|--------|-------|-------|
|     | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 4 | 0.70 | RH4       | 5.000  | 4.00  | 3.700  | 52.00  | 12.00 | 20.00 |
| M 5 | 0.80 | RH4       | 5.500  | 4.50  | 4.650  | 60.00  | 14.00 | 24.00 |
| M 6 | 1.00 | RH5       | 6.000  | 4.50  | 5.550  | 62.00  | 16.00 | 29.00 |
| M 8 | 1.25 | RH5       | 6.200  | 5.00  | 7.400  | 70.00  | 17.00 | 37.00 |
| M10 | 1.50 | RH5       | 7.000  | 5.50  | 9.300  | 75.00  | 20.00 | 41.00 |
| M12 | 1.75 | RH5       | 8.500  | 6.50  | 11.200 | 82.00  | 24.00 | 48.00 |
| M16 | 2.00 | RH6       | 12.500 | 10.00 | 15.100 | 95.00  | 26.00 | 52.00 |
| M20 | 2.50 | RH6       | 15.000 | 12.00 | 18.900 | 105.00 | 32.00 | 58.00 |

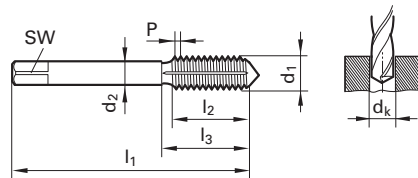


**JIS fluteless taps with oil grooves for ISO metric threads**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N            |
| Form              | C            |
| Cutting direction | right-hand   |

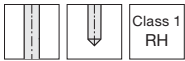


Article no. **4443**

| d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-----|------|-----------|--------|-------|--------|--------|-------|-------|
|     | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 4 | 0.70 | RH6       | 5.000  | 4.00  | 3.700  | 52.00  | 12.00 | 20.00 |
| M 5 | 0.80 | RH6       | 5.500  | 4.50  | 4.650  | 60.00  | 14.00 | 24.00 |
| M 6 | 1.00 | RH7       | 6.000  | 4.50  | 5.550  | 62.00  | 16.00 | 29.00 |
| M 8 | 1.25 | RH7       | 6.200  | 5.00  | 7.400  | 70.00  | 17.00 | 37.00 |
| M10 | 1.50 | RH7       | 7.000  | 5.50  | 9.300  | 75.00  | 20.00 | 41.00 |
| M12 | 1.75 | RH8       | 8.500  | 6.50  | 11.200 | 82.00  | 24.00 | 48.00 |
| M16 | 2.00 | RH10      | 12.500 | 10.00 | 15.100 | 95.00  | 26.00 | 52.00 |
| M20 | 2.50 | RH11      | 15.000 | 12.00 | 18.900 | 105.00 | 32.00 | 58.00 |

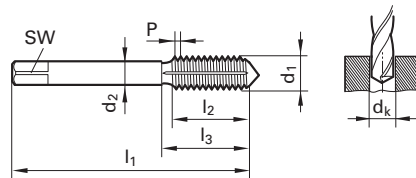


JIS fluteless taps with oil grooves for ISO metric fine threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N            |
| Form              | C            |
| Cutting direction | right-hand   |

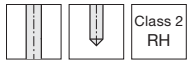


Article no. **4444**

| Code no. | d1xP      | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|-----------|-----------|--------|-------|--------|-------|-------|-------|
|          |           |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6 x0.75  | RH4       | 6.000  | 4.50  | 5.650  | 62.00 | 13.00 | 30.00 |
| 8.005    | M8 x1     | RH4       | 6.200  | 5.00  | 7.550  | 70.00 | 16.00 | 35.00 |
| 10.005   | M10 x1    | RH5       | 7.000  | 5.50  | 9.550  | 70.00 | 16.00 | 35.00 |
| 10.006   | M10 x1.25 | RH5       | 7.000  | 5.50  | 9.400  | 75.00 | 20.00 | 39.00 |
| 12.005   | M12 x1    | RH5       | 8.500  | 6.50  | 11.550 | 70.00 | 20.00 | 40.00 |
| 12.006   | M12 x1.25 | RH5       | 8.500  | 6.50  | 11.400 | 80.00 | 20.00 | 40.00 |
| 12.007   | M12 x1.5  | RH5       | 8.500  | 6.50  | 11.300 | 82.00 | 20.00 | 40.00 |
| 14.007   | M14 x1.5  | RH5       | 10.500 | 8.00  | 13.300 | 88.00 | 20.00 | 40.00 |
| 16.007   | M16 x1.5  | RH5       | 12.500 | 10.00 | 15.300 | 95.00 | 22.00 | 44.00 |
| 20.007   | M20 x1.5  | RH6       | 15.000 | 12.00 | 19.300 | 95.00 | 25.00 | 44.00 |

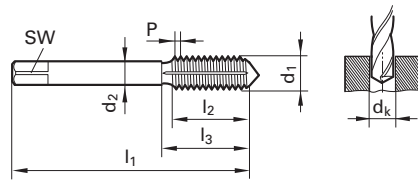


**JIS fluteless taps with oil grooves for ISO metric fine threads**



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N            |
| Form              | C            |
| Cutting direction | right-hand   |

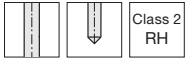


Article no. **4445**

| Code no. | d1xP      | Tolerance | d2     | SW    | dk     | l1    | l2    | l3    |
|----------|-----------|-----------|--------|-------|--------|-------|-------|-------|
|          |           |           | mm     |       | mm     | mm    | mm    | mm    |
| 6.004    | M6 x0.75  | RH6       | 6.000  | 4.50  | 5.650  | 62.00 | 13.00 | 30.00 |
| 8.005    | M8 x1     | RH7       | 6.200  | 5.00  | 7.550  | 70.00 | 16.00 | 35.00 |
| 10.005   | M10 x1    | RH7       | 7.000  | 5.50  | 9.550  | 70.00 | 16.00 | 35.00 |
| 10.006   | M10 x1.25 | RH7       | 7.000  | 5.50  | 9.400  | 75.00 | 20.00 | 39.00 |
| 12.005   | M12 x1    | RH7       | 8.500  | 6.50  | 11.550 | 70.00 | 20.00 | 40.00 |
| 12.006   | M12 x1.25 | RH7       | 8.500  | 6.50  | 11.400 | 80.00 | 20.00 | 40.00 |
| 12.007   | M12 x1.5  | RH7       | 8.500  | 6.50  | 11.300 | 82.00 | 20.00 | 40.00 |
| 14.007   | M14 x1.5  | RH9       | 10.500 | 8.00  | 13.300 | 88.00 | 20.00 | 40.00 |
| 16.007   | M16 x1.5  | RH9       | 12.500 | 10.00 | 15.300 | 95.00 | 22.00 | 44.00 |
| 20.007   | M20 x1.5  | RH10      | 15.000 | 12.00 | 19.300 | 95.00 | 25.00 | 44.00 |

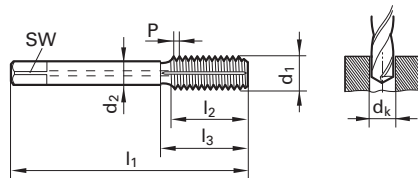


JIS fluteless taps with oil grooves for ISO metric threads



Cutting Data page 10-11

|                   |              |
|-------------------|--------------|
| Tool material     | <b>HSS-E</b> |
| Surface finish    | <b>S</b>     |
| Type              | N            |
| Form              | C            |
| Cutting direction | right-hand   |

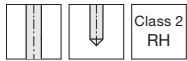


Article no. **4446**

| d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-----|------|-----------|--------|-------|--------|--------|-------|-------|
|     | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 5 | 0.80 | RH6       | 5.500  | 4.50  | 4.650  | 60.00  | 14.00 | 24.00 |
| M 6 | 1.00 | RH7       | 6.000  | 4.50  | 5.550  | 62.00  | 16.00 | 29.00 |
| M 8 | 1.25 | RH7       | 6.200  | 5.00  | 7.400  | 70.00  | 17.00 | 37.00 |
| M10 | 1.50 | RH7       | 7.000  | 5.50  | 9.300  | 75.00  | 20.00 | 41.00 |
| M12 | 1.75 | RH8       | 8.500  | 6.50  | 11.200 | 82.00  | 24.00 | 48.00 |
| M16 | 2.00 | RH10      | 12.500 | 10.00 | 15.100 | 95.00  | 26.00 | 52.00 |
| M20 | 2.50 | RH11      | 15.000 | 12.00 | 18.900 | 105.00 | 32.00 | 58.00 |

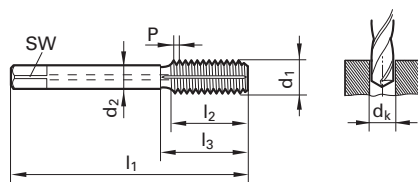


JIS fluteless taps with oil grooves for ISO metric threads



Cutting Data page 10-11

|                   |                      |
|-------------------|----------------------|
| Tool material     | <b>Solid carbide</b> |
| Surface finish    | <b>A</b>             |
| Type              | N                    |
| Form              | C                    |
| Cutting direction | right-hand           |

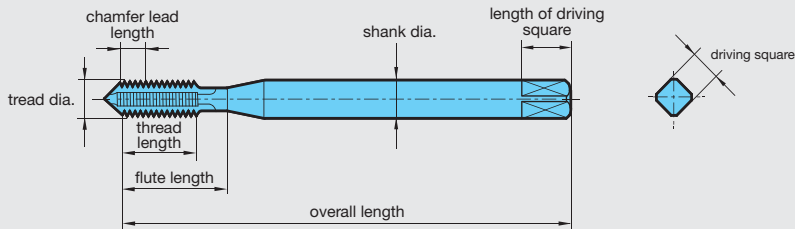


Article no. **4447**

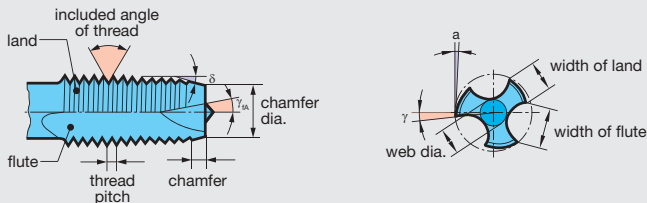
| d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    |
|-----|------|-----------|--------|-------|--------|--------|-------|-------|
|     | mm   |           | mm     |       | mm     | mm     | mm    | mm    |
| M 5 | 0.80 | RH6       | 5.500  | 4.50  | 4.650  | 60.00  | 8.50  | 24.00 |
| M 6 | 1.00 | RH7       | 6.000  | 4.50  | 5.550  | 62.00  | 11.00 | 29.00 |
| M 8 | 1.25 | RH7       | 6.200  | 5.00  | 7.400  | 70.00  | 14.00 | 37.00 |
| M10 | 1.50 | RH7       | 7.000  | 5.50  | 9.300  | 75.00  | 16.00 | 41.00 |
| M12 | 1.75 | RH8       | 8.500  | 6.50  | 11.200 | 82.00  | 18.50 | 48.00 |
| M16 | 2.00 | RH10      | 12.500 | 10.00 | 15.100 | 95.00  | 20.00 | 52.00 |
| M20 | 2.50 | RH11      | 15.000 | 12.00 | 18.900 | 105.00 | 25.00 | 58.00 |



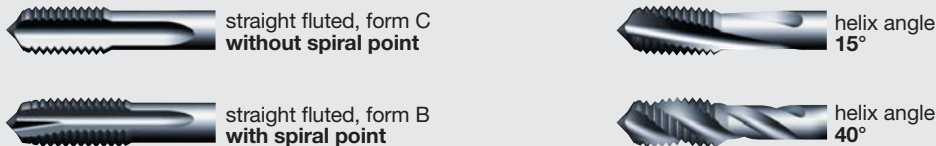
**Definitions and angles, centres and flute forms**



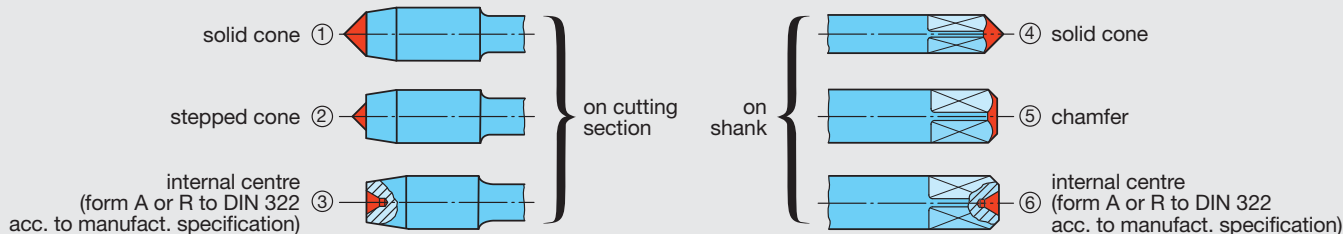
- $\delta$  = chamfer angle
- $\gamma_{fA}$  = spiral point angle
- $\alpha$  = clearance angle
- $\gamma$  = rake angle



**Flute forms**



**Types of centres (standard, to DIN 2197/DIN 2175)**



| Thread dia. range mm | Centre on cutting section     |                     | Centre on shank |
|----------------------|-------------------------------|---------------------|-----------------|
|                      | with chamfer forms A, C, D, E | with chamfer form B |                 |
| ≤ 4.2                | ①                             | ①                   | ④ ⑤ ⑥           |
| > 4.2 ... 5.6        | ① ②                           | ①                   | ④ ⑤ ⑥           |
| > 5.6 ... 10.0       | ① ② ③                         | ① ② ③               | ④ ⑤ ⑥           |
| > 10.0               | ③                             | ③                   | ⑥               |

**Coolant duct geometries**





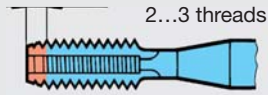
**Chamfer forms, selection and application**

**Form B**



medium, 3.5 - 5.5 threads, with spiral point, for all through holes and deep tapping holes in medium and long-chipping materials

**Form C**



short, 2 - 3 threads for blind holes and generally for aluminium, grey cast iron and brass

**Form D**



medium, 3.5 - 5 threads for short through holes

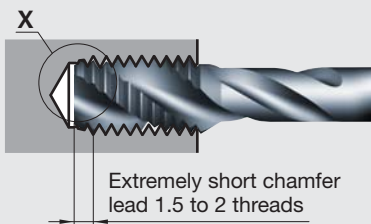
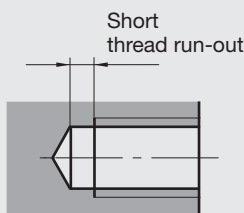
**Form E**



extremely short, 1.5-2 threads, for blind holes with little run-out depth.

**Why is Guhring increasingly offering Form E taps?**

In addition to the conventional Form B and C for machine taps we are increasingly including Form E tools in our standard range. Thus, we are taking into account the increasing demand for taps with which threads can be produced as close as possible to the bottom of the bore when machining blind holes and to produce deepest threads as possible when machining through holes.



**X 2:1**



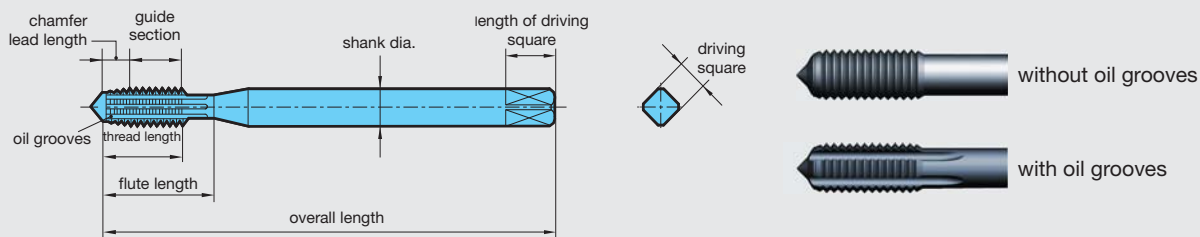
Taps with Form E feature an extremely short chamfer lead with only 1.5 to 2 threads. On modern machines and tapping chucks any inferior guidance of the tool in comparison to Forms B and C with long chamfer lead are eliminated. The run-out of the tap is impossible thanks to the rigid tool clamping. Taps with Form E can provide a significant advantage in the production of very deep reaching, fully tapped threads.



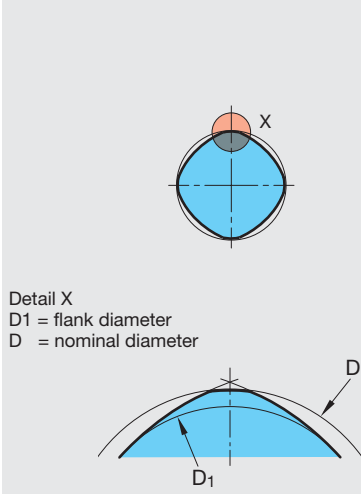


Definitions, angles, centres, thread tolerances and fits

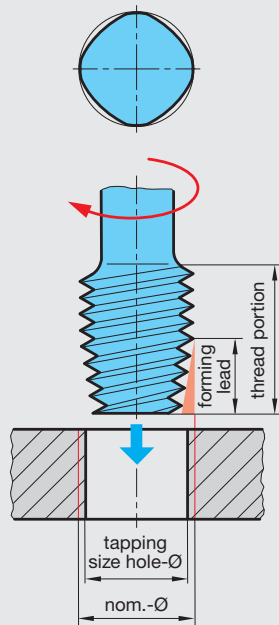
Thread portion



Cross section of fluteless tap

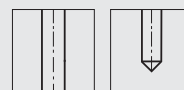


The principle



Types of tapping size hole

with fluteless taps without oil grooves for thread depth  $\leq 1 \times D$



for thread depth  $\geq 1 \times D$



with fluteless taps with oil grooves for all thread depths



Characteristics of different thread types

| Geometry drawing                                       | Standard   | Application                                   | Geometry drawing  | Standard              | Application            |
|--|------------|---|---|-----------------------|------------------------|
| <p>M ISO-metric thread</p>                             | DIN 13-1   | General standard thread                       | <p>MF ISO-metric fine thread</p>  | DIN 13-2 to DIN 13-11 | General fine thread    |
| <p>UNC Unified National Coarse Thread</p>              | ASME B1.1  | General UN standard thread                    | <p>UNF Unified National Fine Thread</p>   | ASME B1.1             | General UN fine thread |
| <p>PT Taper Pipe Thread (identical to Rc and BSPT)</p> | JIS B 0203 | Internal thread for pipe threads and fittings | <p>Legend:</p> <ul style="list-style-type: none"> <li>external thread</li> <li>internal thread</li> <li>play</li> </ul> |                       |                        |

| Std. ISO metric threads<br>DIN 13 |         |                     |                                 |        | ISO metric fine threads<br>DIN 13 |           |                     |                                 |        | UNC threads<br>ASME B1.1 |                  |                     |                                 |        | UNF threads<br>ASME B1.1 |                  |                     |                                 |        |
|-----------------------------------|---------|---------------------|---------------------------------|--------|-----------------------------------|-----------|---------------------|---------------------------------|--------|--------------------------|------------------|---------------------|---------------------------------|--------|--------------------------|------------------|---------------------|---------------------------------|--------|
| nom. Ø                            | pitch P | tapping size hole Ø | core diameter of int. thread 6H |        | nom. Ø                            | x pitch P | tapping size hole Ø | core diameter of int. thread 6H |        | nom. Ø                   | threads per inch | tapping size hole Ø | core diameter of int. thread 2B |        | nom. Ø                   | threads per inch | tapping size hole Ø | core diameter of int. thread 2B |        |
|                                   |         | DIN 336             | min.                            | max.   |                                   |           | DIN 336             | min.                            | max.   |                          |                  | DIN 336             | min.                            | max.   |                          |                  | DIN 336             | min.                            | max.   |
|                                   |         | mm                  | mm                              | mm     |                                   |           | mm                  | mm                              | mm     |                          |                  | mm                  | mm                              | mm     |                          |                  | mm                  | mm                              | mm     |
| M 1                               | 0.25    | <b>0.75</b>         | 0.729                           | 0.785  | M 4.0 x 0.50                      |           | <b>3.50</b>         | 3.459                           | 3.599  | Nr. 1 - 64               |                  | <b>1.55</b>         | 1.425                           | 1.580  | Nr. 1 - 72               |                  | <b>1.55</b>         | 1.473                           | 1.610  |
| M 1.1                             | 0.25    | <b>0.85</b>         | 0.829                           | 0.885  | M 4.5 x 0.50                      |           | <b>4.00</b>         | 3.959                           | 4.099  | Nr. 2 - 56               |                  | <b>1.85</b>         | 1.694                           | 1.872  | Nr. 2 - 64               |                  | <b>1.85</b>         | 1.755                           | 1.910  |
| M 1.2                             | 0.25    | <b>0.95</b>         | 0.929                           | 0.985  | M 5.0 x 0.50                      |           | <b>4.50</b>         | 4.459                           | 4.599  | Nr. 3 - 48               |                  | <b>2.10</b>         | 1.941                           | 2.146  | Nr. 3 - 56               |                  | <b>2.15</b>         | 2.024                           | 2.197  |
| M 1.4                             | 0.30    | <b>1.10</b>         | 1.075                           | 1.142  | M 5.5 x 0.50                      |           | <b>5.00</b>         | 4.959                           | 5.099  | Nr. 4 - 40               |                  | <b>2.35</b>         | 2.157                           | 2.385  | Nr. 4 - 48               |                  | <b>2.40</b>         | 2.271                           | 2.459  |
| M 1.6                             | 0.35    | <b>1.25</b>         | 1.221                           | 1.321  | M 6.0 x 0.75                      |           | <b>5.20</b>         | 5.188                           | 5.378  | Nr. 5 - 40               |                  | <b>2.65</b>         | 2.487                           | 2.698  | Nr. 5 - 44               |                  | <b>2.70</b>         | 2.550                           | 2.741  |
| M 1.8                             | 0.35    | <b>1.45</b>         | 1.421                           | 1.521  | M 7.0 x 0.75                      |           | <b>6.20</b>         | 6.188                           | 6.378  | Nr. 6 - 32               |                  | <b>2.85</b>         | 2.642                           | 2.896  | Nr. 6 - 40               |                  | <b>2.95</b>         | 2.819                           | 3.023  |
| M 2                               | 0.40    | <b>1.60</b>         | 1.567                           | 1.679  | M 8.0 x 0.50                      |           | <b>7.50</b>         | 7.459                           | 7.599  | Nr. 8 - 32               |                  | <b>3.50</b>         | 3.302                           | 3.531  | Nr. 8 - 36               |                  | <b>3.50</b>         | 3.404                           | 3.607  |
| M 2.2                             | 0.45    | <b>1.75</b>         | 1.713                           | 1.838  | M 8.0 x 0.75                      |           | <b>7.20</b>         | 7.188                           | 7.378  | Nr. 10 - 24              |                  | <b>3.90</b>         | 3.683                           | 3.937  | Nr. 10 - 32              |                  | <b>4.10</b>         | 3.962                           | 4.166  |
| M 2.5                             | 0.45    | <b>2.05</b>         | 2.013                           | 2.138  | M 8.0 x 1.00                      |           | <b>7.00</b>         | 6.917                           | 7.153  | Nr. 12 - 24              |                  | <b>4.50</b>         | 4.343                           | 4.597  | Nr. 12 - 28              |                  | <b>4.60</b>         | 4.496                           | 4.724  |
| M 3                               | 0.50    | <b>2.50</b>         | 2.459                           | 2.599  | M 9.0 x 0.75                      |           | <b>8.20</b>         | 8.188                           | 8.378  | 1/4 - 20                 |                  | <b>5.10</b>         | 4.978                           | 5.258  | 1/4 - 28                 |                  | <b>5.50</b>         | 5.359                           | 5.588  |
| M 3.5                             | 0.60    | <b>2.90</b>         | 2.850                           | 3.010  | M 9.0 x 1.00                      |           | <b>8.00</b>         | 7.917                           | 8.153  | 5/16 - 18                |                  | <b>6.60</b>         | 6.401                           | 6.731  | 5/16 - 24                |                  | <b>6.90</b>         | 6.782                           | 7.036  |
| M 4                               | 0.70    | <b>3.30</b>         | 3.242                           | 3.422  | M 10 x 0.75                       |           | <b>9.20</b>         | 9.188                           | 9.378  | 3/8 - 16                 |                  | <b>8.00</b>         | 7.798                           | 8.153  | 3/8 - 24                 |                  | <b>8.50</b>         | 8.382                           | 8.636  |
| M 4.5                             | 0.75    | <b>3.70</b>         | 3.688                           | 3.878  | M 10 x 1.00                       |           | <b>9.00</b>         | 8.917                           | 9.153  | 7/16 - 14                |                  | <b>9.40</b>         | 9.144                           | 9.550  | 7/16 - 20                |                  | <b>9.90</b>         | 9.728                           | 10.033 |
| M 5                               | 0.80    | <b>4.20</b>         | 4.134                           | 4.334  | M 10 x 1.25                       |           | <b>8.80</b>         | 8.647                           | 8.912  | 1/2 - 13                 |                  | <b>10.80</b>        | 10.592                          | 11.024 | 1/2 - 20                 |                  | <b>11.50</b>        | 11.328                          | 11.608 |
| M 6                               | 1.00    | <b>5.00</b>         | 4.917                           | 5.153  | M 11 x 0.75                       |           | <b>10.20</b>        | 10.188                          | 10.378 | 9/16 - 12                |                  | <b>12.20</b>        | 11.989                          | 12.446 | 9/16 - 18                |                  | <b>12.90</b>        | 12.751                          | 13.081 |
| M 7                               | 1.00    | <b>6.00</b>         | 5.917                           | 6.153  | M 11 x 1.00                       |           | <b>10.00</b>        | 9.917                           | 10.153 | 5/8 - 11                 |                  | <b>13.50</b>        | 13.386                          | 13.868 | 5/8 - 18                 |                  | <b>14.50</b>        | 14.351                          | 14.681 |
| M 8                               | 1.25    | <b>6.80</b>         | 6.647                           | 6.912  | M 12 x 1.00                       |           | <b>11.00</b>        | 10.917                          | 11.153 | 3/4 - 10                 |                  | <b>16.50</b>        | 16.307                          | 16.840 | 3/4 - 16                 |                  | <b>17.50</b>        | 17.323                          | 17.678 |
| M 9                               | 1.25    | <b>7.80</b>         | 7.647                           | 7.912  | M 12 x 1.25                       |           | <b>10.80</b>        | 10.647                          | 10.912 | 7/8 - 9                  |                  | <b>19.50</b>        | 19.177                          | 19.761 | 7/8 - 14                 |                  | <b>20.40</b>        | 20.269                          | 20.650 |
| M 10                              | 1.50    | <b>8.50</b>         | 8.376                           | 8.676  | M 12 x 1.50                       |           | <b>10.50</b>        | 10.376                          | 10.676 | 1 - 8                    |                  | <b>22.25</b>        | 21.971                          | 22.606 | 1 - 12                   |                  | <b>23.25</b>        | 23.114                          | 23.571 |
| M 11                              | 1.50    | <b>9.50</b>         | 9.376                           | 9.676  | M 14 x 1.00                       |           | <b>13.00</b>        | 12.917                          | 13.153 |                          |                  |                     |                                 |        | 1 1/8 - 12               |                  | <b>26.50</b>        | 26.289                          | 26.746 |
| M 12                              | 1.75    | <b>10.20</b>        | 10.106                          | 10.441 | M 14 x 1.25                       |           | <b>12.80</b>        | 12.647                          | 12.912 |                          |                  |                     |                                 |        | 1 1/4 - 12               |                  | <b>29.50</b>        | 29.464                          | 29.921 |
| M 14                              | 2.00    | <b>12.00</b>        | 11.835                          | 12.210 | M 14 x 1.50                       |           | <b>12.50</b>        | 12.376                          | 12.676 |                          |                  |                     |                                 |        | 1 3/8 - 12               |                  | <b>32.75</b>        | 32.639                          | 33.096 |
| M 16                              | 2.00    | <b>14.00</b>        | 13.835                          | 14.210 | M 15 x 1.00                       |           | <b>14.00</b>        | 13.917                          | 14.153 |                          |                  |                     |                                 |        | 1 1/2 - 12               |                  | <b>36.00</b>        | 35.814                          | 36.271 |
| M 18                              | 2.50    | <b>15.50</b>        | 15.294                          | 15.744 | M 15 x 1.50                       |           | <b>13.50</b>        | 13.376                          | 13.676 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
| M 20                              | 2.50    | <b>17.50</b>        | 17.294                          | 17.744 | M 16 x 1.00                       |           | <b>15.00</b>        | 14.917                          | 15.153 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
| M 22                              | 2.50    | <b>19.50</b>        | 19.294                          | 19.744 | M 16 x 1.25                       |           | <b>14.80</b>        | 14.647                          | 14.912 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
| M 24                              | 3.00    | <b>21.00</b>        | 20.752                          | 21.252 | M 16 x 1.50                       |           | <b>14.50</b>        | 14.376                          | 14.676 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
| M 27                              | 3.00    | <b>24.00</b>        | 23.752                          | 24.252 | M 17 x 1.00                       |           | <b>16.00</b>        | 15.917                          | 16.153 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
| M 30                              | 3.50    | <b>26.50</b>        | 26.211                          | 26.771 | M 17 x 1.50                       |           | <b>15.50</b>        | 15.376                          | 15.676 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
|                                   |         |                     |                                 |        | M 18 x 1.00                       |           | <b>17.00</b>        | 16.917                          | 17.153 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
|                                   |         |                     |                                 |        | M 18 x 1.50                       |           | <b>16.50</b>        | 16.376                          | 16.676 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
|                                   |         |                     |                                 |        | M 20 x 1.00                       |           | <b>19.00</b>        | 18.917                          | 19.153 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
|                                   |         |                     |                                 |        | M 20 x 1.50                       |           | <b>18.50</b>        | 18.376                          | 18.676 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |
|                                   |         |                     |                                 |        | M 20 x 2.00                       |           | <b>18.00</b>        | 17.835                          | 18.210 |                          |                  |                     |                                 |        |                          |                  |                     |                                 |        |

**PT JIS B 0203  
TAPER PIPE THREAD CONE 1:16**

| nom. Ø  | threads per inch | tapping size hole Ø | tapping size hole Ø | cutting depth |
|---------|------------------|---------------------|---------------------|---------------|
|         |                  | Version A<br>d1     | Version B<br>D1     | ET<br>mm      |
| PT 1/16 | - 28             | 6.20                | 6.60                | 6.20          |
| PT 1/8  | - 28             | 8.20                | 8.60                | 6.20          |
| PT 1/4  | - 19             | 10.90               | 11.50               | 9.40          |
| PT 3/8  | - 19             | 14.40               | 15.00               | 9.70          |
| PT 1/2  | - 14             | 17.90               | 18.70               | 12.70         |
| PT 3/4  | - 14             | 23.30               | 24.20               | 14.10         |
| PT 1    | - 11             | 29.30               | 30.30               | 16.20         |

**Version A**  
(avoid if possible)

**Version B**



| Std. ISO metric threads<br>DIN 13 |            |                           |                        |            |                                       | Std. ISO metric fine threads<br>DIN 13 |           |        |                           |                        |            |                                       |            |
|-----------------------------------|------------|---------------------------|------------------------|------------|---------------------------------------|--|-----------|--------|---------------------------|------------------------|------------|---------------------------------------|------------|
| nom.<br>Ø                         | pitch<br>P | tapping<br>size<br>hole Ø | tapping size<br>hole Ø |            | core diameter<br>of int. thread<br>7H |  | nom.<br>Ø | x<br>P | tapping<br>size<br>hole Ø | tapping size<br>hole Ø |            | core diameter<br>of int. thread<br>7H |            |
|                                   |            |                           | min.<br>mm             | max.<br>mm | min.<br>mm                            | max.<br>mm                             |           |        |                           | min.<br>mm             | max.<br>mm | min.<br>mm                            | max.<br>mm |
|                                   | mm         | mm                        |                        |            |                                       |  |           | mm     | mm                        | mm                     | mm         | mm                                    | mm         |
| M 1                               | 0.25       |                           | 0.729                  | 0.785      |                                       |  | M 6       | x 0.75 | <b>5.65</b>               | 5.62                   | 5.70       | 5.188                                 | 5.424      |
| M 1.1                             | 0.25       |                           | 0.829                  | 0.885      |                                       |  | M 7       | x 0.75 | <b>6.65</b>               | 6.62                   | 6.70       | 6.188                                 | 6.424      |
| M 1.2                             | 0.25       |                           | 0.929                  | 0.985      |                                       |  | M 8       | x 0.75 | <b>7.65</b>               | 7.62                   | 7.70       | 7.188                                 | 7.424      |
| M 1.4                             | 0.30       |                           | 1.076                  | 1.142      |                                       |  | M 8       | x 1.00 | <b>7.55</b>               | 7.52                   | 7.62       | 6.917                                 | 7.217      |
| M 1.6                             | 0.35       |                           | 1.221                  | 1.321      |                                       |  | M 9       | x 0.75 | <b>8.65</b>               | 8.62                   | 8.70       | 8.188                                 | 8.424      |
| M 1.8                             | 0.35       |                           | 1.421                  | 1.521      |                                       |  | M 9       | x 1.00 | <b>8.55</b>               | 8.52                   | 8.62       | 7.917                                 | 8.217      |
| M 2                               | 0.40       | <b>1.85</b>               | 1.84                   | 1.88       | 1.567                                 | 1.679                                  | M 10      | x 0.75 | <b>9.65</b>               | 9.62                   | 9.70       | 9.188                                 | 9.424      |
| M 2,2                             | 0.45       | <b>2.00</b>               | 2.01                   | 2.05       | 1.713                                 | 1.838                                  | M 10      | x 1.00 | <b>9.55</b>               | 9.52                   | 9.62       | 8.917                                 | 9.217      |
| M 2,5                             | 0.45       | <b>2.30</b>               | 2.28                   | 2.32       | 2.013                                 | 2.138                                  | M 10      | x 1.25 | <b>9.40</b>               | 9.36                   | 9.47       | 8.647                                 | 8.982      |
| M 3                               | 0.50       | <b>2.80</b>               | 2.78                   | 2.85       | 2.459                                 | 2.639                                  | M 11      | x 0.75 | <b>10.65</b>              | 10.62                  | 10.70      | 10.188                                | 10.424     |
| M 3,5                             | 0.60       | <b>3.25</b>               | 3.23                   | 3.30       | 2.850                                 | 3.050                                  | M 11      | x 1.00 | <b>10.55</b>              | 10.52                  | 10.62      | 9.917                                 | 10.217     |
| M 4                               | 0.70       | <b>3.70</b>               | 3.68                   | 3.76       | 3.242                                 | 3.466                                  | M 12      | x 1.00 | <b>11.55</b>              | 11.52                  | 11.62      | 10.917                                | 11.217     |
| M 4,5                             | 0.75       | <b>4.20</b>               |                        |            |                                       |  | M 12      | x 1.25 | <b>11.40</b>              | 11.36                  | 11.47      | 10.647                                | 10.982     |
| M 5                               | 0.80       | <b>4.65</b>               | 4.62                   | 4.71       | 4.134                                 | 4.384                                  | M 12      | x 1.50 | <b>11.30</b>              | 11.26                  | 11.38      | 10.376                                | 10.751     |
| M 6                               | 1.00       | <b>5.55</b>               | 5.52                   | 5.62       | 4.917                                 | 5.217                                  | M 14      | x 1.00 | <b>13.55</b>              | 13.52                  | 13.62      | 12.917                                | 13.217     |
| M 7                               | 1.00       | <b>6.55</b>               | 6.52                   | 6.62       | 5.917                                 | 6.217                                  | M 14      | x 1.25 | <b>13.40</b>              | 13.36                  | 13.47      | 12.647                                | 12.982     |
| M 8                               | 1.25       | <b>7.40</b>               | 7.36                   | 7.47       | 6.647                                 | 6.982                                  | M 14      | x 1.50 | <b>13.30</b>              | 13.26                  | 13.38      | 12.376                                | 12.751     |
| M 9                               | 1.25       | <b>8.40</b>               | 8.36                   | 8.47       | 7.647                                 | 7.982                                  | M 15      | x 1.00 | <b>14.55</b>              | 14.52                  | 14.62      | 13.917                                | 14.217     |
| M 10                              | 1.50       | <b>9.30</b>               | 9.26                   | 9.38       | 8.376                                 | 8.751                                  | M 15      | x 1.50 | <b>14.30</b>              | 14.26                  | 14.38      | 13.376                                | 13.751     |
| M 11                              | 1.50       | <b>10.30</b>              | 10.26                  | 10.38      | 9.376                                 | 9.751                                  | M 16      | x 1.00 | <b>15.55</b>              | 15.52                  | 15.62      | 14.917                                | 15.217     |
| M 12                              | 1.75       | <b>11.20</b>              | 11.15                  | 11.29      | 10.106                                | 10.531                                 | M 16      | x 1.50 | <b>15.30</b>              | 15.26                  | 15.38      | 14.376                                | 14.751     |
| M 14                              | 2.00       | <b>13.10</b>              | 13.05                  | 13.20      | 11.835                                | 12.310                                 | M 20      | x 1.50 | <b>19.30</b>              | 19.26                  | 19.38      | 18.376                                | 19.751     |
| M 16                              | 2.00       | <b>15.10</b>              | 15.05                  | 15.20      | 13.835                                | 14.310                                 |           |        |                           |                        |            |                                       |            |
| M 18                              | 2.50       | <b>16.90</b>              | 16.83                  | 17.02      | 15.294                                | 15.854                                 |           |        |                           |                        |            |                                       |            |
| M 20                              | 2.50       | <b>18.90</b>              | 18.83                  | 19.02      | 17.294                                | 17.854                                 |           |        |                           |                        |            |                                       |            |

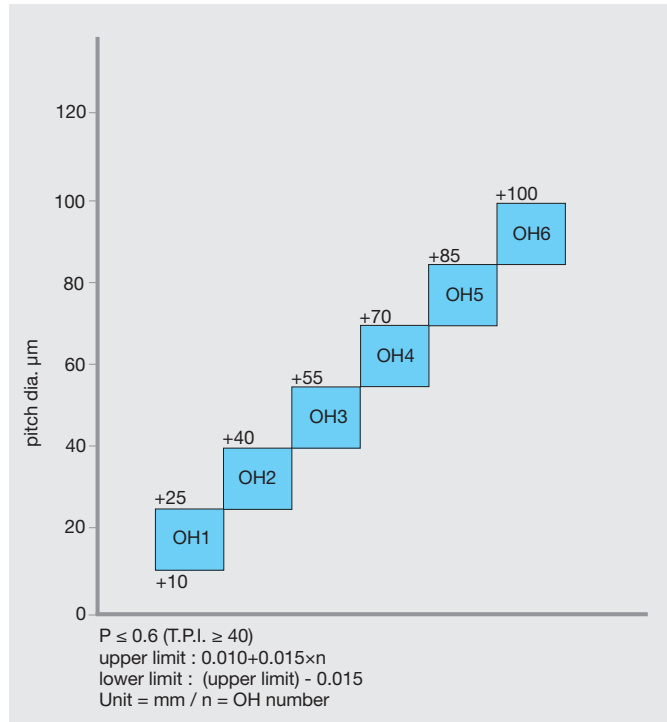
#### Tapping size hole dia. tolerance zone for thread forming (to DIN 13, section 50)

Due to the tensile strength it is not necessary to adhere to the tapping size hole diameter tolerance class 6H; tolerance class 7H satisfies the requirement that the flank coverage of external and internal threads should not fall below  $0.32 \times P$ . In addition, formed threads generally possess a higher tensile strength in comparison to cut threads thanks to an uninterrupted grain flow and subsequent work hardening.



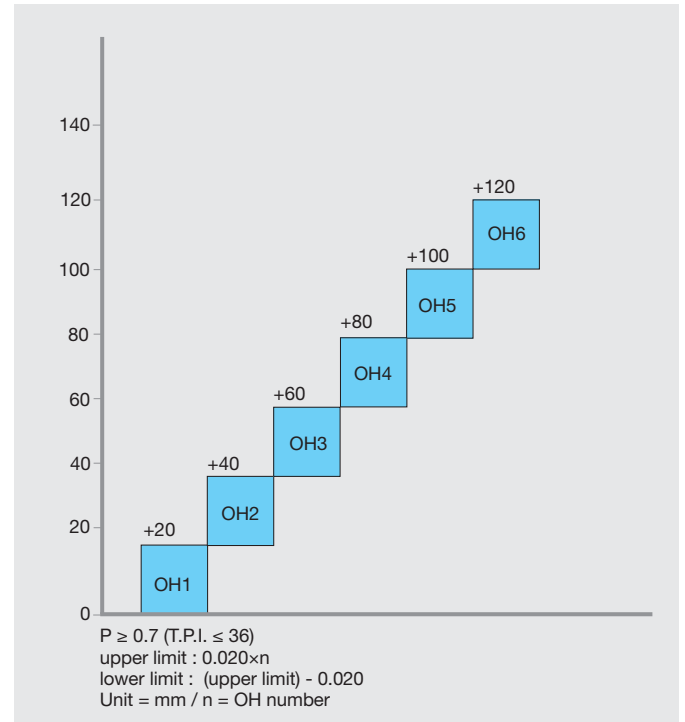
## Pitch ≤ 0.6

OH limits



## Pitch ≥ 0.7

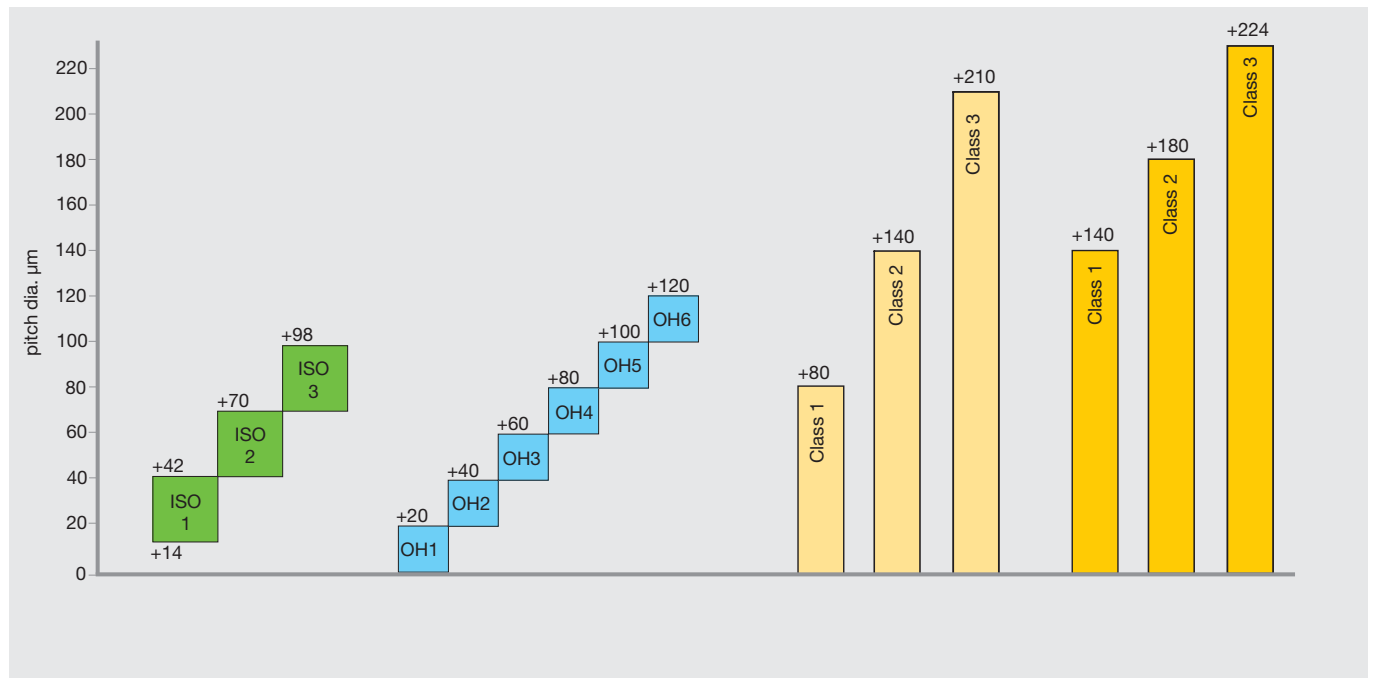
OH limits

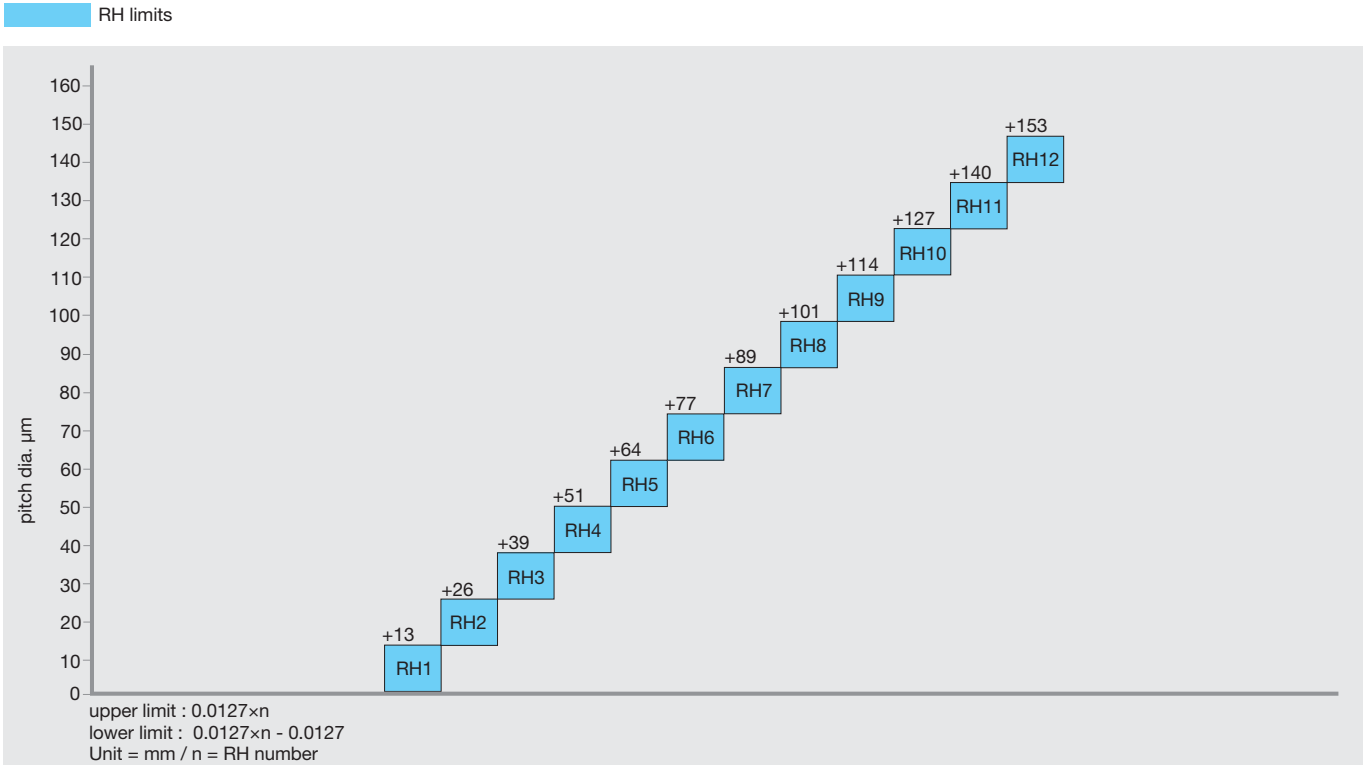


## Example M10 (x 1.5)

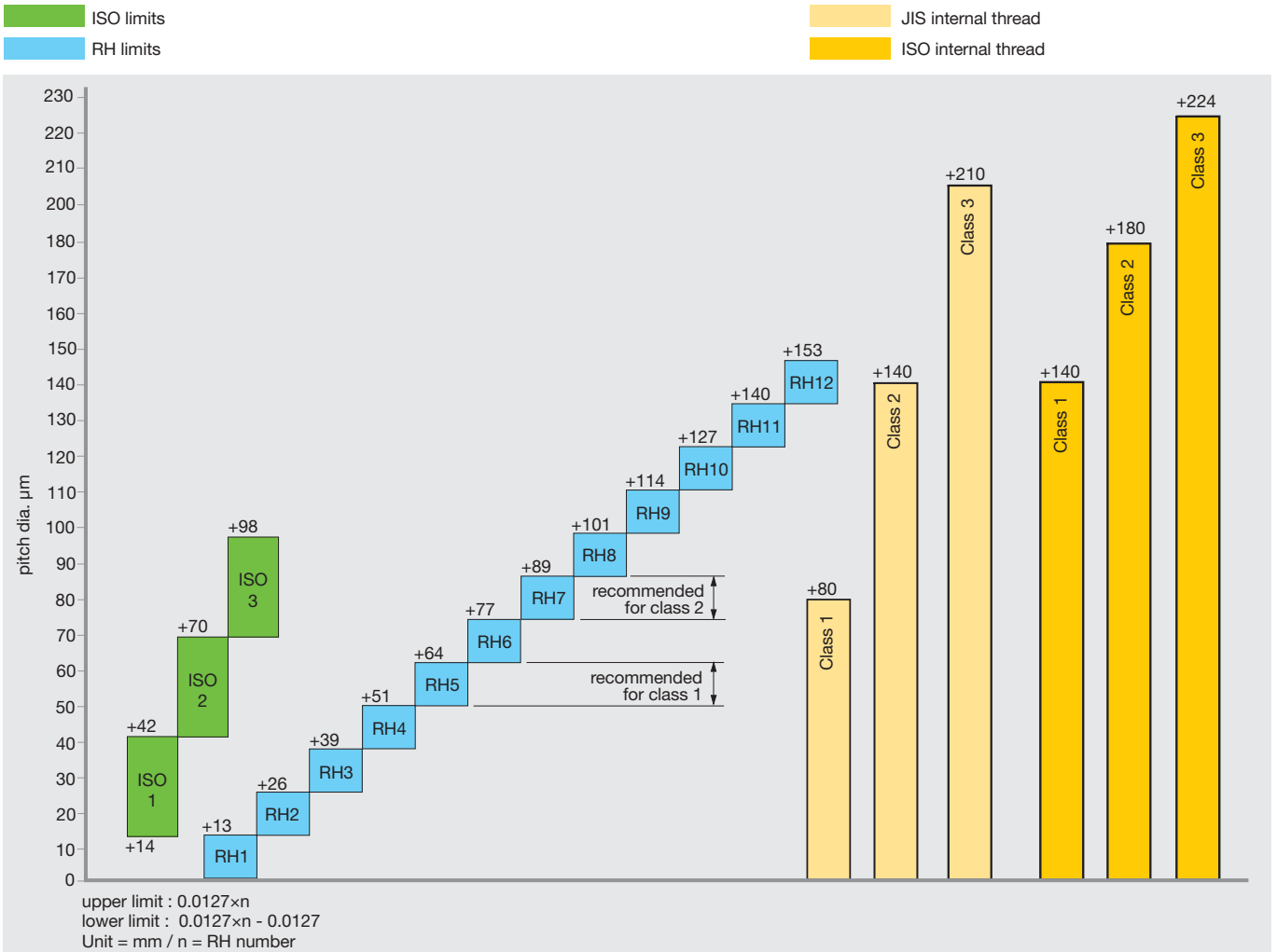
ISO limits  
OH limits

JIS internal thread  
ISO internal thread





Example M10 (x 1.5)



GÜHROSYNC

0.3 mm minimal compensation  
for up to 75% reduced axial forces

for internal, peripheral or  
MQL cooling lubrication

high concentricity and  
application speed

elastic polymer elements for effective axial  
and torsion damping of force peaks

quick and simple handling, slim design

long-life metal spring packet with progressive  
force/travel characteristic curve

maximum tool life  
and thread accuracy

The new **GÜHROSync** tapping chuck

Synchro and hydraulic clamping technology intelligently combined

by **GUHRING**

SAME PRICE  
MORE PERFORMANCE



GÜHRO SYNC

by **GUHRING**





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