

# GÜHRING

- High-performance machining
- higher cutting speeds
- outstanding tool life
- universal application in a wide variety of materials



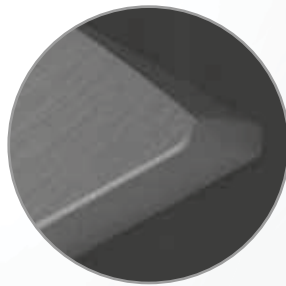
**Pionex** THE NEW GENERATION *THREADING TOOLS*

GÜHRING – YOUR WORLDWIDE PARTNER

# Pionex

THE NEW GENERATION **THREADING TOOLS**

Due to a homogeneous cutting edge an **outstanding and excellent coating adhesion** can be realised.



Tapered thread for **perfect chip evacuation**.

An enhanced coating system based on hard material glide coating ensures **lower friction, an improved chip evacuation and a higher tool life**.



The unique material-mix of the Sirius-coating of the mechanically tough-hard TiAlN and chemically extremely stable zirconium nitride **guarantees a high wear protection and a better chip evacuation**.

**Pionex**TAP



- higher cutting rates
- longer tool lives
- fewer tool changes
- reduction of number of tools in operation

# PionexFlutelessTAP

A special surface finish treatment in combination with the TiCN-coating ensures **increased wear-resistance**.



Based to the modified polygon form the contact surface between tool and functionality area could be optimised. **This reduced torque by up to 30%.**

**Increased wear-resistance** thanks to the application of a new powder metallurgical base material.

Due to the shank tolerance h6 the new fluteless tap generation can be applied in all standard clamping chucks.

## New lubricating groove geometry

Thanks to the optimised lubricating grooves the **lubricating effect has been clearly improved in the forming lead area.**



# ISO code

|   |                                                 |
|---|-------------------------------------------------|
| P | Steel, high-alloyed steel                       |
| M | Stainless steel                                 |
| K | Grey cast iron, spher, graphite/mall. cast iron |
| N | Aluminium and other non-ferrous metals          |
| S | Special, super and titanium alloys              |
| H | Hardened steel and chilled cast iron            |

On the following price and programme pages you will find for every tool recommendations regarding suitability for the application groups and details of max. tensile strength and hardness:

- optimal suitability
- limited suitability

# Pictograms

|                   |                                                                                     |     |                                                                                     |     |                                                                                     |     |
|-------------------|-------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|-----|
| Tool material     | HSS-E                                                                               |     | HSS-E-PM                                                                            |     | High-speed steel                                                                    |     |
| Tolerance on Ø    | 4HX                                                                                 | 6HX | 6GX                                                                                 | 7GX | 6H<br>+0,1                                                                          | 2BX |
| Thread type       |  |     |  |     |  |     |
|                   | Through hole                                                                        |     | Blind hole                                                                          |     | Through hole and blind hole                                                         |     |
| Cutting direction |  |     |  |     |                                                                                     |     |
|                   | right                                                                               |     | left                                                                                |     |                                                                                     |     |
| Internal coolant  |  |     |  |     |                                                                                     |     |
|                   | with IC                                                                             |     | without IC                                                                          |     |                                                                                     |     |
| Form              | B                                                                                   | C   | E                                                                                   |     |                                                                                     |     |
| Type              | N                                                                                   | VA  | VA R45                                                                              |     |                                                                                     |     |

# Coatings

- C TiCN
- A TiAlN
- S Sirius

# **Pionex**TAP



## **Blind hole taps**

|                           |       |
|---------------------------|-------|
| Metric threads.....       | p. 8  |
| Metric fine threads ..... | p. 15 |
| UNC .....                 | p. 19 |
| UNF .....                 | p. 20 |
| G .....                   | p. 21 |



## **Through hole taps**

|                           |       |
|---------------------------|-------|
| Metric threads.....       | p. 22 |
| Metric fine threads ..... | p. 28 |
| UNC .....                 | p. 30 |
| UNF .....                 | p. 31 |
| G .....                   | p. 32 |

# **Pionex**FlutelessTAP



## **Fluteless machine taps**

|                           |       |
|---------------------------|-------|
| Metric threads.....       | p. 35 |
| Metric fine threads ..... | p. 38 |
| UNC .....                 | p. 41 |
| UNF .....                 | p. 42 |
| G .....                   | p. 43 |

|                         |       |
|-------------------------|-------|
| Technical Section ..... | p. 45 |
|-------------------------|-------|



|                                                                                                          |                   |  |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|----------------------------------------------------------------------------------------------------------|-------------------|--|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <br><b>THROUGH HOLE</b> | Thread depth      |  | ≤3xD                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                          | Tool material     |  | HSS-E                                                                             |                                                                                   |                                                                                     | HSS-E-PM                                                                            |                                                                                     |                                                                                     |
|                                                                                                          | Lead form         |  | B                                                                                 | B                                                                                 | B                                                                                   | B                                                                                   | B                                                                                   | B                                                                                   |
|                                                                                                          | Surface           |  |  |  |  |  |  |  |
|                                                                                                          | Cutting direction |  |  |  |  |  |  |  |
|                                                                                                          | Coolant delivery  |  |  |  |  |  |  |  |
|                                                                                                          | Shank tolerance   |  | h9                                                                                | h9                                                                                | h9                                                                                  | h6                                                                                  | h6 + HB                                                                             | h6                                                                                  |
|                                                                                                          |                   |  |  |  |  |  |  |  |
|                                                                                                          |                   |  |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                          |                   |  |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

|                                                                                                                        |             |                                                                                        |           |                                                                                        |                                                                                          |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------|
| <ul style="list-style-type: none"><li>● = Neat oil</li><li>○ = Soluble oil</li><li>△ = Paste</li><li>□ = MQL</li></ul> | Thread type |                                                                                        | Tolerance |                                                                                        | Article no./page                                                                         |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        | M           |                                                                                        | 6HX       |                                                                                        | 4218 p. 22                                                                               | 4644 p. 25                                                                               | 4645 p. 26                                                                               | 4646 p. 23                                                                               | 4651 p. 24                                                                               | 4648 p. 27 |
|                                                                                                                        |             |                                                                                        | 6GX       |                                                                                        | 4638 p. 22                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        |             |                                                                                        | 7GX       |                                                                                        | 4639 p. 22                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        |             |                                                                                        | 6H+0.1    |                                                                                        | 4640 p. 22                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        | MF          |                                                                                        | 6HX       |                                                                                        | 4219 p. 28                                                                               |                                                                                          |                                                                                          | 4647 p. 28                                                                               |                                                                                          | 4649 p. 29 |
|                                                                                                                        |             |                                                                                        | 6GX       |                                                                                        | 4641 p. 28                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        | UNC         |                                                                                        | 2BX       |                                                                                        | 4642 p. 30                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        | UNF         |                                                                                        | 2BX       |                                                                                        | 4643 p. 31                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
|                                                                                                                        | G           |                                                                                        | - X       |                                                                                        | 4220 p. 32                                                                               |                                                                                          |                                                                                          |                                                                                          |                                                                                          |            |
| Suitable lubricant:                                                                                                    |             |  /●/△ |           |  /●/△ |  /●/△ |  /●/△ |  /●/△ |  /●/△ |  /●/△ |            |

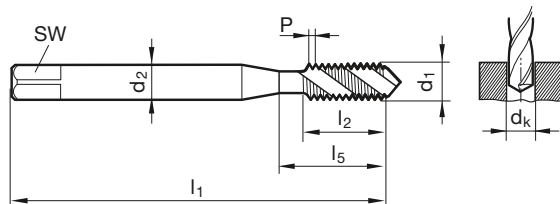
|    |                                     |                                                                       |                            |                                                          |                                                  |    |    |    |    |    |    |
|----|-------------------------------------|-----------------------------------------------------------------------|----------------------------|----------------------------------------------------------|--------------------------------------------------|----|----|----|----|----|----|
|    | Group of materials                  | Tensile strength                                                      | Material example           | Material no.                                             | Recommended cutting speed v <sub>c</sub> [m/min] |    |    |    |    |    |    |
| P  | P1                                  | Structural and free cutting steels, heat-treatable steels unalloyed   | ≤800 N/mm²                 | S235JR<br>C15<br>11SMnPb30                               | 1.0037<br>1.0401<br>1.0718                       | 20 | 20 | 20 | 25 | 25 | 25 |
|    | P2                                  | Free-cutting steels, unalloyed case hardened steels, nitriding steels | 800 - 1000 N/mm²           | S355J2<br>C60<br>31CrMo12                                | 1.0577<br>1.0601<br>1.8515                       | 15 | 15 | 15 | 20 | 20 | 20 |
|    | P3                                  | Alloyed heat-treatable steels, tool steels, high speed steels         | 800 - 1200 N/mm²           | 42CrMo4<br>36CrNiMo4<br>X36CrMo17<br>HS 6-5-2            | 1.7225<br>1.6511<br>1.2316<br>1.3343             | 10 | 10 | 10 | 15 | 15 | 15 |
| M  | M1                                  | Stainless steels, sulphured, austenitic                               | ≤1000 N/mm²                | X5CrNi18-10<br>X6CrNiTi18-10<br>X8CrNiS18-9              | 1.4301<br>1.4571<br>1.4305                       | 12 | 12 | 12 | 15 | 15 | 15 |
|    | M2                                  | Stainless- and acidresistant steels, martensitic                      | ≤1000 N/mm²                | X17CrNi16-2<br>X90CrMoV18<br>X2CrTi12                    | 1.4057<br>1.4112<br>1.4512                       | 10 | 10 | 10 | 12 | 12 | 12 |
|    | M3                                  | Duplex and Super Duplex                                               | ≤1300 N/mm²                | X2CrNiMoN22-5-3<br>X2CrNiMoN25-7-4<br>X2CrNiMoCuWN25-7-4 | 1.4462<br>1.4410<br>1.4501                       | 6  | 6  | 6  | 8  | 8  | 8  |
| K  | K1                                  | Cast iron                                                             | 300 HB                     | EN-GJL-150<br>EN-GJL-250<br>EN-GJL-300                   | 0.6015<br>0.6025<br>0.6030                       | 20 | 20 | 20 | 25 | 25 | 25 |
|    | K2                                  | Spheroidal graphite iron and malleable cast iron                      | 350 HB                     | EN-GJS-400-15<br>EN-GJS-600-3<br>EN-GJS-700-2            | 0.7040<br>0.7060<br>0.7070                       | 20 | 20 | 20 | 25 | 25 | 25 |
|    | K3                                  | ADI<br>GGV                                                            | 1000 N/mm²<br>350 HB       | EN-GJS1000-5<br>EN-GJV250<br>EN-GJV400                   |                                                  | 10 | 10 | 10 | 15 | 15 | 15 |
| N  | N1                                  | Aluminium and wrought alloys                                          | ≤450 N/mm²                 | Al99,5H<br>AlMgSi1<br>AlZn4,5Mg                          | 3.0250<br>3.2315<br>3.4335                       | 10 | 10 | 10 | 12 | 12 | 12 |
|    | N2                                  | Al cast alloys                                                        | ≤600 N/mm²                 | GD-AlSi5Cu1Mg<br>GD-AlSi8Cu3<br>G-AlSi9Mg<br>G-AlSi12    | 3.2134<br>3.2162<br>3.2373<br>3.2581             | 20 | 20 | 20 | 25 | 25 | 25 |
|    | N3                                  | Magnesium alloys                                                      | ≤500 N/mm²                 | GDMgAl8Zn1                                               | 3.5812.08                                        |    |    |    |    |    |    |
|    | N4                                  | Copper and copper alloys                                              | long-chipping              | CuZn20<br>CuZn37Pb0,5                                    | 2.0250<br>2.0332                                 | 20 | 20 | 20 | 25 | 25 | 25 |
|    |                                     |                                                                       | short-chipping             | CuZn39Pb2<br>CuZn43Pb2                                   | 2.0380<br>2.0410                                 | 20 | 20 | 20 | 25 | 25 | 25 |
|    | N5                                  | Copper special alloys                                                 | ≤1400 N/mm²                | Ampco                                                    |                                                  | 10 | 10 | 10 | 15 | 15 | 15 |
| N6 | Plastics<br>[Thermo-, Duroplastics] | long-chipping<br>short-chipping                                       | PMMA, POM,PVC<br>Pertinax  |                                                          |                                                  |    |    |    |    |    |    |
| S  | S1                                  | Titanium and Titanium alloys                                          | ≤ 1200 N/mm²               | Titan<br>TiAl5Sn2<br>TiAl6V4                             | 3.702<5<br>3.7115<br>3.7165                      | 3  | 3  | 3  | 5  | 5  | 5  |
|    | S2                                  | Nickel, cobalt, iron alloys                                           | ≤ 1400 N/mm²               | Hastelloy C4<br>Inconel 718<br>Nimonic 105               | 2.4610<br>2.4668<br>2.4634                       | 2  | 2  | 2  | 3  | 3  | 3  |
| H  | H1<br>H2                            | High tensile/<br>hardened steels                                      | 45 - 55 HRC<br>55 - 62 HRC |                                                          |                                                  |    |    |    |    |    |    |

## Machine taps for ISO metric threads

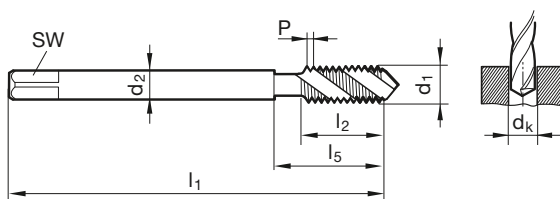


|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

DIN 371



DIN 376



| Tool material    | HSS-E  |        |        |        |
|------------------|--------|--------|--------|--------|
| Tolerance on Ø   | 6HX    | 6GX    | 7GX    | 6H+0,1 |
| Surface          | A      | A      | A      | A      |
| Type             | VA R45 | VA R45 | VA R45 | VA R45 |
| Form             | C      | C      | C      | C      |
| Internal cooling |        |        |        |        |



## DIN 2184-1 DIN 371/DIN 376

Article no. 393 4625 4626 4627

Discount group 103 103 103 103

| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5      | Code no. | Availability |   |   |   |
|------|-------|--------|--------|-------|---------|--------|---------|----------|--------------|---|---|---|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm      |          |              |   |   |   |
| M2   | 0.400 | 2.800  | 2.100  | 1.60  | 45.000  | 4.500  | 13.500  | 2.000    | •            | • | • | • |
| M2,5 | 0.450 | 2.800  | 2.100  | 2.05  | 50.000  | 5.000  | 14.500  | 2.500    | •            | • | • | • |
| M3   | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 6.000  | 18.000  | 3.000    | •            | • | • | • |
| M3,5 | 0.600 | 4.000  | 3.000  | 2.90  | 56.000  | 7.000  | 20.000  | 3.500    | •            | • | • | • |
| M4   | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 7.500  | 21.000  | 4.000    | •            | • | • | • |
| M5   | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 8.500  | 25.000  | 5.000    | •            | • | • | • |
| M6   | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 11.000 | 30.000  | 6.000    | •            | • | • | • |
| M8   | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 14.000 | 35.000  | 8.000    | •            | • | • | • |
| M10  | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 16.000 | 39.000  | 10.000   | •            | • | • | • |
| M12  | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 18.500 | 49.000  | 12.000   | •            | • | • | • |
| M14  | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 20.000 | 53.000  | 14.000   | •            | • | • | • |
| M16  | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 20.000 | 54.000  | 16.000   | •            | • | • | • |
| M18  | 2.500 | 14.000 | 11.000 | 15.50 | 125.000 | 25.000 | 62.000  | 18.000   | •            | • | • | • |
| M20  | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 25.000 | 62.000  | 20.000   | •            | • | • | • |
| M24  | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 30.000 | 73.000  | 24.000   | •            | • | • | • |
| M30  | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 35.000 | 85.000  | 30.000   | •            | • | • | • |
| M33  | 3.500 | 25.000 | 20.000 | 29.50 | 180.000 | 35.000 | 91.000  | 33.000   | •            | • | • | • |
| M36  | 4.000 | 28.000 | 22.000 | 32.00 | 200.000 | 50.000 | 102.000 | 36.000   | •            | • | • | • |
| M39  | 4.000 | 32.000 | 24.000 | 35.00 | 200.000 | 50.000 | 107.000 | 39.000   | •            | • | • | • |



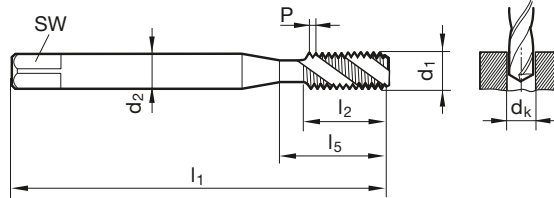
## Machine taps for ISO metric threads



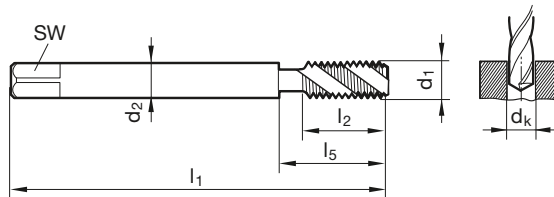
|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |        |
|------------------|--------|
| Tool material    | HSS-E  |
| Tolerance on Ø   | 6HX    |
| Surface          | A      |
| Type             | VA R45 |
| Form             | E      |
| Internal cooling |        |

DIN 371



DIN 376



## DIN 2184-1 DIN 371/DIN 376

Article no. 4630

Discount group 103

| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm   | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M2   | 0.400 | 2.800  | 2.100  | 1.60  | 45.000  | 4.500  | 13.500 | 2.000    | •            |
| M2,5 | 0.450 | 2.800  | 2.100  | 2.05  | 50.000  | 5.000  | 14.500 | 2.500    | •            |
| M3   | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 6.000  | 18.000 | 3.000    | •            |
| M3,5 | 0.600 | 4.000  | 3.000  | 2.90  | 56.000  | 7.000  | 20.000 | 3.500    | •            |
| M4   | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 7.500  | 21.000 | 4.000    | •            |
| M5   | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6   | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8   | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10  | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12  | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14  | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16  | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M18  | 2.500 | 14.000 | 11.000 | 15.50 | 125.000 | 25.000 | 62.000 | 18.000   | •            |
| M20  | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 25.000 | 62.000 | 20.000   | •            |
| M24  | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 30.000 | 73.000 | 24.000   | •            |
| M30  | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 35.000 | 85.000 | 30.000   | •            |

## Machine taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E-PM**

Tolerance on Ø 6HX

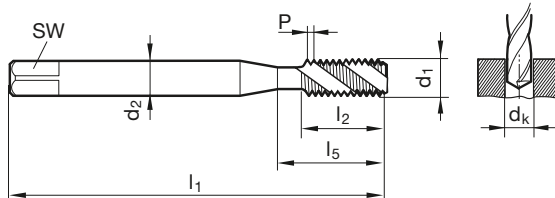
Surface **A**

Type VA R45

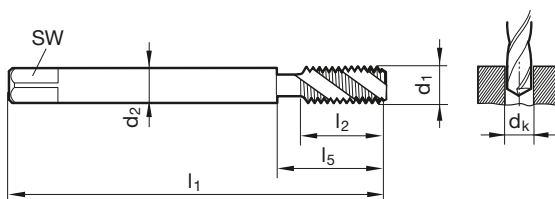
Form C

Internal cooling

DIN 371



DIN 376



DIN 2184-1 DIN 371/DIN 376

Article no. **4634**

Discount group **103**

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M3  | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 6.000  | 18.000 | 3.000    | •            |
| M4  | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 7.500  | 21.000 | 4.000    | •            |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 25.000 | 62.000 | 20.000   | •            |



## Machine taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E-PM**

Tolerance on Ø 6HX

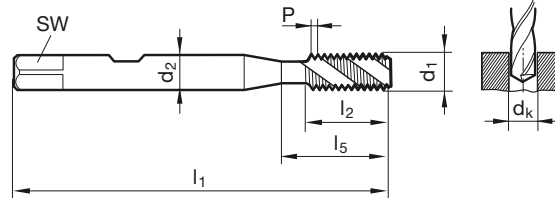
Surface **A**

Type VA R45

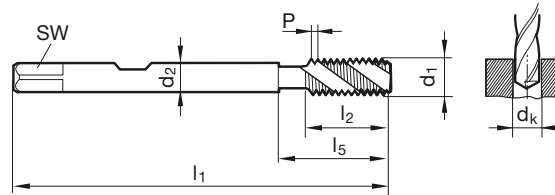
Form C

Internal cooling

DIN 371



DIN 376



DIN 2184-1 DIN 371/DIN 376

Article no. **4650**Discount group **103**

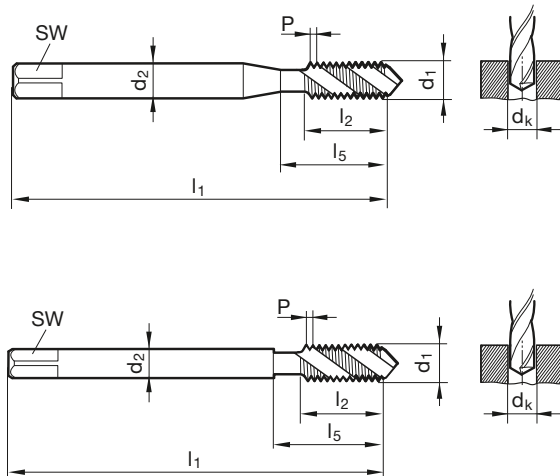
| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M3  | 0.500 | 6.000  | 4.900  | 2.50  | 56.000  | 6.000  | 18.000 | 3.000    | •            |
| M4  | 0.700 | 6.000  | 4.900  | 3.30  | 63.000  | 7.500  | 21.000 | 4.000    | •            |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 12.000 | 9.000  | 10.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 12.000 | 9.000  | 12.00 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 25.000 | 62.000 | 20.000   | •            |

## Machine taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |        |
|------------------|--------|
| Tool material    | HSS-E  |
| Tolerance on Ø   | 6HX    |
| Surface          | A      |
| Type             | VA R45 |
| Form             | C      |
| Internal cooling | ✗      |



## Company std.

Article no.

4633

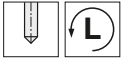
Discount group

103

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5      | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|---------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm      |          |              |
| M3  | 0.500 | 3.500  | 2.700  | 2.50  | 90.000  | 6.000  | 18.000  | 3.000    | •            |
| M4  | 0.700 | 4.500  | 3.400  | 3.30  | 125.000 | 7.500  | 21.000  | 4.000    | •            |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 140.000 | 8.500  | 25.000  | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 160.000 | 11.000 | 30.000  | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 180.000 | 14.000 | 35.000  | 8.010    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 200.000 | 16.000 | 39.000  | 10.010   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 10.20 | 220.000 | 18.500 | 158.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 12.00 | 220.000 | 20.000 | 160.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 220.000 | 20.000 | 160.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 280.000 | 25.000 | 217.000 | 20.000   | •            |



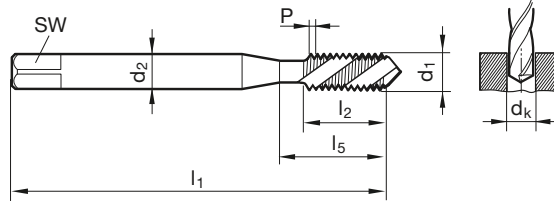
## Machine taps for ISO metric threads



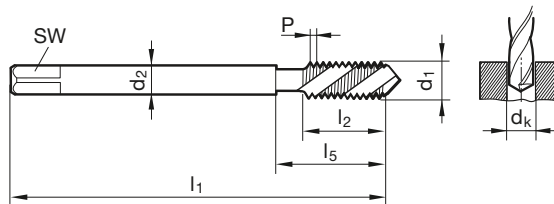
|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |        |
|------------------|--------|
| Tool material    | HSS-E  |
| Tolerance on Ø   | 6HX    |
| Surface          | A      |
| Type             | VA R45 |
| Form             | C      |
| Internal cooling |        |

DIN 371



DIN 376



## DIN 2184-1 DIN 371/DIN 376

Article no. 4629

Discount group 103

| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm   | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M2   | 0.400 | 2.800  | 2.100  | 1.60  | 45.000  | 4.500  | 13.500 | 2.000    | •            |
| M2,5 | 0.450 | 2.800  | 2.100  | 2.05  | 50.000  | 5.000  | 14.500 | 2.500    | •            |
| M3   | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 6.000  | 18.000 | 3.000    | •            |
| M3,5 | 0.600 | 4.000  | 3.000  | 2.90  | 56.000  | 7.000  | 20.000 | 3.500    | •            |
| M4   | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 7.500  | 21.000 | 4.000    | •            |
| M5   | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6   | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8   | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10  | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12  | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14  | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16  | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M18  | 2.500 | 14.000 | 11.000 | 15.50 | 125.000 | 25.000 | 62.000 | 18.000   | •            |
| M20  | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 25.000 | 62.000 | 20.000   | •            |
| M24  | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 30.000 | 73.000 | 24.000   | •            |
| M30  | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 35.000 | 85.000 | 30.000   | •            |

## Oil feed taps for ISO metric threads

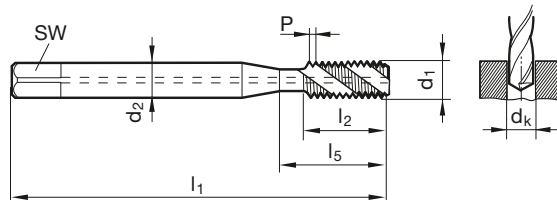


|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

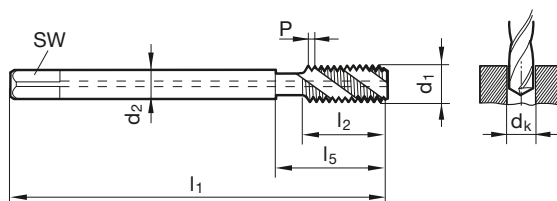
Tool material **HSS-E-PM**Tolerance on Ø **6HX**Surface **A**Type **VA R45**Form **C**

Internal cooling

DIN 371



DIN 376



DIN 2184-1 DIN 371/DIN 376

Article no. **4636**Discount group **103**

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 25.000 | 62.000 | 20.000   | •            |
| M24 | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 30.000 | 73.000 | 24.000   | •            |
| M30 | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 35.000 | 85.000 | 30.000   | •            |

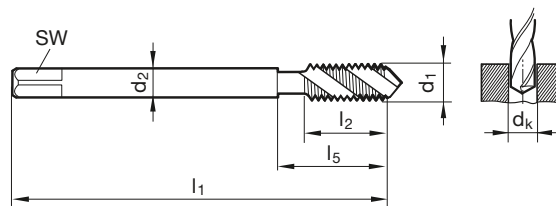


## Machine taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

| Tool material    | HSS-E  |        |
|------------------|--------|--------|
| Tolerance on Ø   | 6HX    | 6GX    |
| Surface          | A      | A      |
| Type             | VA R45 | VA R45 |
| Form             | C      | C      |
| Internal cooling |        |        |



## DIN 2184-1 DIN 374

Article no.

394

4628

Discount group

103

103

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |   |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|---|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |   |
| M6 x 0,75  | 4.500  | 3.400  | 5.20  | 80.000  | 8.000  | 30.000 | 6.004    | •            | • |
| M8 x 0,75  | 6.000  | 4.900  | 7.20  | 80.000  | 8.000  | 30.000 | 8.004    | •            | • |
| M8 x 1     | 6.000  | 4.900  | 7.00  | 90.000  | 11.000 | 35.000 | 8.005    | •            | • |
| M10 x 1    | 7.000  | 5.500  | 9.00  | 90.000  | 11.000 | 35.000 | 10.005   | •            | • |
| M10 x 1,25 | 7.000  | 5.500  | 8.80  | 100.000 | 14.000 | 39.000 | 10.006   | •            | • |
| M12 x 1    | 9.000  | 7.000  | 11.00 | 100.000 | 11.000 | 40.000 | 12.005   | •            | • |
| M12 x 1,25 | 9.000  | 7.000  | 10.80 | 100.000 | 16.000 | 40.000 | 12.006   | •            | • |
| M12 x 1,5  | 9.000  | 7.000  | 10.50 | 100.000 | 16.000 | 40.000 | 12.007   | •            | • |
| M14 x 1,5  | 11.000 | 9.000  | 12.50 | 100.000 | 15.000 | 40.000 | 14.007   | •            | • |
| M16 x 1,5  | 12.000 | 9.000  | 14.50 | 100.000 | 15.000 | 44.000 | 16.007   | •            | • |
| M18 x 1,5  | 14.000 | 11.000 | 16.50 | 110.000 | 16.000 | 44.000 | 18.007   | •            | • |
| M20 x 1,5  | 16.000 | 12.000 | 18.50 | 125.000 | 16.000 | 44.000 | 20.007   | •            | • |
| M24 x 1,5  | 18.000 | 14.500 | 22.50 | 140.000 | 16.000 | 48.000 | 24.007   | •            | • |
|            |        |        |       |         |        |        |          |              |   |
|            |        |        |       |         |        |        |          |              |   |

## Machine taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E-PM**

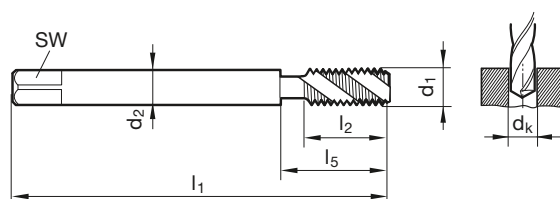
Tolerance on Ø 6HX

Surface **A**

Type VA R45

Form C

Internal cooling



DIN 2184-1 DIN 374

Article no.

4635

Discount group

103

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M8 x 1     | 6.000  | 4.900  | 7.00  | 90.000  | 11.000 | 35.000 | 8.005    | •            |
| M10 x 1    | 7.000  | 5.500  | 9.00  | 90.000  | 11.000 | 35.000 | 10.005   | •            |
| M10 x 1,25 | 7.000  | 5.500  | 8.80  | 100.000 | 14.000 | 39.000 | 10.006   | •            |
| M12 x 1    | 9.000  | 7.000  | 11.00 | 100.000 | 11.000 | 40.000 | 12.005   | •            |
| M12 x 1,25 | 9.000  | 7.000  | 10.80 | 100.000 | 16.000 | 40.000 | 12.006   | •            |
| M12 x 1,5  | 9.000  | 7.000  | 10.50 | 100.000 | 16.000 | 40.000 | 12.007   | •            |
| M14 x 1,5  | 11.000 | 9.000  | 12.50 | 100.000 | 15.000 | 40.000 | 14.007   | •            |
| M16 x 1,5  | 12.000 | 9.000  | 14.50 | 100.000 | 15.000 | 44.000 | 16.007   | •            |
| M18 x 1,5  | 14.000 | 11.000 | 16.50 | 110.000 | 16.000 | 44.000 | 18.007   | •            |
| M20 x 1,5  | 16.000 | 12.000 | 18.50 | 125.000 | 16.000 | 44.000 | 20.007   | •            |
| M24 x 1,5  | 18.000 | 14.500 | 22.50 | 140.000 | 16.000 | 48.000 | 24.007   | •            |

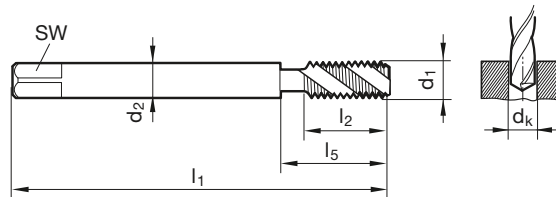


## Machine taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |        |
|------------------|--------|
| Tool material    | HSS-E  |
| Tolerance on Ø   | 6HX    |
| Surface          | A      |
| Type             | VA R45 |
| Form             | E      |
| Internal cooling |        |



DIN 2184-1 DIN 374

Article no.

4631

Discount group

103

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M6 x 0,75  | 4.500  | 3.400  | 5.20  | 80.000  | 8.000  | 30.000 | 6.004    | •            |
| M8 x 0,75  | 6.000  | 4.900  | 7.20  | 80.000  | 8.000  | 30.000 | 8.004    | •            |
| M8 x 1     | 6.000  | 4.900  | 7.00  | 90.000  | 11.000 | 35.000 | 8.005    | •            |
| M10 x 1    | 7.000  | 5.500  | 9.00  | 90.000  | 11.000 | 35.000 | 10.005   | •            |
| M10 x 1,25 | 7.000  | 5.500  | 8.80  | 100.000 | 14.000 | 39.000 | 10.006   | •            |
| M12 x 1    | 9.000  | 7.000  | 11.00 | 100.000 | 11.000 | 40.000 | 12.005   | •            |
| M12 x 1,25 | 9.000  | 7.000  | 10.80 | 100.000 | 16.000 | 40.000 | 12.006   | •            |
| M12 x 1,5  | 9.000  | 7.000  | 10.50 | 100.000 | 16.000 | 40.000 | 12.007   | •            |
| M14 x 1,5  | 11.000 | 9.000  | 12.50 | 100.000 | 15.000 | 40.000 | 14.007   | •            |
| M16 x 1,5  | 12.000 | 9.000  | 14.50 | 100.000 | 15.000 | 44.000 | 16.007   | •            |
| M18 x 1,5  | 14.000 | 11.000 | 16.50 | 110.000 | 16.000 | 44.000 | 18.007   | •            |
| M20 x 1,5  | 16.000 | 12.000 | 18.50 | 125.000 | 16.000 | 44.000 | 20.007   | •            |
| M24 x 1,5  | 18.000 | 14.500 | 22.50 | 140.000 | 16.000 | 48.000 | 24.007   | •            |

## Oil feed taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E-PM**

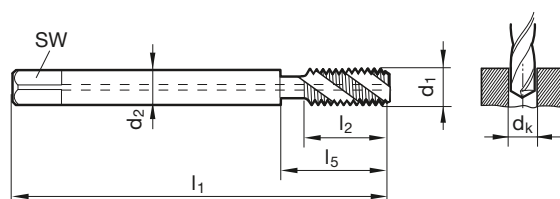
Tolerance on Ø 6HX

Surface **A**

Type VA R45

Form C

Internal cooling



DIN 2184-1 DIN 374

Article no.

4637

Discount group

103

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M8 x 1     | 6.000  | 4.900  | 7.00  | 90.000  | 11.000 | 35.000 | 8.005    | •            |
| M10 x 1    | 7.000  | 5.500  | 9.00  | 90.000  | 11.000 | 35.000 | 10.005   | •            |
| M10 x 1,25 | 7.000  | 5.500  | 8.80  | 100.000 | 14.000 | 39.000 | 10.006   | •            |
| M12 x 1    | 9.000  | 7.000  | 11.00 | 100.000 | 11.000 | 40.000 | 12.005   | •            |
| M12 x 1,25 | 9.000  | 7.000  | 10.80 | 100.000 | 16.000 | 40.000 | 12.006   | •            |
| M12 x 1,5  | 9.000  | 7.000  | 10.50 | 100.000 | 16.000 | 40.000 | 12.007   | •            |
| M14 x 1,5  | 11.000 | 9.000  | 12.50 | 100.000 | 15.000 | 40.000 | 14.007   | •            |
| M16 x 1,5  | 12.000 | 9.000  | 14.50 | 100.000 | 15.000 | 44.000 | 16.007   | •            |
| M18 x 1,5  | 14.000 | 11.000 | 16.50 | 110.000 | 16.000 | 44.000 | 18.007   | •            |
| M20 x 1,5  | 16.000 | 12.000 | 18.50 | 125.000 | 16.000 | 44.000 | 20.007   | •            |
| M24 x 1,5  | 18.000 | 14.500 | 22.50 | 140.000 | 16.000 | 48.000 | 24.007   | •            |

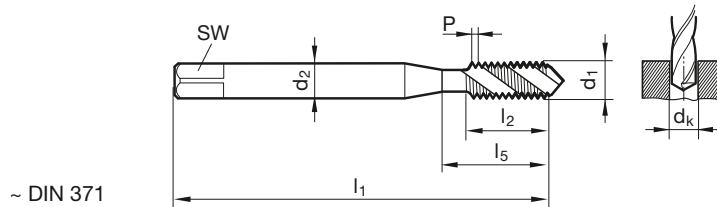


## Machine taps for UNC-threads

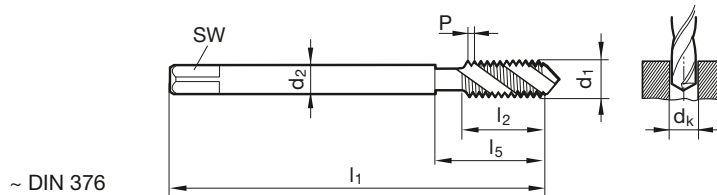


|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |              |
|------------------|--------------|
| Tool material    | <b>HSS-E</b> |
| Tolerance on Ø   | 2BX          |
| Surface          | <b>A</b>     |
| Type             | VA R45       |
| Form             | C            |
| Internal cooling |              |



~ DIN 371



~ DIN 376



## DIN 2184-1 ~DIN 371/~DIN 376

Article no.

391

Discount group

103

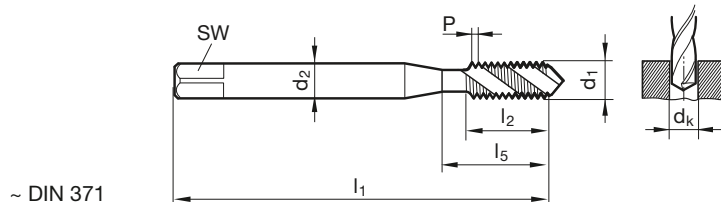
| d1        | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----------|--------|--------|-------|---------|--------|--------|----------|--------------|
|           | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| 2 - 56    | 2.800  | 2.100  | 1.85  | 45.000  | 5.000  | 14.500 | 2.184    | •            |
| 4 - 40    | 3.500  | 2.700  | 2.35  | 56.000  | 7.000  | 18.000 | 2.845    | •            |
| 6 - 32    | 4.000  | 3.000  | 2.85  | 56.000  | 8.000  | 20.000 | 3.505    | •            |
| 8 - 32    | 4.500  | 3.400  | 3.50  | 63.000  | 8.000  | 21.000 | 4.166    | •            |
| 10 - 24   | 6.000  | 4.900  | 3.90  | 70.000  | 11.000 | 25.000 | 4.826    | •            |
| 12 - 24   | 6.000  | 4.900  | 4.50  | 80.000  | 11.000 | 30.000 | 5.486    | •            |
| 1/4 - 20  | 7.000  | 5.500  | 5.10  | 80.000  | 13.000 | 30.000 | 6.350    | •            |
| 5/16 - 18 | 8.000  | 6.200  | 6.60  | 90.000  | 14.000 | 35.000 | 7.938    | •            |
| 3/8 - 16  | 10.000 | 8.000  | 8.00  | 100.000 | 16.000 | 39.000 | 9.525    | •            |
| 7/16 - 14 | 8.000  | 6.200  | 9.40  | 100.000 | 18.000 | 42.000 | 11.113   | •            |
| 1/2 - 13  | 9.000  | 7.000  | 10.80 | 110.000 | 20.000 | 49.000 | 12.700   | •            |
| 9/16 - 12 | 11.000 | 9.000  | 12.20 | 110.000 | 21.000 | 53.000 | 14.288   | •            |
| 5/8 - 11  | 12.000 | 9.000  | 13.50 | 110.000 | 24.000 | 53.000 | 15.875   | •            |
| 3/4 - 10  | 14.000 | 11.000 | 16.50 | 125.000 | 25.000 | 62.000 | 19.050   | •            |
| 7/8 - 9   | 18.000 | 14.500 | 19.50 | 140.000 | 28.000 | 62.000 | 22.225   | •            |
| 1 - 8     | 18.000 | 14.500 | 22.25 | 160.000 | 32.000 | 73.000 | 25.400   | •            |

## Machine taps for UNF-threads

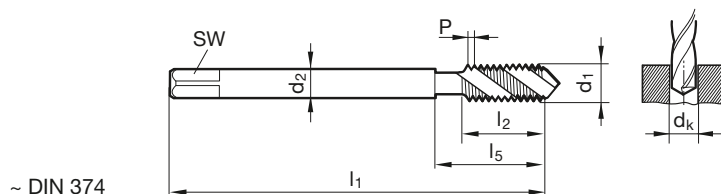


|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |        |
|------------------|--------|
| Tool material    | HSS-E  |
| Tolerance on Ø   | 2BX    |
| Surface          | A      |
| Type             | VA R45 |
| Form             | C      |
| Internal cooling |        |



~ DIN 371



~ DIN 374



## DIN 2184-1 ~DIN 371/~DIN 374

Article no.

392

Discount group

103

| d1        | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----------|--------|--------|-------|---------|--------|--------|----------|--------------|
|           | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| 2 - 64    | 2.800  | 2.100  | 1.85  | 45.000  | 5.000  | 14.500 | 2.184    | •            |
| 4 - 48    | 3.500  | 2.700  | 2.40  | 56.000  | 6.000  | 18.000 | 2.845    | •            |
| 6 - 40    | 4.000  | 3.000  | 2.95  | 56.000  | 6.500  | 20.000 | 3.505    | •            |
| 8 - 36    | 4.500  | 3.400  | 3.50  | 63.000  | 7.000  | 21.000 | 4.166    | •            |
| 10 - 32   | 6.000  | 4.900  | 4.10  | 70.000  | 8.500  | 25.000 | 4.826    | •            |
| 12 - 28   | 6.000  | 4.900  | 4.60  | 80.000  | 9.000  | 30.000 | 5.486    | •            |
| 1/4 - 28  | 7.000  | 5.500  | 5.50  | 80.000  | 9.000  | 30.000 | 6.350    | •            |
| 5/16 - 24 | 8.000  | 6.200  | 6.90  | 90.000  | 11.000 | 35.000 | 7.938    | •            |
| 3/8 - 24  | 10.000 | 8.000  | 8.50  | 90.000  | 11.000 | 35.000 | 9.525    | •            |
| 7/16 - 20 | 8.000  | 6.200  | 9.90  | 100.000 | 13.000 | 42.000 | 11.113   | •            |
| 1/2 - 20  | 9.000  | 7.000  | 11.50 | 100.000 | 13.000 | 40.000 | 12.700   | •            |
| 9/16 - 18 | 11.000 | 9.000  | 12.90 | 100.000 | 14.000 | 40.000 | 14.288   | •            |
| 5/8 - 18  | 12.000 | 9.000  | 14.50 | 100.000 | 15.000 | 44.000 | 15.875   | •            |
| 3/4 - 16  | 14.000 | 11.000 | 17.50 | 110.000 | 16.000 | 44.000 | 19.050   | •            |
| 7/8 - 14  | 18.000 | 14.500 | 20.40 | 125.000 | 19.000 | 44.000 | 22.225   | •            |
| 1 - 12    | 18.000 | 14.500 | 23.25 | 140.000 | 22.000 | 50.000 | 25.400   | •            |

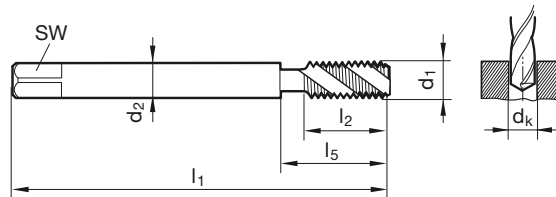


## Machine taps for BSP-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

| Tool material    | HSS-E  |        |
|------------------|--------|--------|
| Tolerance on Ø   | X      | X      |
| Surface          | A      | A      |
| Type             | VA R45 | VA R45 |
| Form             | C      | E      |
| Internal cooling |        |        |



DIN 2184-1 DIN 5156

Article no.

395

4632

Discount group

103

103

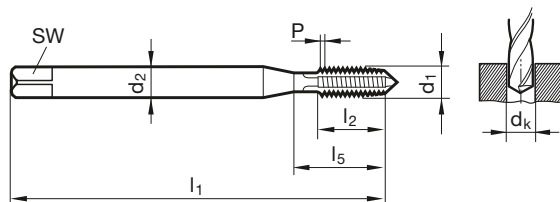
| d1    | P      | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |   |
|-------|--------|--------|--------|-------|---------|--------|--------|----------|--------------|---|
|       | inch   | mm     | mm     | mm    | mm      | mm     | mm     |          |              |   |
| G1/16 | 28.000 | 6.000  | 4.900  | 6.80  | 90.000  | 11.000 | 30.000 | 7.723    | •            | • |
| G1/8  | 28.000 | 7.000  | 5.500  | 8.80  | 90.000  | 11.000 | 35.000 | 9.728    | •            | • |
| G1/4  | 19.000 | 11.000 | 9.000  | 11.80 | 100.000 | 14.000 | 40.000 | 13.157   | •            | • |
| G3/8  | 19.000 | 12.000 | 9.000  | 15.25 | 100.000 | 14.000 | 44.000 | 16.662   | •            | • |
| G1/2  | 14.000 | 16.000 | 12.000 | 19.00 | 125.000 | 18.000 | 44.000 | 20.955   | •            | • |
| G5/8  | 14.000 | 18.000 | 14.500 | 21.00 | 125.000 | 18.000 | 48.000 | 22.911   | •            | • |
| G3/4  | 14.000 | 20.000 | 16.000 | 24.50 | 140.000 | 20.000 | 53.000 | 26.441   | •            | • |
| G7/8  | 14.000 | 22.000 | 18.000 | 28.25 | 150.000 | 22.000 | 53.000 | 30.201   | •            | • |
| G1    | 11.000 | 25.000 | 20.000 | 30.75 | 160.000 | 24.000 | 56.000 | 33.249   | •            | • |
|       |        |        |        |       |         |        |        |          |              |   |

## Machine taps for ISO metric threads

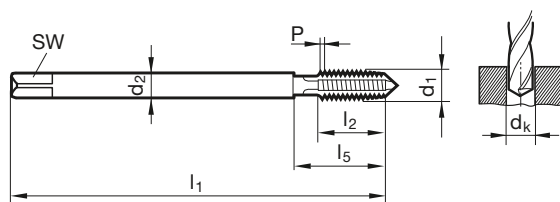


|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

DIN 371



DIN 376



| Tool material    | HSS-E    |          |          |          |
|------------------|----------|----------|----------|----------|
| Tolerance on Ø   | 6HX      | 6GX      | 7GX      | 6H+0,1   |
| Surface          | <b>S</b> | <b>S</b> | <b>S</b> | <b>S</b> |
| Type             | VA       | VA       | VA       | VA       |
| Form             | B        | B        | B        | B        |
| Internal cooling |          |          |          |          |



## DIN 2184-1 DIN 371/DIN 376

Article no. 4218 4638 4639 4640

Discount group 103 103 103 103

| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |   |   |   |
|------|-------|--------|--------|-------|---------|--------|--------|----------|--------------|---|---|---|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |   |   |   |
| M2   | 0.400 | 2.800  | 2.100  | 1.60  | 45.000  | 8.000  | 13.500 | 2.000    | •            | • | • | • |
| M2,5 | 0.450 | 2.800  | 2.100  | 2.05  | 50.000  | 9.000  | 14.500 | 2.500    | •            | • | • | • |
| M3   | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 10.000 | 18.000 | 3.000    | •            | • | • | • |
| M4   | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 12.000 | 21.000 | 4.000    | •            | • | • | • |
| M5   | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 14.000 | 25.000 | 5.000    | •            | • | • | • |
| M6   | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 16.000 | 30.000 | 6.000    | •            | • | • | • |
| M8   | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 17.000 | 35.000 | 8.000    | •            | • | • | • |
| M10  | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 20.000 | 39.000 | 10.000   | •            | • | • | • |
| M12  | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 24.000 | 49.000 | 12.000   | •            | • | • | • |
| M14  | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 26.000 | 53.000 | 14.000   | •            | • | • | • |
| M16  | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 26.000 | 54.000 | 16.000   | •            | • | • | • |
| M18  | 2.500 | 14.000 | 11.000 | 15.50 | 125.000 | 30.000 | 62.000 | 18.000   | •            | • | • | • |
| M20  | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 32.000 | 62.000 | 20.000   | •            | • | • | • |
| M24  | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 36.000 | 73.000 | 24.000   | •            | • | • | • |
| M30  | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 40.000 | 85.000 | 30.000   | •            | • | • | • |



## Machine taps for ISO metric threads

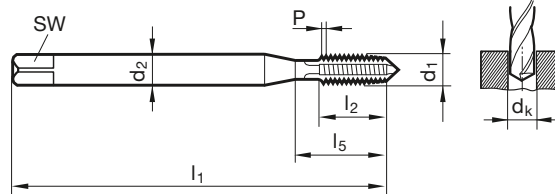


|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

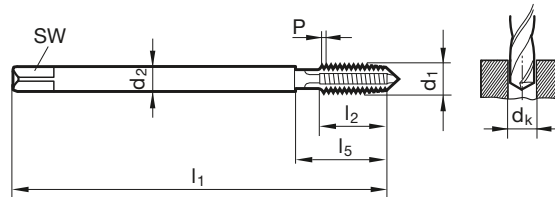
Tool material **HSS-E-PM**Tolerance on Ø **6HX**Surface **S**Type **VA**Form **B**

Internal cooling

DIN 371



DIN 376



DIN 2184-1 DIN 371/DIN 376

Article no. **4646**Discount group **103**

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M3  | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 10.000 | 18.000 | 3.000    | •            |
| M4  | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 12.000 | 21.000 | 4.000    | •            |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 14.000 | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 16.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 17.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 20.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 24.000 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 26.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 26.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 32.000 | 62.000 | 20.000   | •            |

## Machine taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E-PM**

Tolerance on Ø 6HX

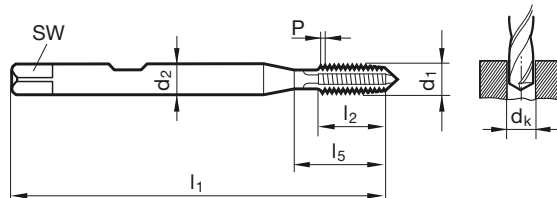
Surface **S**

Type VA

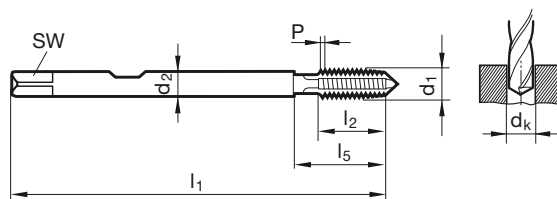
Form B

Internal cooling

DIN 371



DIN 376



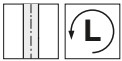
DIN 2184-1 DIN 371/DIN 376

Article no. **4651**Discount group **103**

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M3  | 0.500 | 6.000  | 4.900  | 2.50  | 56.000  | 10.000 | 18.000 | 3.000    | •            |
| M4  | 0.700 | 6.000  | 4.900  | 3.30  | 63.000  | 12.000 | 21.000 | 4.000    | •            |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 14.000 | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 16.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 17.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 20.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 12.000 | 9.000  | 10.20 | 110.000 | 24.000 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 12.000 | 9.000  | 12.00 | 110.000 | 26.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 26.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 32.000 | 62.000 | 20.000   | •            |



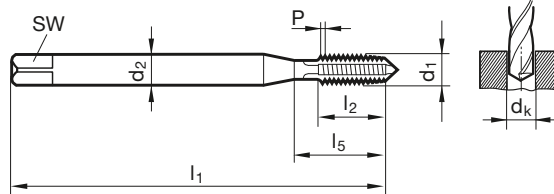
## Machine taps for ISO metric threads



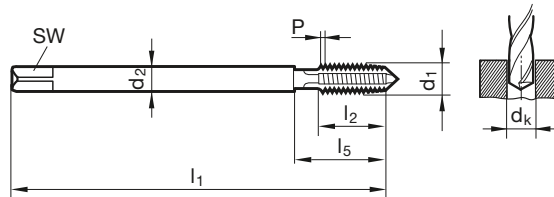
|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |       |
|------------------|-------|
| Tool material    | HSS-E |
| Tolerance on Ø   | 6HX   |
| Surface          | S     |
| Type             | VA    |
| Form             | B     |
| Internal cooling | ✗     |

DIN 371



DIN 376



## DIN 2184-1 DIN 371/DIN 376

Article no. 4644

Discount group 103

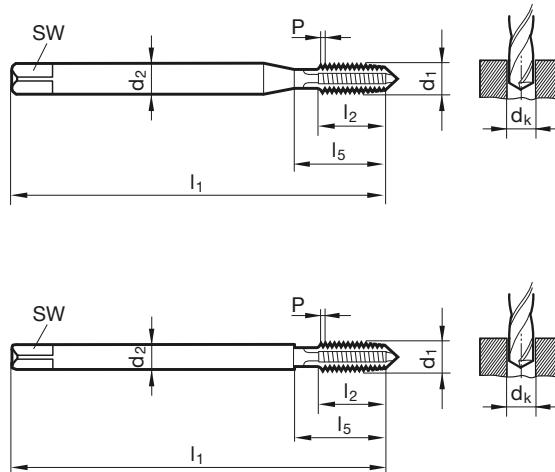
| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm   | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M2   | 0.400 | 2.800  | 2.100  | 1.60  | 45.000  | 8.000  | 13.500 | 2.000    | •            |
| M2,5 | 0.450 | 2.800  | 2.100  | 2.05  | 50.000  | 9.000  | 14.500 | 2.500    | •            |
| M3   | 0.500 | 3.500  | 2.700  | 2.50  | 56.000  | 10.000 | 18.000 | 3.000    | •            |
| M4   | 0.700 | 4.500  | 3.400  | 3.30  | 63.000  | 12.000 | 21.000 | 4.000    | •            |
| M5   | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 14.000 | 25.000 | 5.000    | •            |
| M6   | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 16.000 | 30.000 | 6.000    | •            |
| M8   | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 17.000 | 35.000 | 8.000    | •            |
| M10  | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 20.000 | 39.000 | 10.000   | •            |
| M12  | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 24.000 | 49.000 | 12.000   | •            |
| M14  | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 26.000 | 53.000 | 14.000   | •            |
| M16  | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 26.000 | 54.000 | 16.000   | •            |
| M18  | 2.500 | 14.000 | 11.000 | 15.50 | 125.000 | 30.000 | 62.000 | 18.000   | •            |
| M20  | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 32.000 | 62.000 | 20.000   | •            |
| M24  | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 36.000 | 73.000 | 24.000   | •            |
| M30  | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 40.000 | 85.000 | 30.000   | •            |

## Machine taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |       |
|------------------|-------|
| Tool material    | HSS-E |
| Tolerance on Ø   | 6HX   |
| Surface          | S     |
| Type             | VA    |
| Form             | B     |
| Internal cooling |       |



## Company std.

Article no.

4645

Discount group

103

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5      | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|---------|----------|--------------|
|     | mm    | mm     | mm     | mm    | mm      | mm     | mm      |          |              |
| M3  | 0.500 | 3.500  | 2.700  | 2.50  | 90.000  | 10.000 | 18.000  | 3.000    | •            |
| M4  | 0.700 | 4.500  | 3.400  | 3.30  | 125.000 | 12.000 | 21.000  | 4.000    | •            |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 140.000 | 14.000 | 25.000  | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 160.000 | 16.000 | 30.000  | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 180.000 | 17.000 | 35.000  | 8.010    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 200.000 | 20.000 | 39.000  | 10.010   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 10.20 | 220.000 | 24.000 | 158.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 12.00 | 220.000 | 26.000 | 160.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 220.000 | 26.000 | 160.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 280.000 | 32.000 | 217.000 | 20.000   | •            |



## Oil feed taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E-PM**

Tolerance on Ø 6HX

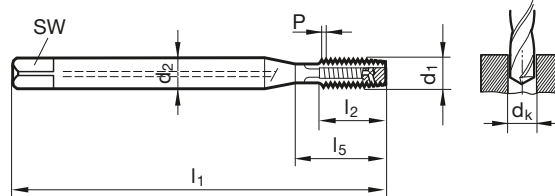
Surface **S**

Type VA

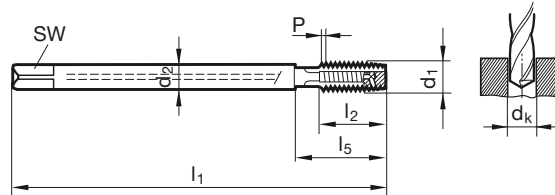
Form B

Internal cooling

DIN 371



DIN 376



DIN 2184-1 DIN 371/DIN 376

Article no. **4648**Discount group **103**

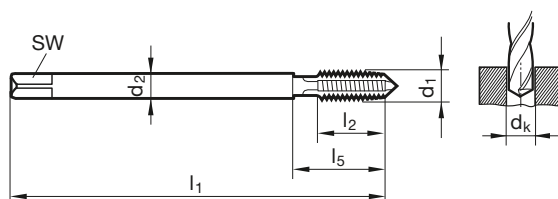
| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M5  | 0.800 | 6.000  | 4.900  | 4.20  | 70.000  | 14.000 | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.00  | 80.000  | 16.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 6.80  | 90.000  | 17.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 8.50  | 100.000 | 20.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 10.20 | 110.000 | 24.000 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 12.00 | 110.000 | 26.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 14.00 | 110.000 | 26.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 17.50 | 140.000 | 32.000 | 62.000 | 20.000   | •            |
| M24 | 3.000 | 18.000 | 14.500 | 21.00 | 160.000 | 36.000 | 73.000 | 24.000   | •            |
| M30 | 3.500 | 22.000 | 18.000 | 26.50 | 180.000 | 40.000 | 85.000 | 30.000   | •            |

## Machine taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

| Tool material    | HSS-E |     | HSS-E-PM |
|------------------|-------|-----|----------|
| Tolerance on Ø   | 6HX   | 6GX | 6HX      |
| Surface          | S     | S   | S        |
| Type             | VA    | VA  | VA       |
| Form             | B     | B   | B        |
| Internal cooling |       |     |          |



## DIN 2184-1 DIN 374

Article no.

4219

4641

4647

Discount group

103

103

103

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |   |   |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|---|---|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |   |   |
| M6 x 0,75  | 4.500  | 3.400  | 5.20  | 80.000  | 13.000 | 30.000 | 6.004    | •            | • |   |
| M8 x 0,75  | 6.000  | 4.900  | 7.20  | 80.000  | 14.000 | 30.000 | 8.004    | •            | • |   |
| M8 x 1     | 6.000  | 4.900  | 7.00  | 90.000  | 17.000 | 35.000 | 8.005    | •            | • | • |
| M10 x 1    | 7.000  | 5.500  | 9.00  | 90.000  | 16.000 | 35.000 | 10.005   | •            | • | • |
| M10 x 1,25 | 7.000  | 5.500  | 8.80  | 100.000 | 20.000 | 39.000 | 10.006   | •            | • | • |
| M12 x 1    | 9.000  | 7.000  | 11.00 | 100.000 | 20.000 | 40.000 | 12.005   | •            | • | • |
| M12 x 1,25 | 9.000  | 7.000  | 10.80 | 100.000 | 20.000 | 40.000 | 12.006   | •            | • | • |
| M12 x 1,5  | 9.000  | 7.000  | 10.50 | 100.000 | 20.000 | 40.000 | 12.007   | •            | • | • |
| M14 x 1,5  | 11.000 | 9.000  | 12.50 | 100.000 | 20.000 | 40.000 | 14.007   | •            | • | • |
| M16 x 1,5  | 12.000 | 9.000  | 14.50 | 100.000 | 22.000 | 44.000 | 16.007   | •            | • | • |
| M18 x 1,5  | 14.000 | 11.000 | 16.50 | 110.000 | 25.000 | 44.000 | 18.007   | •            | • | • |
| M20 x 1,5  | 16.000 | 12.000 | 18.50 | 125.000 | 25.000 | 44.000 | 20.007   | •            | • | • |
| M24 x 1,5  | 18.000 | 14.500 | 22.50 | 140.000 | 28.000 | 48.000 | 24.007   | •            | • | • |

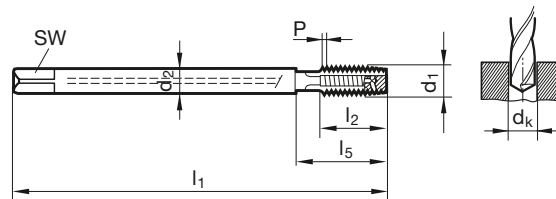


## Oil feed taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |          |
|------------------|----------|
| Tool material    | HSS-E-PM |
| Tolerance on Ø   | 6HX      |
| Surface          | S        |
| Type             | VA       |
| Form             | B        |
| Internal cooling |          |



DIN 2184-1 DIN 374

Article no.

4649

Discount group

103

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M8 x 1     | 6.000  | 4.900  | 7.00  | 90.000  | 17.000 | 35.000 | 8.005    | •            |
| M10 x 1    | 7.000  | 5.500  | 9.00  | 90.000  | 16.000 | 35.000 | 10.005   | •            |
| M10 x 1,25 | 7.000  | 5.500  | 8.80  | 100.000 | 20.000 | 39.000 | 10.006   | •            |
| M12 x 1    | 9.000  | 7.000  | 11.00 | 100.000 | 20.000 | 40.000 | 12.005   | •            |
| M12 x 1,25 | 9.000  | 7.000  | 10.80 | 100.000 | 20.000 | 40.000 | 12.006   | •            |
| M12 x 1,5  | 9.000  | 7.000  | 10.50 | 100.000 | 20.000 | 40.000 | 12.007   | •            |
| M14 x 1,5  | 11.000 | 9.000  | 12.50 | 100.000 | 20.000 | 40.000 | 14.007   | •            |
| M16 x 1,5  | 12.000 | 9.000  | 14.50 | 100.000 | 22.000 | 44.000 | 16.007   | •            |
| M18 x 1,5  | 14.000 | 11.000 | 16.50 | 110.000 | 25.000 | 44.000 | 18.007   | •            |
| M20 x 1,5  | 16.000 | 12.000 | 18.50 | 125.000 | 25.000 | 44.000 | 20.007   | •            |
| M24 x 1,5  | 18.000 | 14.500 | 22.50 | 140.000 | 28.000 | 48.000 | 24.007   | •            |

## Machine taps for UNC-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E**

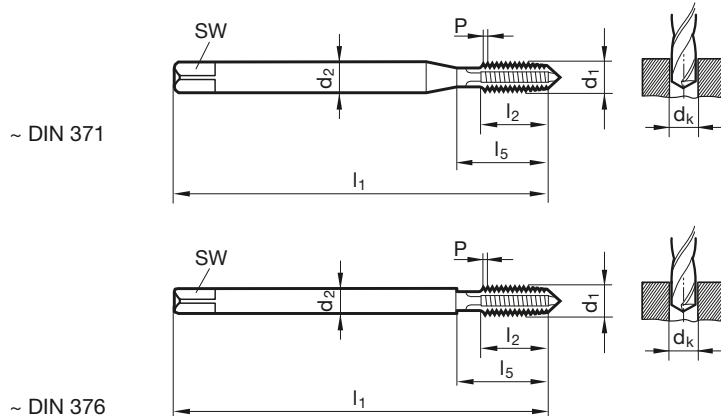
Tolerance on Ø 2BX

Surface **S**

Type VA

Form B

Internal cooling

**DIN 2184-1 ~DIN 371/~DIN 376**

Article no.

**4642**

Discount group

**103**

| d1        | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----------|--------|--------|-------|---------|--------|--------|----------|--------------|
|           | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| 2 - 56    | 2.800  | 2.100  | 1.85  | 45.000  | 9.000  | 14.500 | 2.184    | •            |
| 4 - 40    | 3.500  | 2.700  | 2.35  | 56.000  | 11.000 | 18.000 | 2.845    | •            |
| 6 - 32    | 4.000  | 3.000  | 2.85  | 56.000  | 12.000 | 20.000 | 3.505    | •            |
| 8 - 32    | 4.500  | 3.400  | 3.50  | 63.000  | 12.000 | 21.000 | 4.166    | •            |
| 10 - 24   | 6.000  | 4.900  | 3.90  | 70.000  | 14.000 | 25.000 | 4.826    | •            |
| 12 - 24   | 6.000  | 4.900  | 4.50  | 80.000  | 16.000 | 30.000 | 5.486    | •            |
| 1/4 - 20  | 7.000  | 5.500  | 5.10  | 80.000  | 16.000 | 30.000 | 6.350    | •            |
| 5/16 - 18 | 8.000  | 6.200  | 6.60  | 90.000  | 18.000 | 35.000 | 7.938    | •            |
| 3/8 - 16  | 10.000 | 8.000  | 8.00  | 100.000 | 20.000 | 39.000 | 9.525    | •            |
| 7/16 - 14 | 8.000  | 6.200  | 9.40  | 100.000 | 22.000 | 42.000 | 11.113   | •            |
| 1/2 - 13  | 9.000  | 7.000  | 10.80 | 110.000 | 25.000 | 49.000 | 12.700   | •            |
| 9/16 - 12 | 11.000 | 9.000  | 12.20 | 110.000 | 28.000 | 53.000 | 14.288   | •            |
| 5/8 - 11  | 12.000 | 9.000  | 13.50 | 110.000 | 30.000 | 53.000 | 15.875   | •            |
| 3/4 - 10  | 14.000 | 11.000 | 16.50 | 125.000 | 33.000 | 62.000 | 19.050   | •            |
| 7/8 - 9   | 18.000 | 14.500 | 19.50 | 140.000 | 35.000 | 62.000 | 22.225   | •            |
| 1 - 8     | 18.000 | 14.500 | 22.25 | 160.000 | 38.000 | 73.000 | 25.400   | •            |

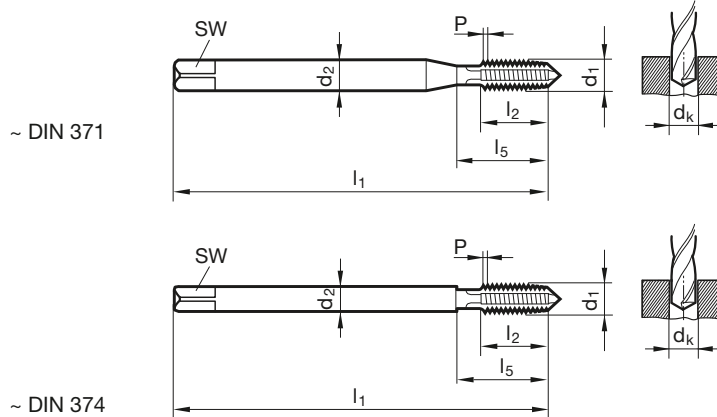


## Machine taps for UNF-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

|                  |       |
|------------------|-------|
| Tool material    | HSS-E |
| Tolerance on Ø   | 2BX   |
| Surface          | S     |
| Type             | VA    |
| Form             | B     |
| Internal cooling |       |



## DIN 2184-1 ~DIN 371/~DIN 374

Article no.

4643

Discount group

103

| d1        | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----------|--------|--------|-------|---------|--------|--------|----------|--------------|
|           | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| 2 - 64    | 2.800  | 2.100  | 1.85  | 45.000  | 9.000  | 14.500 | 2.184    | •            |
| 4 - 48    | 3.500  | 2.700  | 2.40  | 56.000  | 10.000 | 18.000 | 2.845    | •            |
| 6 - 40    | 4.000  | 3.000  | 2.95  | 56.000  | 11.000 | 20.000 | 3.505    | •            |
| 8 - 36    | 4.500  | 3.400  | 3.50  | 63.000  | 12.000 | 21.000 | 4.166    | •            |
| 10 - 32   | 6.000  | 4.900  | 4.10  | 70.000  | 14.000 | 25.000 | 4.826    | •            |
| 12 - 28   | 6.000  | 4.900  | 4.60  | 80.000  | 16.000 | 30.000 | 5.486    | •            |
| 1/4 - 28  | 7.000  | 5.500  | 5.50  | 80.000  | 16.000 | 30.000 | 6.350    | •            |
| 5/16 - 24 | 8.000  | 6.200  | 6.90  | 90.000  | 18.000 | 35.000 | 7.938    | •            |
| 3/8 - 24  | 10.000 | 8.000  | 8.50  | 90.000  | 18.000 | 35.000 | 9.525    | •            |
| 7/16 - 20 | 8.000  | 6.200  | 9.90  | 100.000 | 22.000 | 42.000 | 11.113   | •            |
| 1/2 - 20  | 9.000  | 7.000  | 11.50 | 100.000 | 20.000 | 40.000 | 12.700   | •            |
| 9/16 - 18 | 11.000 | 9.000  | 12.90 | 100.000 | 22.000 | 40.000 | 14.288   | •            |
| 5/8 - 18  | 12.000 | 9.000  | 14.50 | 100.000 | 22.000 | 44.000 | 15.875   | •            |
| 3/4 - 16  | 14.000 | 11.000 | 17.50 | 110.000 | 25.000 | 44.000 | 19.050   | •            |
| 7/8 - 14  | 18.000 | 14.500 | 20.40 | 125.000 | 25.000 | 44.000 | 22.225   | •            |
| 1 - 12    | 18.000 | 14.500 | 23.25 | 140.000 | 28.000 | 50.000 | 25.400   | •            |

## Machine taps for BSP-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | ○ |
| N | ○ |
| S | ○ |
| H |   |

Tool material **HSS-E**

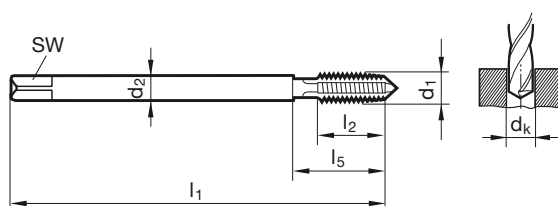
Tolerance on Ø X

Surface **S**

Type VA

Form B

Internal cooling



DIN 2184-1 DIN 5156

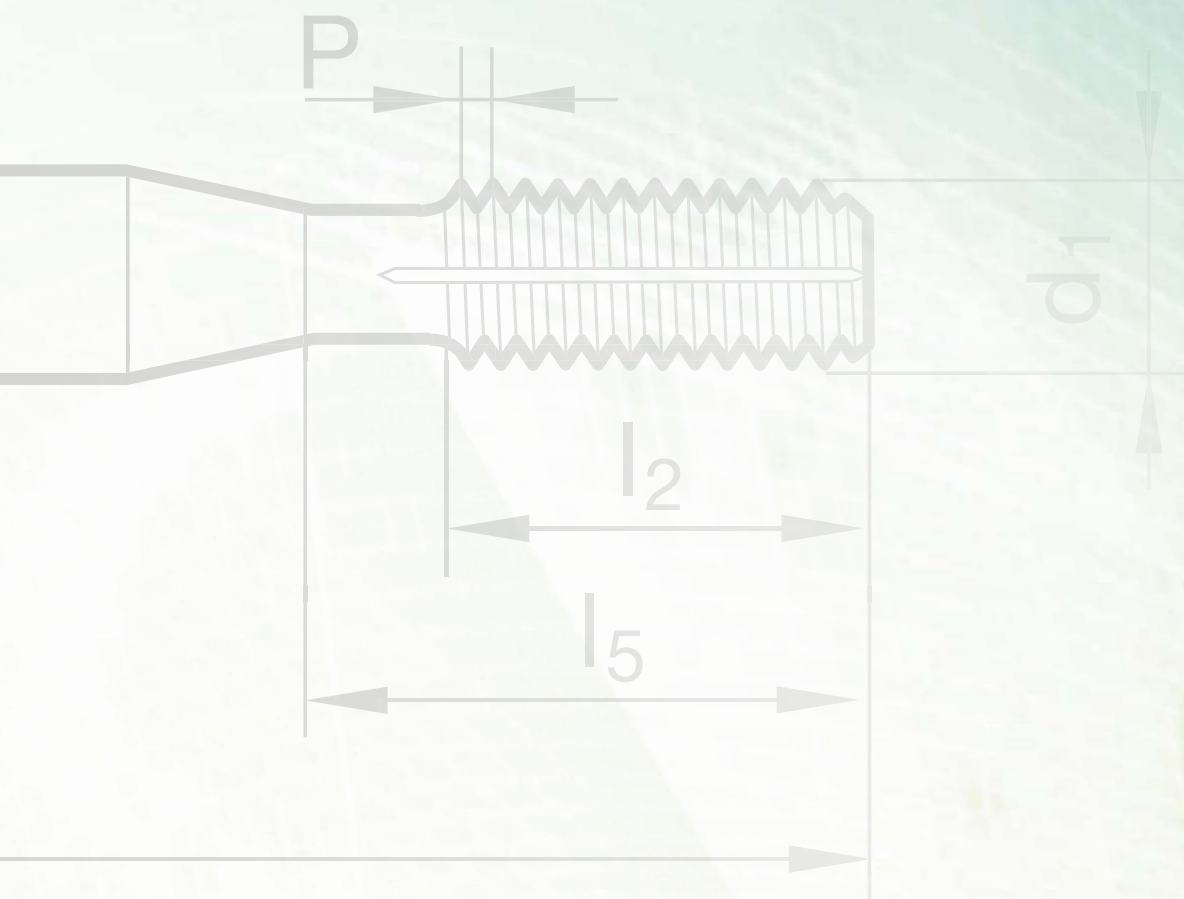
Article no.

4220

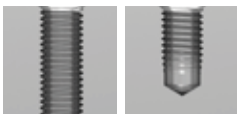
Discount group

103

| d1    | P      | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-------|--------|--------|--------|-------|---------|--------|--------|----------|--------------|
|       | inch   | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| G1/16 | 28.000 | 6.000  | 4.900  | 6.80  | 90.000  | 18.000 | 30.000 | 7.723    | •            |
| G1/8  | 28.000 | 7.000  | 5.500  | 8.80  | 90.000  | 18.000 | 35.000 | 9.728    | •            |
| G1/4  | 19.000 | 11.000 | 9.000  | 11.80 | 100.000 | 20.000 | 40.000 | 13.157   | •            |
| G3/8  | 19.000 | 12.000 | 9.000  | 15.25 | 100.000 | 22.000 | 44.000 | 16.662   | •            |
| G1/2  | 14.000 | 16.000 | 12.000 | 19.00 | 125.000 | 25.000 | 44.000 | 20.955   | •            |
| G5/8  | 14.000 | 18.000 | 14.500 | 21.00 | 125.000 | 25.000 | 48.000 | 22.911   | •            |
| G3/4  | 14.000 | 20.000 | 16.000 | 24.50 | 140.000 | 28.000 | 53.000 | 26.441   | •            |
| G7/8  | 14.000 | 22.000 | 18.000 | 28.25 | 150.000 | 28.000 | 53.000 | 30.201   | •            |
| G1    | 11.000 | 25.000 | 20.000 | 30.75 | 160.000 | 30.000 | 56.000 | 33.249   | •            |



FLUTELESS TAPS

|                                                                                                                               |                            |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                                               | Thread depth               | ≤3xD                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | Tool material              | HSS-E-PM                                                                          |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | Lead form                  | C                                                                                 | E                                                                                   | C                                                                                   | E                                                                                   |                                                                                     |
|                                                                                                                               | Surface                    |  |  |  |  |                                                                                     |
|                                                                                                                               | Coolant delivery           |  |  |  |  |                                                                                     |
|                                                                                                                               | Shank tolerance            | h6                                                                                | h6                                                                                  | h6                                                                                  | h6                                                                                  |                                                                                     |
| <br><b>THROUGH HOLE</b><br><b>BLIND HOLE</b> |                            |                                                                                   |    |  |  |  |
|                                                                                                                               |                            |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <div>● = Neat oil</div> <div>● = Soluble oil</div> <div>△ = Paste</div> <div>□ = MQL</div>                                    | <b>Thread type</b>         | <b>Tolerance</b>                                                                  | <b>Article no./page</b>                                                             |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | <b>M</b>                   | 6HX                                                                               | 4487 p. 35                                                                          | 4494 p. 35                                                                          | 4485 p. 37                                                                          | 4483 p. 36                                                                          |
|                                                                                                                               |                            | 6GX                                                                               | 4488 p. 35                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | <b>MF</b>                  | 6HX                                                                               | 4489 p. 38                                                                          | 4495 p. 38                                                                          | 4486 p. 40                                                                          | 4484 p. 39                                                                          |
|                                                                                                                               |                            | 6GX                                                                               | 4490 p. 38                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | <b>UNC</b>                 | 2BX                                                                               | 4491 p. 41                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | <b>UNF</b>                 | 2BX                                                                               | 4492 p. 42                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | <b>G</b>                   | - X                                                                               | 4493 p. 43                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                                                                                                                               | <b>Suitable lubricant:</b> |                                                                                   |    |  |  |  |
|                                                                                                                               |                            |                                                                                   |    |  |  |  |

|          | Group of materials                                                              | Tensile strength                 | Material example                                         | Material no.                         | Recommended cutting speed v <sub>c</sub> [m/min] |    |    |    |
|----------|---------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------|--------------------------------------|--------------------------------------------------|----|----|----|
| <b>P</b> | <b>P1</b> Structural and free cutting steels, heat-treatable steels unalloyed   | ≤800 N/mm <sup>2</sup>           | S235JR<br>C15<br>11SMnPb30                               | 1.0037<br>1.0401<br>1.0718           | 25                                               | 25 | 25 | 25 |
|          | <b>P2</b> Free-cutting steels, unalloyed case hardened steels, nitriding steels | 800 - 1000 N/mm <sup>2</sup>     | S355J2<br>C60<br>31CrMo12                                | 1.0577<br>1.0601<br>1.8515           | 25                                               | 25 | 25 | 25 |
|          | <b>P3</b> Alloyed heat-treatable steels, tool steels, high speed steels         | 800 - 1200 N/mm <sup>2</sup>     | 42CrMo4<br>36CrNiMo4<br>X36CrMo17<br>HS 6-5-2            | 1.7225<br>1.6511<br>1.2316<br>1.3343 | 15                                               | 15 | 15 | 15 |
| <b>M</b> | <b>M1</b> Stainless steels, sulphured, austenitic                               | ≤1000 N/mm <sup>2</sup>          | X5CrNi18-10<br>X6CrNiTi18-10<br>X8CrNiS18-9              | 1.4301<br>1.4571<br>1.4305           | 15                                               | 15 | 15 | 15 |
|          | <b>M2</b> Stainless- and acidresistant steels, martensitic                      | ≤1000 N/mm <sup>2</sup>          | X17CrNi16-2<br>X90CrMoV18<br>X2CrTi12                    | 1.4057<br>1.4112<br>1.4512           | 10                                               | 10 | 10 | 10 |
|          | <b>M3</b> Duplex and Super Duplex                                               | ≤1300 N/mm <sup>2</sup>          | X2CrNiMoN22-5-3<br>X2CrNiMoN25-7-4<br>X2CrNiMoCuWN25-7-4 | 1.4462<br>1.4410<br>1.4501           | 6                                                | 6  | 6  | 6  |
| <b>K</b> | <b>K1</b> Cast Iron                                                             | 300 HB                           | EN-GJL-150<br>EN-GJL-250<br>EN-GJL-300                   | 0.6015<br>0.6025<br>0.6030           |                                                  |    |    |    |
|          | <b>K2</b> Spheroidal graphite iron and malleable cast iron                      | 350 HB                           | EN-GJS-400-15<br>EN-GJS-600-3<br>EN-GJS-700-2            | 0.7040<br>0.7060<br>0.7070           | 30                                               | 30 | 30 | 30 |
|          | <b>K3</b> ADI<br>GGV                                                            | 1000 N/mm <sup>2</sup><br>350 HB | EN-GJS1000-5<br>EN-GJV250<br>EN-GJV400                   |                                      | 25                                               | 25 | 25 | 25 |
| <b>N</b> | <b>N1</b> Aluminium and wrought alloys                                          | ≤450 N/mm <sup>2</sup>           | Al99,5H<br>AlMgSi1<br>AlZn4,5Mg                          | 3.0250<br>3.2315<br>3.4335           | 15                                               | 15 | 15 | 15 |
|          | <b>N2</b> Al cast alloys                                                        | ≤600 N/mm <sup>2</sup>           | GD-ALSi5Cu1Mg<br>GD-ALSi8Cu3<br>G-ALSi9Mg<br>G-ALSi12    | 3.2134<br>3.2162<br>3.2373<br>3.2581 | 30                                               | 30 | 30 | 30 |
|          | <b>N3</b> Magnesium alloys                                                      | ≤500 N/mm <sup>2</sup>           | GDMgAl8Zn1                                               | 3.5812.08                            |                                                  |    |    |    |
|          | <b>N4</b> Copper and copper alloys                                              | long-chipping                    | CuZn20<br>CuZn37Pb0,5                                    | 2.0250<br>2.0332                     | 30                                               | 30 | 30 | 30 |
|          |                                                                                 | short-chipping                   | CuZn39Pb2<br>CuZn43Pb2                                   | 2.0380<br>2.0410                     |                                                  |    |    |    |
|          | <b>N5</b> Copper special alloys                                                 | ≤1400 N/mm <sup>2</sup>          | Ampco                                                    |                                      |                                                  |    |    |    |
| <b>S</b> | <b>N6</b> Plastics<br>[Thermoplastics, Duroplastics]                            | long-chipping<br>short-chipping  | PMMA, POM,PVC<br>Pertinax                                |                                      |                                                  |    |    |    |
|          | <b>S1</b> Titanium and Titanium alloys                                          | ≤ 1200 N/mm <sup>2</sup>         | Titan<br>TiAl5Sn2<br>TiAl6V4                             | 3.702<5<br>3.7115<br>3.7165          | 8                                                | 8  | 8  | 8  |
| <b>H</b> | <b>S2</b> Nickel, cobalt, iron alloys                                           | ≤ 1400 N/mm <sup>2</sup>         | Hastelloy C4<br>Inconel 718<br>Nimonic 105               | 2.4610<br>2.4668<br>2.4634           | 8                                                | 8  | 8  | 8  |
|          | <b>H1</b> High tensile/<br><b>H2</b> hardened steels                            | 45 - 55 HRC<br>55 - 62 HRC       |                                                          |                                      |                                                  |    |    |    |



# Fluteless machine taps for ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

Tool material

HSS-E-PM

Tolerance on Ø

4HX/6HX

6GX

6HX

Surface

C

C

C

Type

N

N

N

Form

C

C

E

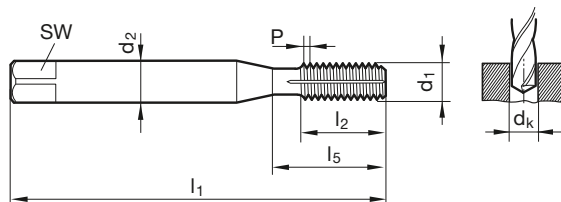
Internal cooling

X

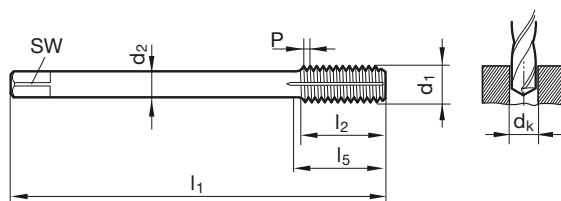
X

X

~ DIN 371



~ DIN 376



DIN 2174 ~DIN 371/~DIN 376

Article no.

4487

4488

4494

Discount group

208

208

208

| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm   | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M1   | 0.250 | 2.500  | 2.100  | 0.90  | 40.000  | 4.000  |        | 1.000    | •            |
| M1,2 | 0.250 | 2.500  | 2.100  | 1.10  | 40.000  | 4.800  |        | 1.200    | •            |
| M1,4 | 0.300 | 2.500  | 2.100  | 1.25  | 40.000  | 5.600  |        | 1.400    | •            |
| M1,6 | 0.350 | 2.500  | 2.100  | 1.45  | 40.000  | 6.400  |        | 1.600    | •            |
| M1,7 | 0.350 | 2.500  | 2.100  | 1.55  | 40.000  | 6.800  |        | 1.700    | •            |
| M1,8 | 0.350 | 2.500  | 2.100  | 1.65  | 40.000  | 7.300  |        | 1.800    | •            |
| M2   | 0.400 | 2.800  | 2.100  | 1.85  | 45.000  | 8.000  | 13.500 | 2.000    | • • •        |
| M2,5 | 0.450 | 2.800  | 2.100  | 2.30  | 50.000  | 9.000  | 14.500 | 2.500    | • • •        |
| M3   | 0.500 | 3.500  | 2.700  | 2.80  | 56.000  | 10.000 | 18.000 | 3.000    | • • •        |
| M4   | 0.700 | 4.500  | 3.400  | 3.70  | 63.000  | 12.000 | 21.000 | 4.000    | • • •        |
| M5   | 0.800 | 6.000  | 4.900  | 4.65  | 70.000  | 14.000 | 25.000 | 5.000    | • • •        |
| M6   | 1.000 | 6.000  | 4.900  | 5.55  | 80.000  | 16.000 | 30.000 | 6.000    | • • •        |
| M8   | 1.250 | 8.000  | 6.200  | 7.40  | 90.000  | 17.000 | 35.000 | 8.000    | • • •        |
| M10  | 1.500 | 10.000 | 8.000  | 9.30  | 100.000 | 20.000 | 39.000 | 10.000   | • • •        |
| M12  | 1.750 | 9.000  | 7.000  | 11.20 | 110.000 | 24.000 | 49.000 | 12.000   | • • •        |
| M14  | 2.000 | 11.000 | 9.000  | 13.10 | 110.000 | 26.000 | 53.000 | 14.000   | • • •        |
| M16  | 2.000 | 12.000 | 9.000  | 15.10 | 110.000 | 26.000 | 54.000 | 16.000   | • • •        |
| M20  | 2.500 | 16.000 | 12.000 | 18.90 | 140.000 | 32.000 | 62.000 | 20.000   | • • •        |

Article no. 4487 from Ø M2 with oil grooves, Ø tolerance ≤ M1.4 = 4HX

## Oil feed fluteless taps f. ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

Tool material **HSS-E-PM**

Tolerance on Ø 6HX

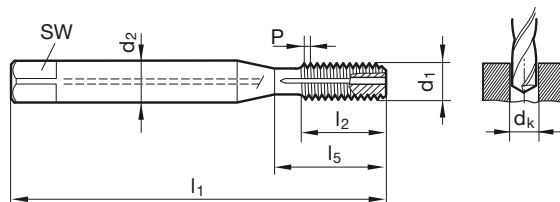
Surface **C**

Type **N**

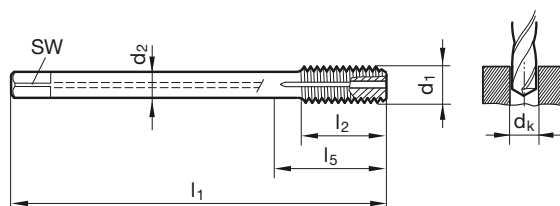
Form **E**

Internal cooling

~ DIN 371



~ DIN 376



DIN 2174 ~DIN 371/~DIN 376

Article no. **4483**

Discount group **208**

| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M5  | 0.800 | 6.000  | 4.900  | 4.65  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.55  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 7.40  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 9.30  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 11.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 13.10 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 15.10 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 18.90 | 140.000 | 25.000 | 62.000 | 20.000   | •            |



# Oil feed fluteless taps f. ISO metric threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

Tool material **HSS-E-PM**

Tolerance on Ø **6HX**

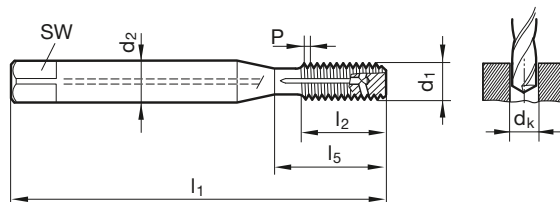
Surface **Ⓢ**

Type **N**

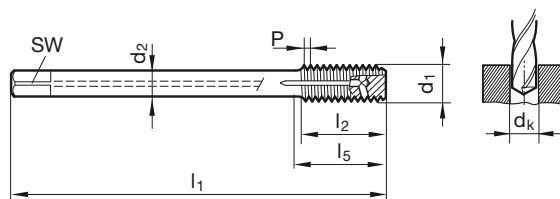
Form **C**

Internal cooling

~ DIN 371



~ DIN 376



DIN 2174 ~DIN 371/~DIN 376

Article no. **4485**

Discount group **208**

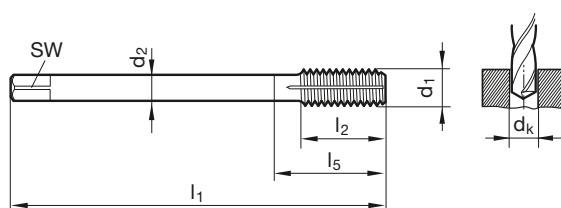
| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----|-------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm  | mm    | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M5  | 0.800 | 6.000  | 4.900  | 4.65  | 70.000  | 8.500  | 25.000 | 5.000    | •            |
| M6  | 1.000 | 6.000  | 4.900  | 5.55  | 80.000  | 11.000 | 30.000 | 6.000    | •            |
| M8  | 1.250 | 8.000  | 6.200  | 7.40  | 90.000  | 14.000 | 35.000 | 8.000    | •            |
| M10 | 1.500 | 10.000 | 8.000  | 9.30  | 100.000 | 16.000 | 39.000 | 10.000   | •            |
| M12 | 1.750 | 9.000  | 7.000  | 11.20 | 110.000 | 18.500 | 49.000 | 12.000   | •            |
| M14 | 2.000 | 11.000 | 9.000  | 13.10 | 110.000 | 20.000 | 53.000 | 14.000   | •            |
| M16 | 2.000 | 12.000 | 9.000  | 15.10 | 110.000 | 20.000 | 54.000 | 16.000   | •            |
| M20 | 2.500 | 16.000 | 12.000 | 18.90 | 140.000 | 25.000 | 62.000 | 20.000   | •            |

## Fluteless machine taps for ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

| Tool material    | HSS-E-PM |     |     |
|------------------|----------|-----|-----|
| Tolerance on Ø   | 6HX      | 6GX | 6HX |
| Surface          | •        | •   | •   |
| Type             | N        | N   | N   |
| Form             | C        | C   | E   |
| Internal cooling | ✗        | ✗   | ✗   |



## DIN 2174 ~ DIN 374

Article no.

4489

4490

4495

Discount group

208

208

208

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |   |   |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|---|---|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |   |   |
| M8 x 1     | 6.000  | 4.900  | 7.55  | 90.000  | 16.000 | 35.000 | 8.005    | •            | • | • |
| M10 x 1    | 7.000  | 5.500  | 9.55  | 90.000  | 16.000 | 35.000 | 10.005   | •            | • | • |
| M10 x 1,25 | 7.000  | 5.500  | 9.40  | 100.000 | 20.000 | 39.000 | 10.006   | •            | • | • |
| M12 x 1,25 | 9.000  | 7.000  | 11.40 | 100.000 | 20.000 | 40.000 | 12.006   | •            | • | • |
| M12 x 1,5  | 9.000  | 7.000  | 11.30 | 100.000 | 20.000 | 40.000 | 12.007   | •            | • | • |
| M14 x 1,25 | 11.000 | 9.000  | 13.40 | 100.000 | 20.000 | 40.000 | 14.006   | •            | • | • |
| M14 x 1,5  | 11.000 | 9.000  | 13.30 | 100.000 | 20.000 | 40.000 | 14.007   | •            | • | • |
| M16 x 1,5  | 12.000 | 9.000  | 15.30 | 100.000 | 22.000 | 44.000 | 16.007   | •            | • | • |
| M20 x 1,5  | 16.000 | 12.000 | 19.30 | 125.000 | 25.000 | 44.000 | 20.007   | •            | • | • |



# Oil feed fluteless taps f. ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

Tool material **HSS-E-PM**

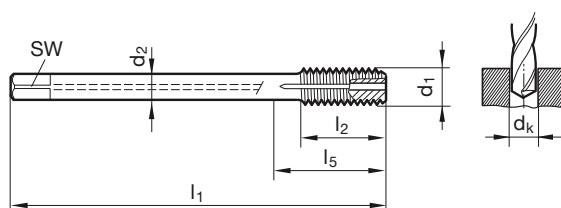
Tolerance on Ø 6HX

Surface **C**

Type N

Form E

Internal cooling



DIN 2174 ~DIN 374

Article no. **4484**

Discount group **208**

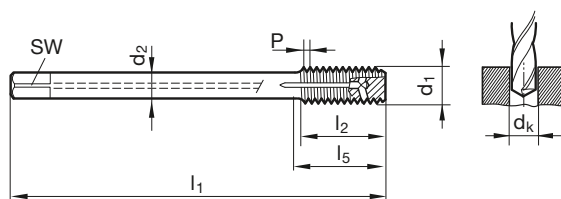
| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M8 x 1     | 6.000  | 4.900  | 7.55  | 90.000  | 11.000 | 35.000 | 8.005    | •            |
| M10 x 1    | 7.000  | 5.500  | 9.55  | 90.000  | 11.000 | 35.000 | 10.005   | •            |
| M10 x 1,25 | 7.000  | 5.500  | 9.40  | 100.000 | 14.000 | 39.000 | 10.006   | •            |
| M12 x 1,25 | 9.000  | 7.000  | 11.40 | 100.000 | 16.000 | 40.000 | 12.006   | •            |
| M12 x 1,5  | 9.000  | 7.000  | 11.30 | 100.000 | 16.000 | 40.000 | 12.007   | •            |
| M14 x 1,25 | 11.000 | 9.000  | 13.40 | 100.000 | 15.000 | 40.000 | 14.006   | •            |
| M14 x 1,5  | 11.000 | 9.000  | 13.30 | 100.000 | 15.000 | 40.000 | 14.007   | •            |
| M16 x 1,5  | 12.000 | 9.000  | 15.30 | 100.000 | 15.000 | 44.000 | 16.007   | •            |
| M20 x 1,5  | 16.000 | 12.000 | 19.30 | 125.000 | 16.000 | 44.000 | 20.007   | •            |

Oil feed fluteless taps f. ISO metric fine threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

|                  |          |
|------------------|----------|
| Tool material    | HSS-E-PM |
| Tolerance on Ø   | 6HX      |
| Surface          | C        |
| Type             | N        |
| Form             | C        |
| Internal cooling |          |



DIN 2174 ~DIN 374

Article no.

4486

Discount group

208

| d1         | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------------|--------|--------|-------|---------|--------|--------|----------|--------------|
|            | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| M8 x 1     | 6.000  | 4.900  | 7.55  | 90.000  | 11.000 | 35.000 | 8.005    | •            |
| M10 x 1    | 7.000  | 5.500  | 9.55  | 90.000  | 11.000 | 35.000 | 10.005   | •            |
| M10 x 1,25 | 7.000  | 5.500  | 9.40  | 100.000 | 14.000 | 39.000 | 10.006   | •            |
| M12 x 1,25 | 9.000  | 7.000  | 11.40 | 100.000 | 16.000 | 40.000 | 12.006   | •            |
| M12 x 1,5  | 9.000  | 7.000  | 11.30 | 100.000 | 16.000 | 40.000 | 12.007   | •            |
| M14 x 1,25 | 11.000 | 9.000  | 13.40 | 100.000 | 15.000 | 40.000 | 14.006   | •            |
| M14 x 1,5  | 11.000 | 9.000  | 13.30 | 100.000 | 15.000 | 40.000 | 14.007   | •            |
| M16 x 1,5  | 12.000 | 9.000  | 15.30 | 100.000 | 15.000 | 44.000 | 16.007   | •            |
| M20 x 1,5  | 16.000 | 12.000 | 19.30 | 125.000 | 16.000 | 44.000 | 20.007   | •            |



# Fluteless machine taps for UNC-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

Tool material

HSS-E-PM

Tolerance on Ø

2BX

Surface

C

Type

N

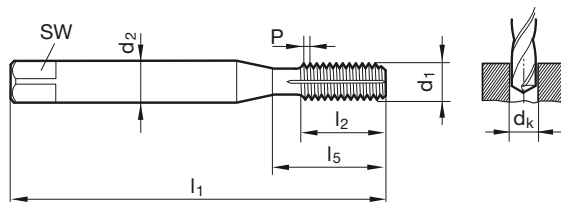
Form

C

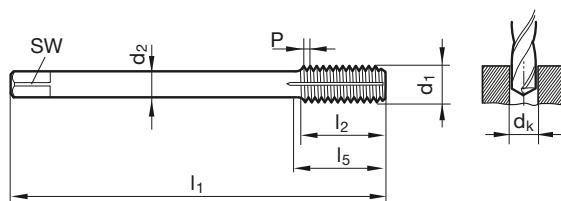
Internal cooling



~ DIN 371



~ DIN 376



DIN 2184-1 ~DIN 371/~DIN 376

Article no.

4491

Discount group

208

| d1        | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----------|--------|--------|-------|---------|--------|--------|----------|--------------|
| mm        | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| 4 - 40    | 3.500  | 2.700  | 2.55  | 56.000  | 11.000 | 18.000 | 2.845    | •            |
| 6 - 32    | 4.000  | 3.000  | 3.15  | 56.000  | 12.000 | 20.000 | 3.505    | •            |
| 8 - 32    | 4.500  | 3.400  | 3.80  | 63.000  | 12.000 | 21.000 | 4.166    | •            |
| 10 - 24   | 6.000  | 4.900  | 4.35  | 70.000  | 14.000 | 25.000 | 4.826    | •            |
| 12 - 24   | 6.000  | 4.900  | 5.00  | 80.000  | 16.000 | 30.000 | 5.486    | •            |
| 1/4 - 20  | 7.000  | 5.500  | 5.75  | 80.000  | 16.000 | 30.000 | 6.350    | •            |
| 5/16 - 18 | 8.000  | 6.200  | 7.30  | 90.000  | 18.000 | 35.000 | 7.938    | •            |
| 3/8 - 16  | 10.000 | 8.000  | 8.80  | 90.000  | 20.000 | 35.000 | 9.525    | •            |
| 7/16 - 14 | 8.000  | 6.200  | 10.30 | 100.000 | 22.000 | 42.000 | 11.113   | •            |
| 1/2 - 13  | 9.000  | 7.000  | 11.80 | 100.000 | 25.000 | 40.000 | 12.700   | •            |
| 9/16 - 12 | 11.000 | 9.000  | 13.30 | 100.000 | 28.000 | 40.000 | 14.288   | •            |
| 5/8 - 11  | 12.000 | 9.000  | 14.80 | 100.000 | 30.000 | 44.000 | 15.875   | •            |
| 3/4 - 10  | 14.000 | 11.000 | 17.90 | 110.000 | 33.000 | 44.000 | 19.050   | •            |

## Fluteless machine taps for UNF-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

Tool material

HSS-E-PM

Tolerance on Ø

2BX

Surface

C

Type

N

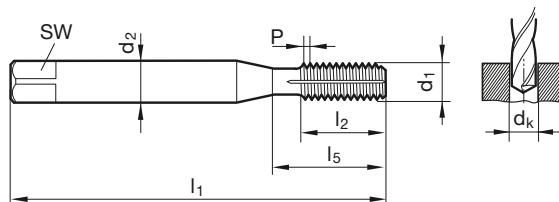
Form

C

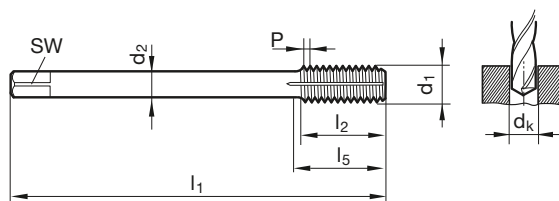
Internal cooling



~ DIN 371



~ DIN 374



DIN 2184-1 ~DIN 371/~DIN 374

Article no.

4492

Discount group

208

| d1        | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|-----------|--------|--------|-------|---------|--------|--------|----------|--------------|
|           | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| 4 - 48    | 3.500  | 2.700  | 2.60  | 56.000  | 10.000 | 18.000 | 2.845    | •            |
| 6 - 40    | 4.000  | 3.000  | 3.20  | 56.000  | 11.000 | 20.000 | 3.505    | •            |
| 8 - 36    | 4.500  | 3.400  | 3.85  | 63.000  | 12.000 | 21.000 | 4.166    | •            |
| 10 - 32   | 6.000  | 4.900  | 4.45  | 70.000  | 14.000 | 25.000 | 4.826    | •            |
| 12 - 28   | 6.000  | 4.900  | 5.10  | 80.000  | 16.000 | 30.000 | 5.486    | •            |
| 1/4 - 28  | 7.000  | 5.500  | 5.95  | 80.000  | 16.000 | 30.000 | 6.350    | •            |
| 5/16 - 24 | 8.000  | 6.200  | 7.45  | 90.000  | 18.000 | 35.000 | 7.938    | •            |
| 3/8 - 24  | 10.000 | 8.000  | 9.05  | 100.000 | 18.000 | 39.000 | 9.525    | •            |
| 7/16 - 20 | 8.000  | 6.200  | 10.55 | 100.000 | 22.000 | 42.000 | 11.113   | •            |
| 1/2 - 20  | 9.000  | 7.000  | 12.10 | 100.000 | 20.000 | 40.000 | 12.700   | •            |
| 9/16 - 18 | 11.000 | 9.000  | 13.65 | 100.000 | 22.000 | 40.000 | 14.288   | •            |
| 5/8 - 18  | 12.000 | 9.000  | 15.25 | 100.000 | 22.000 | 44.000 | 15.875   | •            |
| 3/4 - 16  | 14.000 | 11.000 | 18.35 | 110.000 | 25.000 | 44.000 | 19.050   | •            |

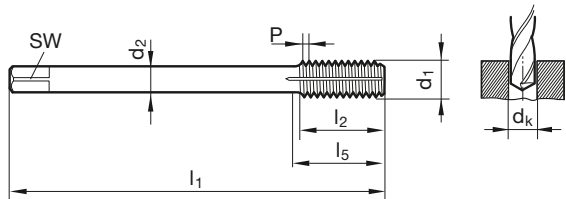


Fluteless machine taps for BSP-threads



|   |   |
|---|---|
| P | • |
| M | • |
| K | • |
| N | ○ |
| S | • |
| H |   |

|                  |          |
|------------------|----------|
| Tool material    | HSS-E-PM |
| Tolerance on Ø   |          |
| Surface          | C        |
| Type             | N        |
| Form             | C        |
| Internal cooling |          |



|                     |                |      |
|---------------------|----------------|------|
| DIN 2184-1 DIN 2189 | Article no.    | 4493 |
|                     | Discount group | 208  |

| d1   | P      | d2     | SW     | dk    | l1      | l2     | l5     | Code no. | Availability |
|------|--------|--------|--------|-------|---------|--------|--------|----------|--------------|
|      | inch   | mm     | mm     | mm    | mm      | mm     | mm     |          |              |
| G1/8 | 28.000 | 7.000  | 5.500  | 9.30  | 90.000  | 18.000 | 35.000 | 9.728    | •            |
| G1/4 | 19.000 | 11.000 | 9.000  | 12.50 | 100.000 | 20.000 | 40.000 | 13.157   | •            |
| G3/8 | 19.000 | 12.000 | 9.000  | 16.00 | 100.000 | 22.000 | 44.000 | 16.662   | •            |
| G1/2 | 14.000 | 16.000 | 12.000 | 20.00 | 125.000 | 25.000 | 44.000 | 20.955   | •            |

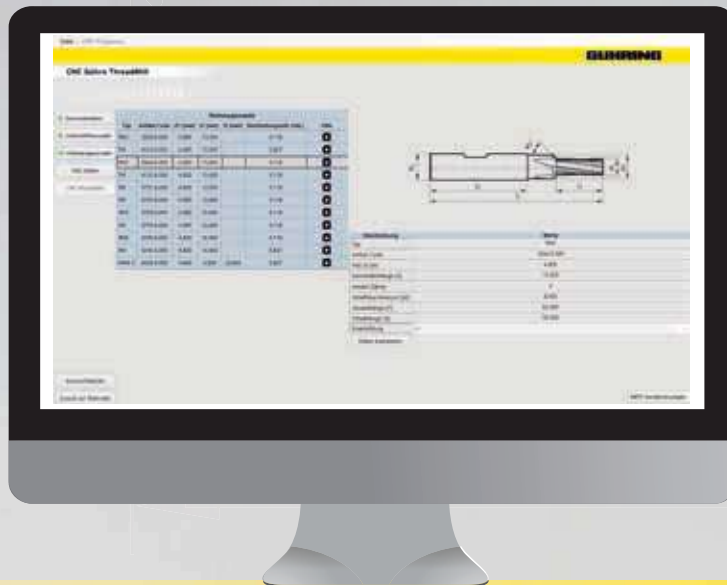


## CNC Gühro ThreadMill

Free programming software  
for thread milling cutters and drill thread milling cutter

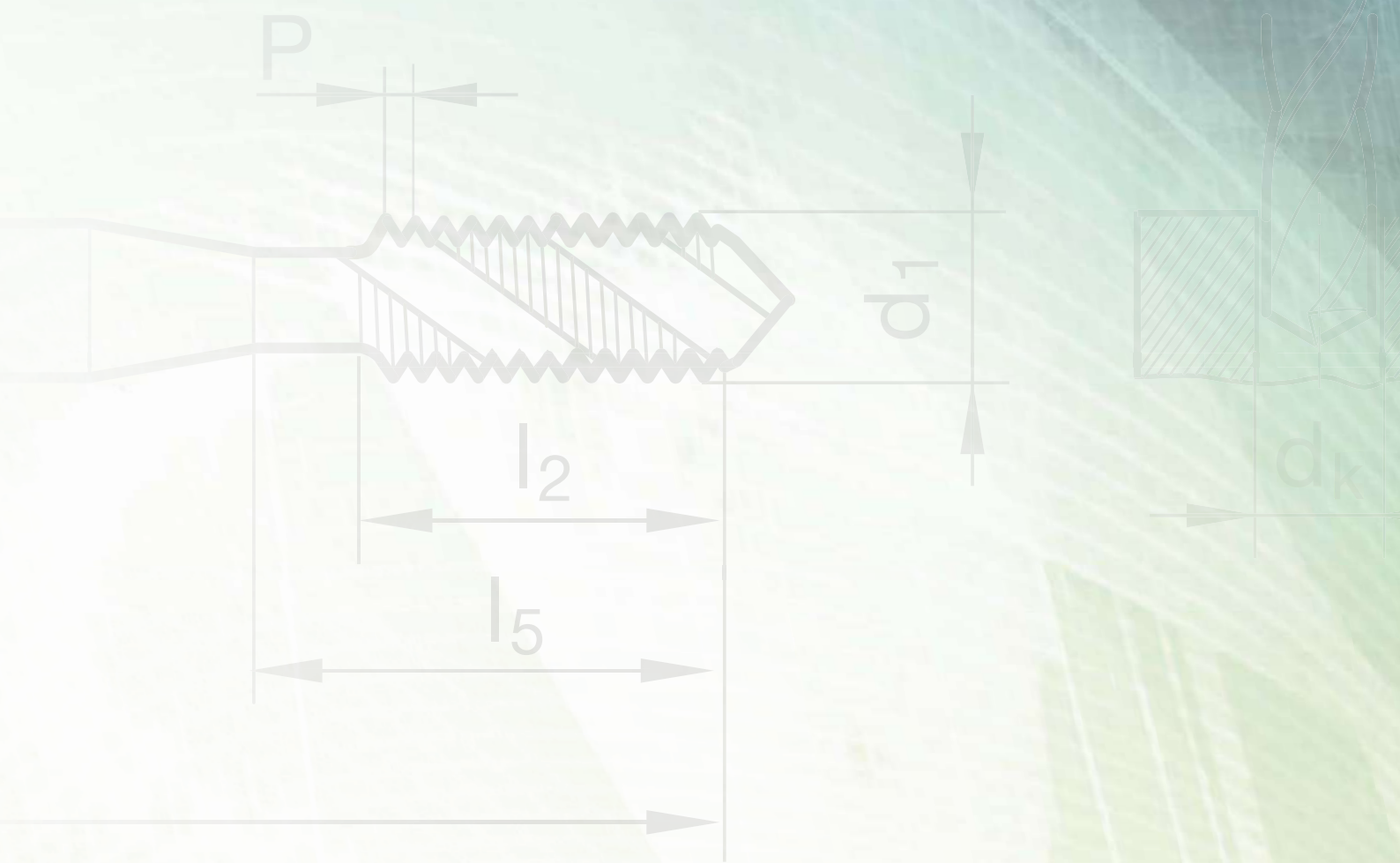
In order to make the machining with Gühring thread milling cutters even more user friendly, we have developed the intuitive "CNC Gühro ThreadMill".

"CNC Gühro Thread Mill" is available free-of-charge.  
Simply download it from our homepage [www.guehring.de](http://www.guehring.de).



To the optimal CNC programme in five steps

1. Specify the thread data  
select from all current thread standards
2. Select the material  
you are always referred to the optimal parameters
3. Select the tool  
technical data, drawing, machining time and video simplify selection
4. Record CNC data  
enter required milling strategy and parameters
5. Receive CNC programme with code and data sheet  
programming data (Sinumerik, Haidenhain, Fanuc, Philips, Mazatrol or Hurco)  
are imported and automatically recognised



TECHNICAL SECTION

|                                                          | from page |
|----------------------------------------------------------|-----------|
| Tapping size hole and hole diameter                      | 47        |
| DIN characteristic features                              | 50        |
| Comparison of standards                                  | 53        |
| The characteristics of different thread types            | 54        |
| General information for tapping                          | 56        |
| Definitions and angles, centres and flute forms          | 56        |
| Chamfer forms, selection and application                 | 57        |
| Tolerance fields                                         | 59        |
| Taps for ISO metric threads DIN EN 22857 (extract)       | 60        |
| General information for thread forming                   | 61        |
| Thread production by pressure deformation                | 61        |
| “Profile“ – Gühring’s new fluteless tap generation       | 62        |
| Definitions, angles, centres, thread tolerances and fits | 63        |
| Tapping size hole diameter                               | 64        |
| Lubrication for thread forming                           | 65        |



# Tapping size holes for thread cutting and thread milling

| Std. ISO metric threads<br>DIN 13 |            |                                            |                                     |            | ISO metric fine threads<br>DIN 13 |            |                                            |                                    |            |             |            |                                            | UNC threads<br>ASME B1.1           |            |            |             |                                            |                                    |            |
|-----------------------------------|------------|--------------------------------------------|-------------------------------------|------------|-----------------------------------|------------|--------------------------------------------|------------------------------------|------------|-------------|------------|--------------------------------------------|------------------------------------|------------|------------|-------------|--------------------------------------------|------------------------------------|------------|
| nom.<br>Ø                         | pitch<br>P | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 6H* |            | nom. x<br>Ø                       | pitch<br>P | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 6H |            | nom. x<br>Ø | pitch<br>P | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 6H |            | nom.<br>Ø  | threads     | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 2B |            |
|                                   | mm         |                                            | min.<br>mm                          | max.<br>mm |                                   |            |                                            | min.<br>mm                         | max.<br>mm |             |            |                                            | min.<br>mm                         | max.<br>mm |            | per<br>inch |                                            | min.<br>mm                         | max.<br>mm |
| M 1                               | 0.25       | 0.75                                       | 0.729                               | 0.785      | M 2.5 x 0.35                      | 2.15       | 2.121                                      | 2.221                              |            | M 22 x 1.50 | 20.50      | 20.376                                     | 20.676                             |            | No. 1 - 64 | 1.55        | 1.425                                      | 1.580                              |            |
| M 1.1                             | 0.25       | 0.85                                       | 0.829                               | 0.885      | M 3.0 x 0.35                      | 2.65       | 2.621                                      | 2.721                              |            | M 22 x 2.00 | 20.00      | 19.835                                     | 20.210                             |            | No. 2 - 56 | 1.85        | 1.694                                      | 1.872                              |            |
| M 1.2                             | 0.25       | 0.95                                       | 0.929                               | 0.985      | M 3.5 x 0.35                      | 3.15       | 3.121                                      | 3.221                              |            | M 24 x 1.00 | 23.00      | 22.917                                     | 23.153                             |            | No. 3 - 48 | 2.10        | 1.941                                      | 2.146                              |            |
| M 1.4                             | 0.30       | 1.10                                       | 1.075                               | 1.142      | M 4.0 x 0.50                      | 3.50       | 3.459                                      | 3.599                              |            | M 24 x 1.50 | 22.50      | 22.376                                     | 22.676                             |            | No. 4 - 40 | 2.35        | 2.157                                      | 2.385                              |            |
| M 1.6                             | 0.35       | 1.25                                       | 1.221                               | 1.321      | M 4.5 x 0.50                      | 4.00       | 3.959                                      | 4.099                              |            | M 24 x 2.00 | 22.00      | 21.835                                     | 22.210                             |            | No. 5 - 40 | 2.65        | 2.487                                      | 2.698                              |            |
| M 1.8                             | 0.35       | 1.45                                       | 1.421                               | 1.521      | M 5.0 x 0.50                      | 4.50       | 4.459                                      | 4.599                              |            | M 25 x 1.00 | 24.00      | 23.917                                     | 24.153                             |            | No. 6 - 32 | 2.85        | 2.642                                      | 2.896                              |            |
| M 2                               | 0.40       | 1.60                                       | 1.567                               | 1.679      | M 5.5 x 0.50                      | 5.00       | 4.959                                      | 5.099                              |            | M 25 x 1.50 | 23.50      | 23.376                                     | 23.676                             |            | No. 8 - 32 | 3.50        | 3.302                                      | 3.531                              |            |
| M 2.2                             | 0.45       | 1.75                                       | 1.713                               | 1.838      | M 6.0 x 0.75                      | 5.20       | 5.188                                      | 5.378                              |            | M 25 x 2.00 | 23.00      | 22.835                                     | 23.210                             |            | No.10 - 24 | 3.90        | 3.683                                      | 3.937                              |            |
| M 2.5                             | 0.45       | 2.05                                       | 2.013                               | 2.138      | M 7.0 x 0.75                      | 6.20       | 6.188                                      | 6.378                              |            | M 27 x 1.00 | 26.00      | 25.917                                     | 26.153                             |            | No.12 - 24 | 4.50        | 4.343                                      | 4.597                              |            |
| M 3                               | 0.50       | 2.50                                       | 2.459                               | 2.599      | M 8.0 x 0.50                      | 7.50       | 7.459                                      | 7.599                              |            | M 27 x 1.50 | 25.50      | 25.376                                     | 25.676                             |            | 1/4 - 20   | 5.10        | 4.978                                      | 5.258                              |            |
| M 3.5                             | 0.60       | 2.90                                       | 2.850                               | 3.010      | M 8.0 x 0.75                      | 7.20       | 7.188                                      | 7.378                              |            | M 27 x 2.00 | 25.00      | 24.835                                     | 25.210                             |            | 5/16 - 18  | 6.60        | 6.401                                      | 6.731                              |            |
| M 4                               | 0.70       | 3.30                                       | 3.242                               | 3.422      | M 8.0 x 1.00                      | 7.00       | 6.917                                      | 7.153                              |            | M 28 x 1.00 | 27.00      | 26.917                                     | 27.153                             |            | 3/8 - 16   | 8.00        | 7.798                                      | 8.153                              |            |
| M 4.5                             | 0.75       | 3.70                                       | 3.688                               | 3.878      | M 9.0 x 0.75                      | 8.20       | 8.188                                      | 8.378                              |            | M 28 x 1.50 | 26.50      | 26.376                                     | 26.676                             |            | 7/16 - 14  | 9.40        | 9.144                                      | 9.550                              |            |
| M 5                               | 0.80       | 4.20                                       | 4.134                               | 4.334      | M 9.0 x 1.00                      | 8.00       | 7.917                                      | 8.153                              |            | M 28 x 2.00 | 26.00      | 25.835                                     | 26.210                             |            | 1/2 - 13   | 10.80       | 10.592                                     | 11.024                             |            |
| M 6                               | 1.00       | 5.00                                       | 4.917                               | 5.153      | M 10 x 0.75                       | 9.20       | 9.188                                      | 9.378                              |            | M 30 x 1.00 | 29.00      | 28.917                                     | 29.153                             |            | 9/16 - 12  | 12.20       | 11.989                                     | 12.446                             |            |
| M 7                               | 1.00       | 6.00                                       | 5.917                               | 6.153      | M 10 x 1.00                       | 9.00       | 8.917                                      | 9.153                              |            | M 30 x 1.50 | 28.50      | 28.376                                     | 28.676                             |            | 5/8 - 11   | 13.50       | 13.386                                     | 13.868                             |            |
| M 8                               | 1.25       | 6.80                                       | 6.647                               | 6.912      | M 10 x 1.25                       | 8.80       | 8.647                                      | 8.912                              |            | M 30 x 2.00 | 28.00      | 27.835                                     | 28.210                             |            | 3/4 - 10   | 16.50       | 16.307                                     | 16.840                             |            |
| M 9                               | 1.25       | 7.80                                       | 7.647                               | 7.912      | M 11 x 0.75                       | 10.20      | 10.188                                     | 10.378                             |            | M 30 x 3.00 | 27.00      | 26.752                                     | 27.252                             |            | 7/8 - 9    | 19.50       | 19.177                                     | 19.761                             |            |
| M 10                              | 1.50       | 8.50                                       | 8.376                               | 8.676      | M 11 x 1.00                       | 10.00      | 9.917                                      | 10.153                             |            | M 32 x 1.50 | 30.50      | 30.376                                     | 30.676                             |            | 1 - 8      | 22.25       | 21.971                                     | 22.606                             |            |
| M 11                              | 1.50       | 9.50                                       | 9.376                               | 9.676      | M 12 x 1.00                       | 11.00      | 10.917                                     | 11.153                             |            | M 32 x 2.00 | 30.00      | 29.835                                     | 30.210                             |            | 1 1/8 - 7  | 25.00       | 24.638                                     | 25.349                             |            |
| M 12                              | 1.75       | 10.20                                      | 10.106                              | 10.441     | M 12 x 1.25                       | 10.80      | 10.647                                     | 10.912                             |            | M 33 x 1.50 | 31.50      | 31.376                                     | 31.676                             |            | 1 1/4 - 7  | 28.00       | 27.813                                     | 28.524                             |            |
| M 14                              | 2.00       | 12.00                                      | 11.835                              | 12.210     | M 12 x 1.50                       | 10.50      | 10.376                                     | 10.676                             |            | M 33 x 2.00 | 31.00      | 30.835                                     | 31.210                             |            | 1 3/8 - 6  | 30.75       | 30.353                                     | 31.115                             |            |
| M 16                              | 2.00       | 14.00                                      | 13.835                              | 14.210     | M 14 x 1.00                       | 13.00      | 12.917                                     | 13.153                             |            | M 33 x 3.00 | 30.00      | 29.752                                     | 30.252                             |            | 1 1/2 - 6  | 34.00       | 33.528                                     | 34.290                             |            |
| M 18                              | 2.50       | 15.50                                      | 15.294                              | 15.744     | M 14 x 1.25                       | 12.80      | 12.647                                     | 12.912                             |            | M 35 x 1.50 | 33.50      | 33.376                                     | 33.676                             |            | 1 3/4 - 5  | 39.50       | 38.938                                     | 39.802                             |            |
| M 20                              | 2.50       | 17.50                                      | 17.294                              | 17.744     | M 14 x 1.50                       | 12.50      | 12.376                                     | 12.676                             |            | M 36 x 1.50 | 34.50      | 34.376                                     | 34.676                             |            | 2 - 4.5    | 45.00       | 44.679                                     | 45.593                             |            |
| M 22                              | 2.50       | 19.50                                      | 19.294                              | 19.744     | M 15 x 1.00                       | 14.00      | 13.917                                     | 14.153                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 24                              | 3.00       | 21.00                                      | 20.752                              | 21.252     | M 15 x 1.50                       | 13.50      | 13.376                                     | 13.676                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 27                              | 3.00       | 24.00                                      | 23.752                              | 24.252     | M 16 x 1.00                       | 15.00      | 14.917                                     | 15.153                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 30                              | 3.50       | 26.50                                      | 26.211                              | 26.771     | M 16 x 1.25                       | 14.80      | 14.647                                     | 14.912                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 33                              | 3.50       | 29.50                                      | 29.211                              | 29.771     | M 16 x 1.50                       | 14.50      | 14.376                                     | 14.676                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 36                              | 4.00       | 32.00                                      | 31.670                              | 32.270     | M 17 x 1.00                       | 16.00      | 15.917                                     | 16.153                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 39                              | 4.00       | 35.00                                      | 34.670                              | 35.270     | M 17 x 1.50                       | 15.50      | 15.376                                     | 15.676                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 42                              | 4.50       | 37.50                                      | 37.129                              | 37.799     | M 18 x 1.00                       | 17.00      | 16.917                                     | 17.153                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 45                              | 4.50       | 40.50                                      | 40.129                              | 40.799     | M 18 x 1.50                       | 16.50      | 16.376                                     | 16.676                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 48                              | 5.00       | 43.00                                      | 42.587                              | 43.297     | M 20 x 1.00                       | 19.00      | 18.917                                     | 19.153                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 52                              | 5.00       | 47.00                                      | 46.587                              | 47.297     | M 20 x 1.50                       | 18.50      | 18.376                                     | 18.676                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
| M 56                              | 5.50       | 50.50                                      | 50.046                              | 50.796     | M 20 x 2.00                       | 18.00      | 17.835                                     | 18.210                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |
|                                   |            |                                            |                                     |            | M 22 x 1.00                       | 21.00      | 20.917                                     | 21.153                             |            |             |            |                                            |                                    |            |            |             |                                            |                                    |            |

\* M 1.1 up to M 1.4 tapping size hole of int. thread 5H

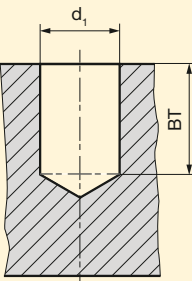
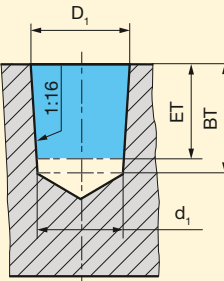
| MJ threads<br>DIN ISO 5855 |   |            |                                            |                                     |            | UNC threads<br>ISO 3161 |         |             |                                            |                                    |            | UNF threads<br>ISO 3161 |         |             |                                            |                                    |            |
|----------------------------|---|------------|--------------------------------------------|-------------------------------------|------------|-------------------------|---------|-------------|--------------------------------------------|------------------------------------|------------|-------------------------|---------|-------------|--------------------------------------------|------------------------------------|------------|
| nom.<br>Ø                  | x | pitch<br>P | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 5H* |            | nom.<br>Ø               | threads |             | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 3B |            | nom.<br>Ø               | threads |             | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 3B |            |
|                            |   | mm         |                                            | min.<br>mm                          | max.<br>mm |                         |         | per<br>inch |                                            | min.<br>mm                         | max.<br>mm |                         |         | per<br>inch |                                            | min.<br>mm                         | max.<br>mm |
| MJ 3                       | x | 0.50       | 2.60                                       | 2.513                               | 2.653      | No. 6                   | -       | 32          | 2.85                                       | 2.733                              | 2.939      | No. 6                   | -       | 40          | 3.00                                       | 2.888                              | 3.053      |
| MJ 4                       | x | 0.70       | 3.40                                       | 3.318                               | 3.498      | No. 8                   | -       | 32          | 3.55                                       | 3.393                              | 3.599      | No. 8                   | -       | 36          | 3.60                                       | 3.480                              | 3.663      |
| MJ 5                       | x | 0.80       | 4.30                                       | 4.221                               | 4.421      | No. 10                  | -       | 24          | 4.00                                       | 3.795                              | 4.064      | No. 10                  | -       | 32          | 4.20                                       | 4.054                              | 4.255      |
| MJ 6                       | x | 0.50       | 5.55                                       | 5.513                               | 5.625      | No. 12                  | -       | 24          | 4.60                                       | 4.455                              | 4.704      | No. 12                  | -       | 28          | 4.75                                       | 4.602                              | 4.816      |
| MJ 6                       | x | 0.75       | 5.35                                       | 5.269                               | 5.419      | 1/4                     | -       | 20          | 5.30                                       | 5.113                              | 5.387      | 1/4                     | -       | 28          | 5.60                                       | 5.466                              | 5.662      |
| MJ 6                       | x | 1.00       | 5.10                                       | 5.026                               | 5.216      | 5/16                    | -       | 18          | 6.75                                       | 6.563                              | 6.833      | 5/16                    | -       | 24          | 7.00                                       | 6.906                              | 7.109      |
| MJ 8                       | x | 0.50       | 7.55                                       | 7.513                               | 7.625      | 3/8                     | -       | 16          | 8.20                                       | 7.978                              | 8.255      | 3/8                     | -       | 24          | 8.60                                       | 8.494                              | 8.679      |
| MJ 8                       | x | 0.75       | 7.35                                       | 7.269                               | 7.419      | 7/16                    | -       | 14          | 9.60                                       | 9.346                              | 9.639      | 7/16                    | -       | 20          | 10.00                                      | 9.876                              | 10.084     |
| MJ 8                       | x | 1.00       | 7.10                                       | 7.026                               | 7.216      | 1/2                     | -       | 13          | 11.00                                      | 10.798                             | 11.095     | 1/2                     | -       | 20          | 11.60                                      | 11.463                             | 11.661     |
| MJ 8                       | x | 1.25       | 6.90                                       | 6.782                               | 6.994      | 9/16                    | -       | 12          | 12.40                                      | 12.228                             | 12.482     | 9/16                    | -       | 18          | 13.00                                      | 12.913                             | 13.122     |
| MJ 10                      | x | 1.00       | 9.10                                       | 9.026                               | 9.216      | 5/8                     | -       | 11          | 13.80                                      | 13.627                             | 13.904     | 5/8                     | -       | 18          | 14.60                                      | 14.501                             | 14.702     |
| MJ 10                      | x | 1.25       | 8.90                                       | 8.782                               | 8.994      |                         |         |             |                                            |                                    |            |                         |         |             |                                            |                                    |            |
| MJ 10                      | x | 1.50       | 8.60                                       | 8.539                               | 8.775      |                         |         |             |                                            |                                    |            |                         |         |             |                                            |                                    |            |
| MJ 12                      | x | 1.75       | 10.40                                      | 10.295                              | 10.560     |                         |         |             |                                            |                                    |            |                         |         |             |                                            |                                    |            |
| MJ 16                      | x | 2.00       | 14.20                                      | 14.051                              | 14.351     |                         |         |             |                                            |                                    |            |                         |         |             |                                            |                                    |            |

\* MJ 3x0.50 up to MJ 5x0.80 tapping size hole of int. thread 6H

# Tapping size holes for thread cutting and thread milling

| UNF threads<br>ASME B1.1 |                        |                                            |                                    |            | BSW (Whitworth)<br>threads BS84 |                        |                                            |                                 |            | (Whitworth) threads<br>(DIN-ISO 228-1) |                        |                                            |                                 |            | Steel armoured conduit threads<br>to DIN 40430 |                        |                                            |                                 |            |
|--------------------------|------------------------|--------------------------------------------|------------------------------------|------------|---------------------------------|------------------------|--------------------------------------------|---------------------------------|------------|----------------------------------------|------------------------|--------------------------------------------|---------------------------------|------------|------------------------------------------------|------------------------|--------------------------------------------|---------------------------------|------------|
| nom. Ø                   | threads<br>per<br>inch | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread 2B |            | nom. Ø                          | threads<br>per<br>inch | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread |            | nom. Ø                                 | threads<br>per<br>inch | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread |            | nom. Ø                                         | threads<br>per<br>inch | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread |            |
|                          |                        |                                            | min.<br>mm                         | max.<br>mm |                                 |                        |                                            | min.<br>mm                      | max.<br>mm |                                        |                        |                                            | min.<br>mm                      | max.<br>mm |                                                |                        |                                            | min.<br>mm                      | max.<br>mm |
| No. 1- 72                |                        | <b>1.55</b>                                | 1.473                              | 1.610      | W 1/16                          | 60                     | <b>1.20</b>                                | 1.045                           | 1.230      | G 1/16                                 | 28                     | <b>6.80</b>                                | 6.561                           | 6.843      | Pg 7                                           | 20                     | <b>11.40</b>                               | 11.280                          | 11.430     |
| No. 2- 64                |                        | <b>1.85</b>                                | 1.755                              | 1.910      | W 3/32                          | 48                     | <b>1.80</b>                                | 1.704                           | 1.912      | G 1/8                                  | 28                     | <b>8.80</b>                                | 8.566                           | 8.848      | Pg 9                                           | 18                     | <b>14.00</b>                               | 13.860                          | 14.010     |
| No. 3- 56                |                        | <b>2.15</b>                                | 2.024                              | 2.197      | W 1/8                           | 40                     | <b>2.50</b>                                | 2.362                           | 2.591      | G 1/4                                  | 19                     | <b>11.80</b>                               | 11.445                          | 11.890     | Pg 11                                          | 18                     | <b>17.30</b>                               | 17.260                          | 17.410     |
| No. 4- 48                |                        | <b>2.40</b>                                | 2.271                              | 2.459      | W 5/32                          | 32                     | <b>3.20</b>                                | 2.952                           | 3.214      | G 3/8                                  | 19                     | <b>15.25</b>                               | 14.950                          | 15.395     | Pg 13.5                                        | 18                     | <b>19.00</b>                               | 19.060                          | 19.210     |
| No. 5- 44                |                        | <b>2.70</b>                                | 2.550                              | 2.741      | W 3/16                          | 24                     | <b>3.60</b>                                | 3.407                           | 3.745      | G 1/2                                  | 14                     | <b>19.00</b>                               | 18.631                          | 19.172     | Pg 16                                          | 18                     | <b>21.30</b>                               | 21.160                          | 21.310     |
| No. 6- 40                |                        | <b>2.95</b>                                | 2.819                              | 3.023      | W 7/32                          | 24                     | <b>4.50</b>                                | 4.201                           | 4.539      | G 5/8                                  | 14                     | <b>21.00</b>                               | 20.587                          | 21.128     | Pg 21                                          | 16                     | <b>26.90</b>                               | 26.780                          | 27.030     |
| No. 8- 36                |                        | <b>3.50</b>                                | 3.404                              | 3.607      | W 1/4                           | 20                     | <b>5.10</b>                                | 4.724                           | 5.156      | G 3/4                                  | 14                     | <b>24.50</b>                               | 24.117                          | 24.658     | Pg 29                                          | 16                     | <b>35.50</b>                               | 35.480                          | 35.730     |
| No. 10- 32               |                        | <b>4.10</b>                                | 3.962                              | 4.166      | W 5/16                          | 18                     | <b>6.50</b>                                | 6.130                           | 6.590      | G 7/8                                  | 14                     | <b>28.25</b>                               | 27.877                          | 28.418     | Pg 36                                          | 16                     | <b>45.50</b>                               | 45.480                          | 45.730     |
| No. 12- 28               |                        | <b>4.60</b>                                | 4.496                              | 4.724      | W 3/8                           | 16                     | <b>7.90</b>                                | 7.492                           | 7.987      | G 1                                    | 11                     | <b>30.75</b>                               | 30.291                          | 30.931     | Pg 42                                          | 16                     | <b>52.50</b>                               | 52.480                          | 52.730     |
| 1/4 - 28                 |                        | <b>5.50</b>                                | 5.359                              | 5.588      | W 7/16                          | 14                     | <b>9.20</b>                                | 8.789                           | 9.330      | G 1 1/8                                | 11                     | <b>35.50</b>                               | 34.939                          | 35.579     | Pg 48                                          | 16                     | <b>57.80</b>                               | 57.780                          | 58.030     |
| 5/16 - 24                |                        | <b>6.90</b>                                | 6.782                              | 7.036      | W 1/2                           | 12                     | <b>10.50</b>                               | 9.989                           | 10.591     | G 1 1/4                                | 11                     | <b>39.50</b>                               | 38.952                          | 39.592     |                                                |                        |                                            |                                 |            |
| 3/8 - 24                 |                        | <b>8.50</b>                                | 8.382                              | 8.636      | W 9/16                          | 12                     | <b>12.00</b>                               | 11.577                          | 12.179     | G 1 1/2                                | 11                     | <b>45.25</b>                               | 44.845                          | 45.485     |                                                |                        |                                            |                                 |            |
| 7/16 - 20                |                        | <b>9.90</b>                                | 9.728                              | 10.033     | W 5/8                           | 11                     | <b>13.50</b>                               | 12.918                          | 13.558     | G 1 3/4                                | 11                     | <b>51.00</b>                               | 50.788                          | 51.428     |                                                |                        |                                            |                                 |            |
| 1/2 - 20                 |                        | <b>11.50</b>                               | 11.328                             | 11.608     | W 3/4                           | 10                     | <b>16.25</b>                               | 15.797                          | 16.483     | G 2                                    | 11                     | <b>57.00</b>                               | 56.656                          | 57.296     |                                                |                        |                                            |                                 |            |
| 9/16 - 18                |                        | <b>12.90</b>                               | 12.751                             | 13.081     | W 7/8                           | 9                      | <b>19.25</b>                               | 18.611                          | 19.353     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 5/8 - 18                 |                        | <b>14.50</b>                               | 14.351                             | 14.681     | W 1                             | 8                      | <b>22.00</b>                               | 21.334                          | 22.147     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 3/4 - 16                 |                        | <b>17.50</b>                               | 17.323                             | 17.678     | W 1 1/8                         | 7                      | <b>24.50</b>                               | 23.928                          | 24.832     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 7/8 - 14                 |                        | <b>20.40</b>                               | 20.269                             | 20.650     | W 1 1/4                         | 7                      | <b>27.75</b>                               | 27.103                          | 28.007     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 1 - 12                   |                        | <b>23.25</b>                               | 23.114                             | 23.571     | W 1 3/8                         | 6                      | <b>30.50</b>                               | 29.504                          | 30.528     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 1 1/8 - 12               |                        | <b>26.50</b>                               | 26.289                             | 26.746     | W 1 1/2                         | 6                      | <b>33.50</b>                               | 32.679                          | 33.703     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 1 1/4 - 12               |                        | <b>29.50</b>                               | 29.464                             | 29.921     | W 1 5/8                         | 5                      | <b>35.50</b>                               | 34.769                          | 35.963     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 1 3/8 - 12               |                        | <b>32.75</b>                               | 32.639                             | 33.096     | W 1 3/4                         | 5                      | <b>39.00</b>                               | 37.944                          | 39.138     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |
| 1 1/2 - 12               |                        | <b>36.00</b>                               | 35.814                             | 36.271     | W 2                             | 4.5                    | <b>44.50</b>                               | 43.571                          | 44.877     |                                        |                        |                                            |                                 |            |                                                |                        |                                            |                                 |            |

**NPT ANSI B 2.1**  
**American tapered pipe thread 1:16**

| Version A<br>(avoid if possible)                                                    |  | Version B                                                                           |  | nom. threads<br>Ø<br>per<br>inch | tapp. size hole Ø<br>cylindrical (A)<br>d <sub>1</sub> | tapp. size hole Ø<br>conical (B)<br>D <sub>1</sub> | cutting depth<br>ET<br>mm | cutting depth<br>BT (min)<br>mm |
|-------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|--|----------------------------------|--------------------------------------------------------|----------------------------------------------------|---------------------------|---------------------------------|
|  |  |  |  | 1/16 - 27                        | <b>6.15</b>                                            | 6.39                                               | 9.29                      | 10.7                            |
|                                                                                     |  |                                                                                     |  | 1/8 - 27                         | <b>8.40</b>                                            | 8.74                                               | 9.32                      | 10.8                            |
|                                                                                     |  |                                                                                     |  | 1/4 - 18                         | <b>11.10</b>                                           | <b>11.36</b>                                       | 13.52                     | 15.6                            |
|                                                                                     |  |                                                                                     |  | 3/8 - 18                         | <b>14.30</b>                                           | <b>14.80</b>                                       | 13.83                     | 16.0                            |
|                                                                                     |  |                                                                                     |  | 1/2 - 14                         | <b>17.90</b>                                           | <b>18.32</b>                                       | 18.07                     | 20.8                            |
|                                                                                     |  |                                                                                     |  | 3/4 - 14                         | <b>23.30</b>                                           | <b>23.67</b>                                       | 18.55                     | 21.3                            |
|                                                                                     |  |                                                                                     |  | 1 - 11.5                         | <b>29.00</b>                                           | <b>29.69</b>                                       | 22.29                     | 25.6                            |
|                                                                                     |  |                                                                                     |  | 1 1/4 - 11.5                     | <b>37.70</b>                                           | <b>38.45</b>                                       | 22.80                     | 26.1                            |
|                                                                                     |  |                                                                                     |  | 1 1/2 - 11.5                     | <b>43.70</b>                                           | <b>44.52</b>                                       | 22.80                     | 26.1                            |
|                                                                                     |  |                                                                                     |  | 2 - 11.5                         | <b>55.60</b>                                           | <b>56.56</b>                                       | 23.20                     | 26.5                            |
|                                                                                     |  |                                                                                     |  | 2 1/2 - 8                        | <b>66.30</b>                                           | <b>67.62</b>                                       | 31.75                     | 36.3                            |
|                                                                                     |  |                                                                                     |  | 3 - 8                            | <b>82.30</b>                                           | <b>83.52</b>                                       | 33.74                     | 38.5                            |

| Metric/metric fine EG-threads (EG M14 x 1.25)<br>for wire thread inserts DIN 8140 |                       |                                            |                                 |            | UNC (UNC-STI) EG-threads<br>for wire thread inserts ASME B18.29.1 |                        |                                            |                                 |            | UNF (UNF-STI) EG-threads<br>for wire thread inserts ASME B18.29.1 |                        |                                            |                                 |            |
|-----------------------------------------------------------------------------------|-----------------------|--------------------------------------------|---------------------------------|------------|-------------------------------------------------------------------|------------------------|--------------------------------------------|---------------------------------|------------|-------------------------------------------------------------------|------------------------|--------------------------------------------|---------------------------------|------------|
| nom. Ø                                                                            | x<br>pitch<br>P<br>mm | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread |            | nom. Ø                                                            | threads<br>per<br>inch | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread |            | nom. Ø                                                            | threads<br>per<br>inch | tapping<br>size<br>hole Ø<br>DIN 336<br>mm | core diameter<br>of int. thread |            |
|                                                                                   |                       |                                            | min.<br>mm                      | max.<br>mm |                                                                   |                        |                                            | min.<br>mm                      | max.<br>mm |                                                                   |                        |                                            | min.<br>mm                      | max.<br>mm |
| EG M 4                                                                            | 0.70                  | <b>4.20</b>                                | 4.152                           | 4.292      | EG No. 6                                                          | - 32                   | <b>3.80</b>                                | 3.678                           | 3.879      | EG No. 6                                                          | - 40                   | <b>3.70</b>                                | 3.644                           | 3.818      |
| EG M 5                                                                            | 0.80                  | <b>5.25</b>                                | 5.174                           | 5.334      | EG No. 8                                                          | - 32                   | <b>4.40</b>                                | 4.338                           | 4.524      | EG No. 8                                                          | - 36                   | <b>4.40</b>                                | 4.321                           | 4.498      |
| EG M 6                                                                            | 1.00                  | <b>6.30</b>                                | 6.217                           | 6.407      | EG No. 10                                                         | - 24                   | <b>5.20</b>                                | 5.055                           | 5.283      | EG No. 10                                                         | - 32                   | <b>5.10</b>                                | 4.999                           | 5.184      |
| EG M 8                                                                            | 1.25                  | <b>8.40</b>                                | 8.271                           | 8.483      | EG No. 12                                                         | - 24                   | <b>5.80</b>                                | 5.715                           | 5.944      | EG Nr. 12                                                         | - 28                   | <b>5.70</b>                                | 5.682                           | 5.809      |
| EG M10                                                                            | 1.50                  | <b>10.50</b>                               | 10.324                          | 10.560     | EG 1/4                                                            | - 20                   | <b>6.70</b>                                | 6.624                           | 6.868      | EG 1/4                                                            | - 28                   | <b>6.60</b>                                | 6.546                           | 6.721      |
| EG M12                                                                            | 1.75                  | <b>12.50</b>                               | 12.379                          | 12.644     | EG 5/16                                                           | - 18                   | <b>8.40</b>                                | 8.242                           | 8.489      | EG 5/16                                                           | - 24                   | <b>8.25</b>                                | 8.166                           | 8.352      |
| EG M14 x 1.25                                                                     |                       | <b>14.40</b>                               | 14.271                          | 14.483     | EG 3/8                                                            | - 16                   | <b>10.00</b>                               | 9.868                           | 10.127     | EG 3/8                                                            | - 24                   | <b>9.80</b>                                | 9.754                           | 9.931      |
| EG M16                                                                            | 2.00                  | <b>16.50</b>                               | 16.433                          | 16.733     | EG 7/16                                                           | - 14                   | <b>11.60</b>                               | 11.506                          | 11.783     | EG 7/16                                                           | - 20                   | <b>11.50</b>                               | 11.389                          | 11.585     |
|                                                                                   |                       |                                            |                                 |            | EG 1/2                                                            | - 13                   | <b>13.30</b>                               | 13.122                          | 13.393     | EG 1/2                                                            | - 20                   | <b>13.10</b>                               | 12.974                          | 13.172     |
|                                                                                   |                       |                                            |                                 |            | EG 9/16                                                           | - 12                   | <b>14.90</b>                               | 14.747                          | 15.032     | EG 9/16                                                           | - 18                   | <b>14.70</b>                               | 14.592                          | 14.798     |
|                                                                                   |                       |                                            |                                 |            | EG 5/8                                                            | - 11                   | <b>16.50</b>                               | 16.375                          | 16.673     | EG 5/8                                                            | - 18                   | <b>16.25</b>                               | 16.180                          | 16.386     |



## Recommended hole diameter for thread forming

| Std. ISO metric threads<br>DIN 13 |       |                   |                   |         |                           | ISO metric fine threads<br>DIN 13 |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |
|-----------------------------------|-------|-------------------|-------------------|---------|---------------------------|-----------------------------------|--------------|-------|-------------------|-------------------|---------|---------------------------|-------------|----------|-------|-------------------|-------------------|---------|---------------------------|---------|
| nom. Ø                            | pitch | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 7H* |                                   | nom. x Ø     | pitch | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 7H* |             | nom. x Ø | pitch | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 7H* |         |
| mm                                | mm    | mm                | min. mm           | max. mm | min. mm                   | max. mm                           | mm           | mm    | mm                | min. mm           | max. mm | min. mm                   | max. mm     | mm       | mm    | mm                | min. mm           | max. mm | min. mm                   | max. mm |
| M1                                | 0.25  | 0.90              | 0.89              | 0.92    | 0.729                     | 0.819                             | M 2.5 x 0.35 | 2.35  | 2.35              | 2.38              | 2.121   | 2.221                     | M 17 x 1.50 | 16.30    | 16.26 | 16.38             | 15.376            | 15.751  |                           |         |
| M1.2                              | 0.25  | 1.10              | 1.09              | 1.12    | 0.929                     | 1.019                             | M 3 x 0.35   | 2.85  | 2.85              | 2.88              | 2.621   | 2.721                     | M 18 x 1.00 | 17.55    | 17.52 | 17.62             | 16.917            | 17.217  |                           |         |
| M1.4                              | 0.30  | 1.28              | 1.27              | 1.30    | 1.075                     | 1.181                             | M 4 x 0.35   | 3.85  | 3.85              | 3.88              | 3.621   | 3.721                     | M 18 x 1.50 | 17.30    | 17.26 | 17.38             | 16.376            | 16.751  |                           |         |
| M1.6                              | 0.35  | 1.46              | 1.45              | 1.48    | 1.221                     | 1.346                             | M 4 x 0.50   | 3.80  | 3.78              | 3.83              | 3.459   | 3.639                     | M 18 x 2.00 | 17.10    | 17.05 | 17.20             | 15.835            | 16.310  |                           |         |
| M1.7                              | 0.35  | 1.56              | 1.55              | 1.58    | 1.321                     | 1.446                             | M 5 x 0.50   | 4.80  | 4.78              | 4.83              | 4.459   | 4.639                     | M 20 x 1.00 | 19.55    | 19.52 | 19.62             | 18.917            | 19.217  |                           |         |
| M1.8                              | 0.35  | 1.66              | 1.65              | 1.68    | 1.421                     | 1.546                             | M 5.5 x 0.50 | 5.30  | 5.28              | 5.33              | 4.959   | 5.139                     | M 20 x 1.50 | 19.30    | 19.26 | 19.38             | 18.376            | 19.751  |                           |         |
| M 2                               | 0.40  | 1.85              | 1.84              | 1.88    | 1.567                     | 1.679                             | M 6 x 0.75   | 5.65  | 5.62              | 5.70              | 5.188   | 5.424                     | M 24 x 1.00 | 23.55    | 23.52 | 23.62             | 22.917            | 23.217  |                           |         |
| M 2.2                             | 0.45  | 2.00              | 2.01              | 2.05    | 1.713                     | 1.838                             | M 7 x 0.75   | 6.65  | 6.62              | 6.70              | 6.188   | 6.424                     | M 24 x 1.50 | 23.30    | 23.26 | 23.38             | 22.376            | 22.751  |                           |         |
| M 2.5                             | 0.45  | 2.30              | 2.28              | 2.32    | 2.013                     | 2.138                             | M 8 x 0.75   | 7.65  | 7.62              | 7.70              | 7.188   | 7.424                     | M 24 x 2.00 | 23.10    | 23.05 | 23.20             | 21.835            | 22.310  |                           |         |
| M 3                               | 0.50  | 2.80              | 2.78              | 2.85    | 2.459                     | 2.639                             | M 8 x 1.00   | 7.55  | 7.52              | 7.62              | 6.917   | 7.217                     | M 27 x 1.50 | 26.30    | 26.26 | 26.38             | 25.376            | 25.751  |                           |         |
| M 3.5                             | 0.60  | 3.25              | 3.23              | 3.30    | 2.850                     | 3.050                             | M 9 x 0.75   | 8.65  | 8.62              | 8.70              | 8.188   | 8.424                     | M 30 x 1.50 | 29.30    | 29.26 | 29.38             | 28.376            | 28.751  |                           |         |
| M 4                               | 0.70  | 3.70              | 3.68              | 3.76    | 3.242                     | 3.466                             | M 9 x 1.00   | 8.55  | 8.52              | 8.62              | 7.917   | 8.217                     | M 33 x 1.50 | 32.30    | 32.26 | 32.38             | 31.376            | 31.751  |                           |         |
| M 4.5                             | 0.75  | 4.20              |                   |         |                           |                                   | M 10 x 0.75  | 9.65  | 9.62              | 9.70              | 9.188   | 9.424                     | M 36 x 1.50 | 35.30    | 35.26 | 35.38             | 34.376            | 34.751  |                           |         |
| M 5                               | 0.80  | 4.65              | 4.62              | 4.71    | 4.134                     | 4.384                             | M 10 x 1.00  | 9.55  | 9.52              | 9.62              | 8.917   | 9.217                     | M 39 x 1.50 | 38.30    | 38.26 | 38.38             | 37.376            | 37.751  |                           |         |
| M 6                               | 1.00  | 5.55              | 5.52              | 5.62    | 4.917                     | 5.217                             | M 10 x 1.25  | 9.40  | 9.36              | 9.47              | 8.647   | 8.982                     | M 42 x 1.50 | 41.30    | 41.26 | 41.38             | 40.376            | 40.751  |                           |         |
| M 7                               | 1.00  | 6.55              | 6.52              | 6.62    | 5.917                     | 6.217                             | M 11 x 0.75  | 10.65 | 10.62             | 10.70             | 10.188  | 10.424                    |             |          |       |                   |                   |         |                           |         |
| M 8                               | 1.25  | 7.40              | 7.36              | 7.47    | 6.647                     | 6.982                             | M 11 x 1.00  | 10.55 | 10.52             | 10.62             | 9.917   | 10.217                    |             |          |       |                   |                   |         |                           |         |
| M 9                               | 1.25  | 8.40              | 8.36              | 8.47    | 7.647                     | 7.982                             | M 12 x 1.00  | 11.55 | 11.52             | 11.62             | 10.917  | 11.217                    |             |          |       |                   |                   |         |                           |         |
| M 10                              | 1.50  | 9.30              | 9.26              | 9.38    | 8.376                     | 8.751                             | M 12 x 1.25  | 11.40 | 11.36             | 11.47             | 10.647  | 10.982                    |             |          |       |                   |                   |         |                           |         |
| M 11                              | 1.50  | 10.30             | 10.26             | 10.38   | 9.376                     | 9.751                             | M 12 x 1.50  | 11.30 | 11.26             | 11.38             | 10.376  | 10.751                    |             |          |       |                   |                   |         |                           |         |
| M 12                              | 1.75  | 11.20             | 11.15             | 11.29   | 10.106                    | 10.531                            | M 14 x 1.00  | 13.55 | 13.52             | 13.62             | 12.917  | 13.217                    |             |          |       |                   |                   |         |                           |         |
| M 14                              | 2.00  | 13.10             | 13.05             | 13.20   | 11.835                    | 12.310                            | M 14 x 1.25  | 13.40 | 13.36             | 13.47             | 12.647  | 12.982                    |             |          |       |                   |                   |         |                           |         |
| M 16                              | 2.00  | 15.10             | 15.05             | 15.20   | 13.835                    | 14.310                            | M 14 x 1.50  | 13.30 | 13.26             | 13.38             | 12.376  | 12.751                    |             |          |       |                   |                   |         |                           |         |
| M 18                              | 2.50  | 16.90             | 16.83             | 17.02   | 15.294                    | 15.854                            | M 15 x 1.00  | 14.55 | 14.52             | 14.62             | 13.917  | 14.217                    |             |          |       |                   |                   |         |                           |         |
| M 20                              | 2.50  | 18.90             | 18.83             | 19.02   | 17.294                    | 17.854                            | M 15 x 1.50  | 14.30 | 14.26             | 14.38             | 13.376  | 13.751                    |             |          |       |                   |                   |         |                           |         |
| M 22                              | 2.50  | 20.90             | 20.83             | 21.02   | 19.294                    | 19.854                            | M 16 x 1.00  | 15.55 | 15.52             | 15.62             | 14.917  | 15.217                    |             |          |       |                   |                   |         |                           |         |
| M 24                              | 3.00  | 22.70             | 22.62             | 22.80   | 20.752                    | 21.382                            | M 16 x 1.50  | 15.30 | 15.26             | 15.38             | 14.376  | 14.751                    |             |          |       |                   |                   |         |                           |         |
| M 27                              | 3.00  | 25.70             | 25.62             | 25.80   | 23.752                    | 24.382                            | M 17 x 1.00  | 16.55 | 16.52             | 16.62             | 15.917  | 16.217                    |             |          |       |                   |                   |         |                           |         |
| M 30                              | 3.50  | 28.50             | 28.40             | 28.60   | 26.211                    | 26.921                            |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |
| M 33                              | 3.50  | 31.50             | 31.40             | 31.60   | 29.211                    | 29.921                            |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |
| M 36                              | 4.00  | 34.30             | 34.17             | 34.40   | 31.670                    | 32.420                            |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |
| M 39                              | 4.00  | 37.30             | 37.17             | 37.40   | 34.670                    | 35.420                            |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |
| M 42                              | 4.50  | 40.10             | 39.95             | 40.20   | 37.129                    | 37.979                            |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |

\* M 2.5x0.35 up to M 4x0.35 tapping size hole of int. thread 6H

\* M 2.5x0.35 up to M 4x0.35 tapping size hole of int. thread 6H

\* M 2 up to M 2.5 tapping size hole of int. thread 6H

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

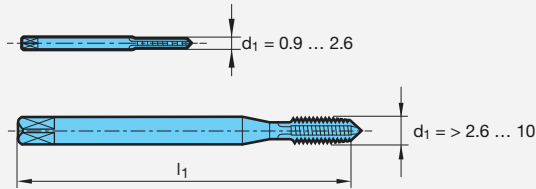
Due to the tensile strength it is not necessary to adhere to the tapping size hole diameter tolerance class 6H; tolerance class 7H satisfies the requirement that the flank coverage of external and internal threads should not fall below 0.32xP. In addition, formed threads generally possess a higher tensile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

| UNC-threads<br>ASME B1.1 |              |                   |                   |         |                          |         | UNF-threads<br>ASME B1.1 |              |                   |                   |         |                          |         | (Whitworth-) pipe thread G<br>DIN EN ISO 228-1 |          |                   |                   |         |                       |         |
|--------------------------|--------------|-------------------|-------------------|---------|--------------------------|---------|--------------------------|--------------|-------------------|-------------------|---------|--------------------------|---------|------------------------------------------------|----------|-------------------|-------------------|---------|-----------------------|---------|
| nom. Ø                   | pitch        | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 2B |         | nom. Ø                   | pitch        | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 2B |         | nom. Ø                                         | pitch    | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread |         |
|                          | per inch     | mm                | min. mm           | max. mm | min. mm                  | max. mm |                          | per inch     | mm                | min. mm           | max. mm | min. mm                  | max. mm | inch                                           | per inch | mm                | min. mm           | max. mm | min. mm               | max. mm |
| No. 1 - 64               | <b>1.68</b>  | 1.67              | 1.70              |         | 1.425                    | 1.580   | No. 1 - 72               | <b>1.70</b>  | 1.69              | 1.72              |         | 1.473                    | 1.610   | G 1/16                                         | 28       | <b>7.30</b>       | 7.28              | 7.35    | 6.561                 | 6.843   |
| No. 2 - 56               | <b>1.98</b>  | 1.97              | 2.01              |         | 1.694                    | 1.872   | No. 2 - 64               | <b>2.00</b>  | 1.99              | 2.03              |         | 1.755                    | 1.910   | G 1/8                                          | 28       | <b>9.30</b>       | 9.28              | 9.35    | 8.566                 | 8.848   |
| No. 3 - 48               | <b>2.28</b>  | 2.27              | 2.32              |         | 1.941                    | 2.146   | No. 3 - 56               | <b>2.30</b>  | 2.29              | 2.34              |         | 2.024                    | 2.197   | G 1/4                                          | 19       | <b>12.50</b>      | 12.48             | 12.55   | 11.445                | 11.890  |
| No. 4 - 40               | <b>2.55</b>  | 2.54              | 2.59              |         | 2.157                    | 2.385   | No. 4 - 48               | <b>2.60</b>  | 2.59              | 2.63              |         | 2.271                    | 2.459   | G 3/8                                          | 19       | <b>16.00</b>      | 15.98             | 16.05   | 14.950                | 15.395  |
| No. 5 - 40               | <b>2.90</b>  | 2.89              | 2.94              |         | 2.487                    | 2.698   | No. 5 - 44               | <b>2.90</b>  | 2.89              | 2.93              |         | 2.550                    | 2.741   | G 1/2                                          | 14       | <b>20.00</b>      | 19.98             | 20.12   | 18.631                | 19.172  |
| No. 6 - 32               | <b>3.15</b>  | 3.14              | 3.19              |         | 2.642                    | 2.896   | No. 6 - 40               | <b>3.20</b>  | 3.19              | 3.24              |         | 2.819                    | 3.023   | G 5/8                                          | 14       | <b>22.00</b>      | 21.98             | 22.12   | 20.587                | 21.128  |
| No. 8 - 32               | <b>3.80</b>  | 3.78              | 3.82              |         | 3.302                    | 3.531   | No. 8 - 36               | <b>3.85</b>  | 3.83              | 3.88              |         | 3.404                    | 3.607   | G 3/4                                          | 14       | <b>25.50</b>      | 25.48             | 25.62   | 24.117                | 24.658  |
| No. 10- 24               | <b>4.35</b>  | 4.33              | 4.39              |         | 3.683                    | 3.937   | No. 10- 32               | <b>4.45</b>  | 4.43              | 4.49              |         | 3.962                    | 4.166   | G 7/8                                          | 14       | <b>29.25</b>      | 29.23             | 29.37   | 27.877                | 28.418  |
| No. 12- 24               | <b>5.00</b>  | 4.97              | 5.03              |         | 4.343                    | 4.597   | No. 12- 28               | <b>5.10</b>  | 5.07              | 5.13              |         | 4.496                    | 4.724   | G 1                                            | 11       | <b>32.00</b>      | 31.98             | 32.15   | 30.291                | 30.931  |
| 1/4 - 20                 | <b>5.75</b>  | 5.72              | 5.80              |         | 4.978                    | 5.258   | 1/4 - 28                 | <b>5.95</b>  | 5.92              | 5.99              |         | 5.359                    | 5.588   | G 1 1/4                                        | 11       | <b>40.75</b>      | 40.70             | 40.85   | 38.952                | 39.592  |
| 5/16 - 18                | <b>7.30</b>  | 7.26              | 7.37              |         | 6.401                    | 6.731   | 5/16 - 24                | <b>7.45</b>  | 7.42              | 7.50              |         | 6.782                    | 7.036   |                                                |          |                   |                   |         |                       |         |
| 3/8 - 16                 | <b>8.80</b>  | 8.77              | 8.88              |         | 7.798                    | 8.153   | 3/8 - 24                 | <b>9.05</b>  | 9.02              | 9.10              |         | 8.838                    | 8.636   |                                                |          |                   |                   |         |                       |         |
| 7/16 - 14                | <b>10.30</b> | 10.27             | 10.37             |         | 9.144                    | 9.550   | 7/16 - 20                | <b>10.55</b> | 10.48             | 10.58             |         | 9.728                    | 10.033  |                                                |          |                   |                   |         |                       |         |
| 1/2 - 13                 | <b>11.80</b> | 11.77             | 11.88             |         | 10.592                   | 11.024  | 1/2 - 20                 | <b>12.10</b> | 12.08             | 12.18             |         | 11.328                   | 11.608  |                                                |          |                   |                   |         |                       |         |
| 9/16 - 12                | <b>13.30</b> | 13.28             | 13.39             |         | 11.989                   | 12.446  | 9/16 - 18                | <b>13.65</b> | 13.61             | 13.72             |         | 12.751                   | 13.081  |                                                |          |                   |                   |         |                       |         |
| 5/8 - 11                 | <b>14.80</b> | 14.78             | 14.90             |         | 13.386                   | 13.868  | 5/8 - 18                 | <b>15.25</b> | 15.21             | 15.32             |         | 14.351                   | 14.681  |                                                |          |                   |                   |         |                       |         |
| 3/4 - 10                 | <b>17.90</b> | 17.85             | 17.97             |         | 16.307                   | 16.840  | 3/4 - 16                 | <b>18.35</b> | 18.30             | 18.41             |         | 17.323                   | 17.678  |                                                |          |                   |                   |         |                       |         |
| 7/8 - 9                  | <b>21.00</b> | 20.95             | 21.10             |         | 19.177                   | 19.761  | 7/8 - 14                 | <b>21.40</b> | 21.35             | 21.49             |         | 20.269                   | 20.650  |                                                |          |                   |                   |         |                       |         |
| 1 - 8                    | <b>24.00</b> | 23.95             | 24.12             |         | 21.971                   | 22.606  | 1 - 12                   | <b>24.45</b> | 24.40             | 24.54             |         | 23.114                   | 23.571  |                                                |          |                   |                   |         |                       |         |

## Characteristic features of the individual standards

### DIN 371

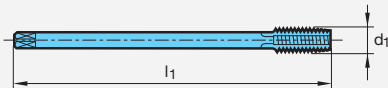
in the master standard  
DIN 2184-1



Standard for machine taps with reinforced shank for standard ISO metric threads and ISO metric fine threads. Long design. Shank design in accordance with diameter ranges shown above (mm).

### DIN 376

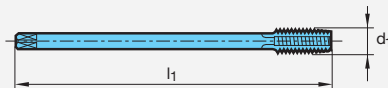
in the master standard  
DIN 2184-1



Standard for machine taps with reduced shank for standard ISO metric threads. Long design. Diameter range  $d_1 = 1.6 \dots 68$  mm ( $\leq \text{Ø M3}$ , shank without square)

### DIN 374

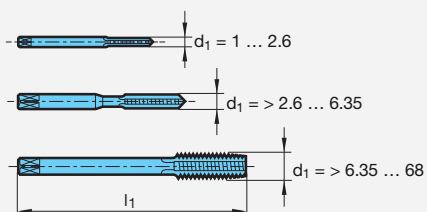
in the master standard  
DIN 2184-1



Standard for machine taps with reduced shank for ISO metric fine threads. Long design. Diameter range  $d_1 = 3 \dots 52$  mm

### DIN 352

in the master standard  
DIN 2184-2



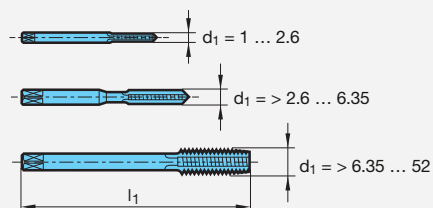
Standard for hand and machine taps for standard ISO metric threads. Short design. Shank design in accordance with diameter ranges shown opposite (mm).



## Characteristic of the individual standards

### DIN 2181

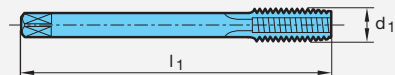
in the master standard  
DIN 2184-2



Standard for hand and machine taps for standard ISO metric threads. Short design. Shank design in accordance with diameter ranges shown opposite (mm).

### DIN 5156

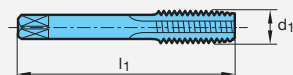
in the master standard  
DIN 2184-1



Standard for machine taps for BSP threads to DIN ISO 228 and for BSW threads to DIN 2999. Long design.  
Diameter ranges:  
BSP threads G 1/16" ... G 4"  
BSW threads W 1/16" ... W 4"

### DIN 5157

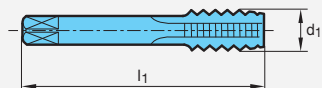
in the master standard  
DIN 2184-2



Standard for machine taps for BSP threads to DIN ISO 228 and for BSW threads to DIN EN 10 226-1. Short design.  
Diameter ranges:  
BSP threads G 1/16" ... G 4"  
BSW threads W 1/16" ... W 4"

### DIN 40 432

in the master standard  
DIN 2184-2

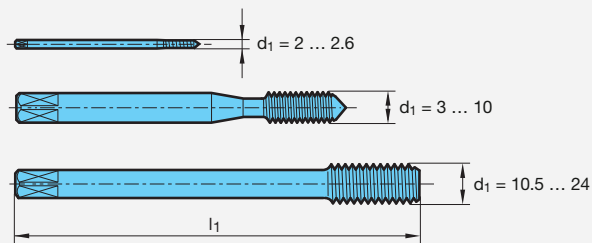


Standard for machine taps for steel armoured conduit threads to DIN 40 430. Short design.  
Diameter range:  
Pg 7 (12.5 mm) ... Pg 48 (59.3 mm)  
Will be replaced by DIN 374 ISO 3 6G.

## Characteristic features of the individual standards

### DIN 2174

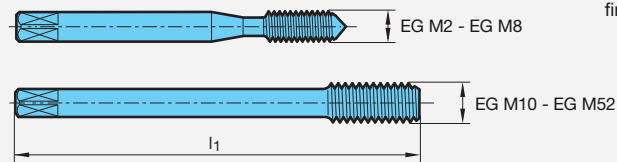
in the master standard  
DIN 2184-1



Standard for fluteless taps for standard ISO metric threads and ISO metric fine threads. Long design. Shank design in accordance with diameter ranges shown opposite (mm).

### DIN 40 435

in the master standard  
DIN 2184-1

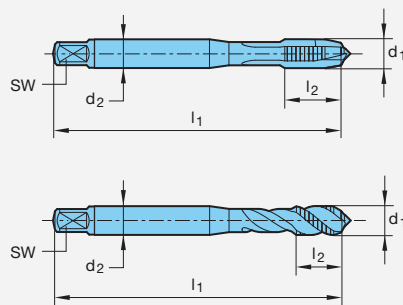


Standard for machine taps for tapped holes (EG) for wire thread inserts as in DIN 8140 for ISO metric threads. Standard thread tapped holes EG M2 to EG M52 and fine thread tapped holes EG M8 x1 to EG M48 x 3



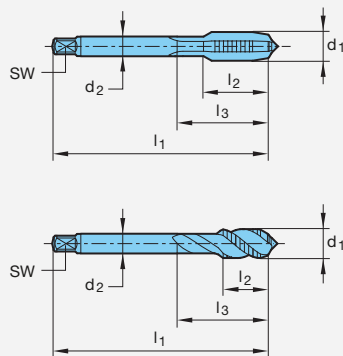
## DIN - International Standards

### DIN 2184-1 DIN 2184-2

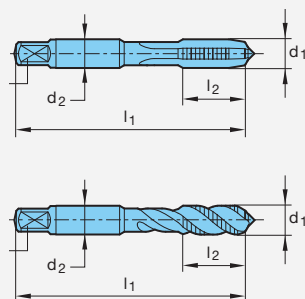


### JIS B 4430

Japan Industrial Standard

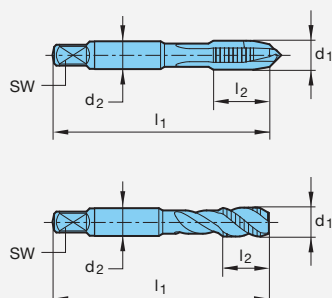


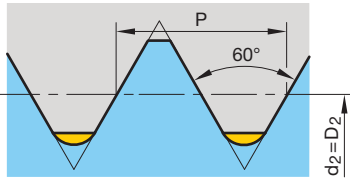
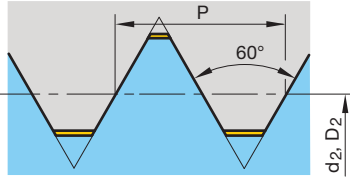
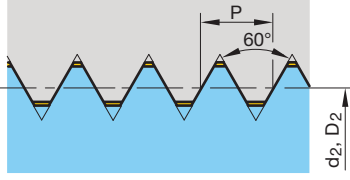
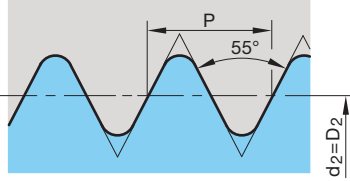
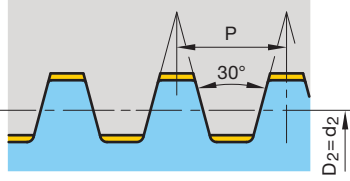
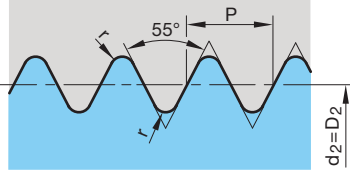
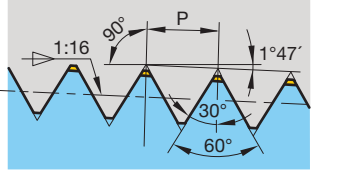
### ISO 529

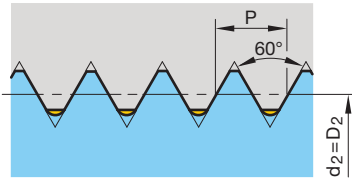
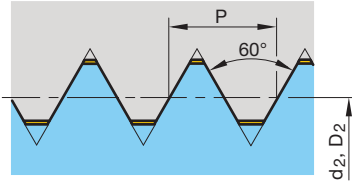
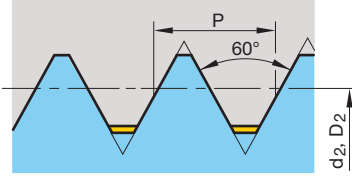
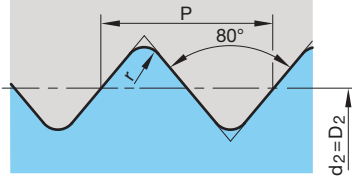
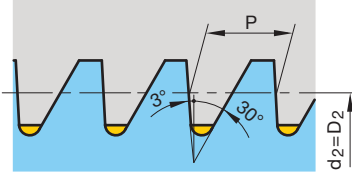
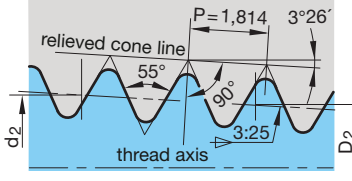
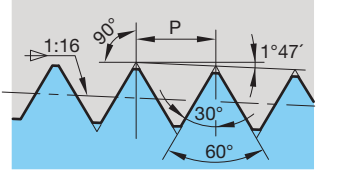


### ASME B94.9

The American Society of  
Mechanical Engineers



| Geometry drawing                                                                    | Standard          | Application                                          |
|-------------------------------------------------------------------------------------|-------------------|------------------------------------------------------|
| <b>M ISO-metric thread</b>                                                          |                   |                                                      |
|    | DIN 13-1          | General standard thread                              |
| <b>UNC Unified National Coarse Thread</b>                                           |                   |                                                      |
|    | ASME B1.1         | General UN standard thread                           |
| <b>UNEF Unified National Extra Fine Thread</b>                                      |                   |                                                      |
|   | ASME B1.1         | General UN extra fine thread                         |
| <b>G Cylindrical Pipe Thread without thread sealing connections</b>                 |                   |                                                      |
|  | DIN EN ISO 228-1  | Threads for pipes, pipe connections and fittings     |
| <b>TR ISO-metric trapezoidal thread</b>                                             |                   |                                                      |
|  | DIN 103           | General, draw collets, rolling stock                 |
| <b>W Cylindrical Whitworth Thread</b>                                               |                   |                                                      |
|  | DIN 477           | Side connector and accessories for gas bottle valves |
| <b>NPT American Standard Pipe Threads tapered for sealing</b>                       |                   |                                                      |
|  | ANSI/ASME B1.20.1 | Pipe threads and fittings                            |

| Geometry drawing                                                                     | Standard                                | Application                                            |
|--------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| <b>MF ISO-metric fine thread</b>                                                     |                                         |                                                        |
|    | DIN 13-2 to DIN 13-11                   | General fine thread                                    |
| <b>UNF Unified National Fine Thread</b>                                              |                                         |                                                        |
|    | ASME B1.1 ISO-metric trapezoidal thread | General UN Fine Thread                                 |
| <b>UNS Unified Special Thread</b>                                                    |                                         |                                                        |
|   | ASME B1.1                               | General UN special thread                              |
| <b>PG steel conduit thread</b>                                                       |                                         |                                                        |
|  | DIN 40430 cylindrical round thread      | Electrical engineering                                 |
| <b>S metric saw thread</b>                                                           |                                         |                                                        |
|  | DIN 513                                 | When absorbing uni-directional forces                  |
| <b>W Whitworth Taper Thread</b>                                                      |                                         |                                                        |
|  | DIN 477                                 | Threaded connection in gas cylinder bottles for valves |
| <b>NPTF American Standard Pipe Thread tapered for dry sealing</b>                    |                                         |                                                        |
|  | ANSI B1.20.3                            | Pipe threads and fittings                              |

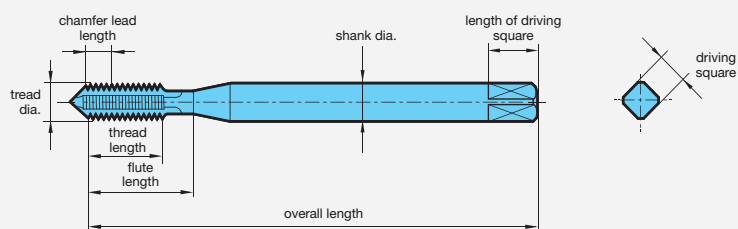


| Geometry drawing                                        | Standard                                                                                               | Application                                                                                          |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>BSW cylindrical Whitworth thread</b>                 |                                                                                                        |                                                                                                      |
|                                                         | B.S. 84<br>British<br>Standard                                                                         | Threads for<br>pipes, pipe<br>connections and<br>fittings                                            |
| <b>BSP pipe thread cylindrical (identical to G)</b>     |                                                                                                        |                                                                                                      |
|                                                         | B.S. 93<br>British<br>Standard                                                                         | Threads for<br>pipes, pipe<br>connections and<br>fittings                                            |
| <b>R Whitworth pie thread tapered external thread</b>   |                                                                                                        |                                                                                                      |
|                                                         | DIN EN<br>10226-1<br>(based on<br>ISO 7-1)<br>replace-<br>ment for<br>DIN 2999-1                       | External thread<br>for pipe threads<br>and fittings<br>(for in the thread<br>sealing<br>connections) |
| <b>Rc Whitworth pipe thread tapered internal thread</b> |                                                                                                        |                                                                                                      |
|                                                         | DIN ISO<br>10226-2<br>(hardly used<br>in Europe,<br>replaceable<br>with pipe<br>threads to<br>ISO 7-1) | Internal thread<br>for pipe threads<br>and fittings<br>(for in the thread<br>sealing<br>connections) |
| <b>MJ thread metric thread</b>                          |                                                                                                        |                                                                                                      |
|                                                         | DIN ISO<br>5855-1                                                                                      | For the aero-<br>space industry                                                                      |
| <b>Vg valve thread</b>                                  |                                                                                                        |                                                                                                      |
|                                                         | DIN 7756                                                                                               | Valves for car<br>tyres manifold<br>block                                                            |
| <b>MFS</b>                                              |                                                                                                        |                                                                                                      |
|                                                         | DIN 8141                                                                                               | Interference<br>fits in<br>Aluminium-cast<br>alloys                                                  |

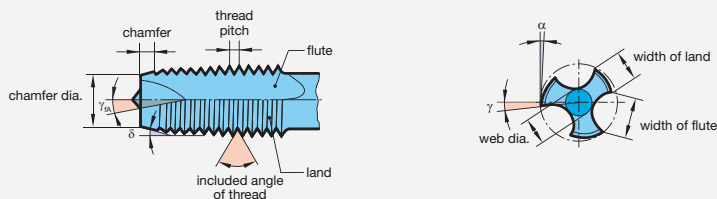
| Geometry drawing                                            | Standard                                                                         | Application                                                                                          |
|-------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>BSF Whitworth fine thread cylindrical</b>                |                                                                                  |                                                                                                      |
|                                                             | B.S. 84<br>British<br>Standard<br>Fine                                           | Threads for<br>pipes, pipe<br>connections and<br>fittings                                            |
| <b>BSPT pipe thread tapered (identical to Rc)</b>           |                                                                                  |                                                                                                      |
|                                                             | B.S. 93<br>British<br>Standard                                                   | Internal thread<br>for pipe threads<br>and fittings                                                  |
| <b>Rp Whitworth pipe thread cylindrical internal thread</b> |                                                                                  |                                                                                                      |
|                                                             | DIN EN<br>10226-1<br>(based on<br>ISO 7-1)<br>Replace-<br>ment for<br>DIN 2999-1 | Internal thread<br>for pipe threads<br>and fittings<br>(for in the thread<br>sealing<br>connections) |
| <b>RD cylindrical round thread</b>                          |                                                                                  |                                                                                                      |
|                                                             | DIN 405                                                                          | General,<br>load hook,<br>mining,<br>food industry                                                   |
| <b>UNJ inch thread</b>                                      |                                                                                  |                                                                                                      |
|                                                             | ISO 3161                                                                         | For the aero-<br>space industry                                                                      |
| <b>MSG lock nut thread</b>                                  |                                                                                  |                                                                                                      |
|                                                             | Gühring<br>standard                                                              | Self-locking<br>thread<br>transmission<br>housing etc.                                               |

|  |                 |
|--|-----------------|
|  | external thread |
|  | internal thread |
|  | play            |

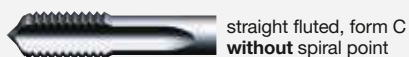
## Definitions and angles, centres and flute forms



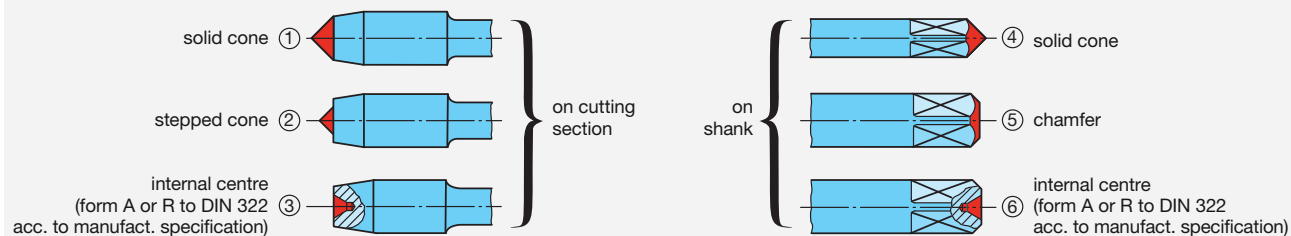
$\delta$  = try square  
 $\gamma_{fA}$  = spiral point angle  
 $\alpha$  = clearance angle  
 $\gamma$  = rake angle



### Flute forms



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



| Thread dia. range<br>mm | Centre on cutting section        |                        | Centre on shank |
|-------------------------|----------------------------------|------------------------|-----------------|
|                         | with chamfer forms<br>A, C, D, E | with chamfer form<br>B |                 |
| ≤ 4.2                   | ①                                | ①                      | ④⑤⑥             |
| > 4.2 ... 5.6           | ①②                               | ①                      | ④⑤⑥             |
| > 5.6 ... 10.0          | ①②③                              | ①②③                    | ④⑤⑥             |
| > 10.0                  | ③                                | ③                      | ⑥               |

### Coolant duct geometries





## Chamfer forms - Selection and application

When cutting internal threads, all the machining is carried out by the cutting teeth of the chamfer. Therefore, a decision on the best type of chamfer form has to be carefully made as both tool life and quality of thread are thereby greatly affected.

Generally speaking, the form and length of chamfer depend on the type of hole to be tapped. The tapping of through holes does not normally give rise to any difficulties whereas the production of blind holes can create certain problems associated with the need to evacuate swarf in the reverse direction to the feed, i.e. up to the flutes of the tap and then cut off such swarf when the tap is reversed out of the hole.

The length of chamfer is determined by taking into account various conflicting factors. To avoid overloading, premature bluntness and oversize threads the number of chamfer cutting threads must not be kept too low. A too long chamfer lead, however, increases the torque and thus the danger of breakage. The spiral point with form B ensures a chip removal always in the direction of feed.



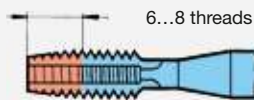
Through hole



Blind hole

### Chamfer forms to DIN 2197

#### Form A



long, 6 - 8 threads  
for short  
through holes

#### 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.

#### Form F

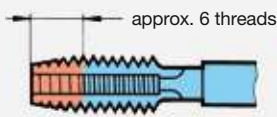


extremely short, 1-1.5 threads,  
for blind holes with  
little run-out depth.  
Avoid use if possible.

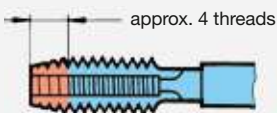
## Chamfer forms - Selection and application

### Chamfer lead length for sets of 3 taps

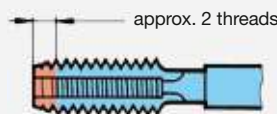
**Form A**  
first tap



**Form D**  
second tap

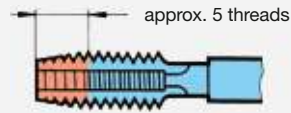


**Form C**  
bottoming tap

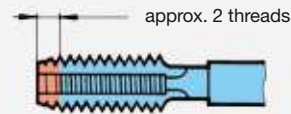


### Chamfer lead length for sets of 2 taps

**Form D**  
first tap



**Form C**  
bottoming tap



### Application recommendations

While in the first instance, the type of tapped hole required determines the chamfer, generally the tap geometry - i.e. form, number and direction of flutes, cutting angle, etc. - depend on the material to be machined and on the application. Basically, taps up to M16 for tapping ISO metric threads or for the engineering industry in general, have 3 flutes, and above this size 4 or more flutes.

Taps with left-hand flutes and taps with spiral points remove the chips in the cutting direction or direction of feed and are therefore especially suitable for tapping through holes. Taps with straight flutes and long chamfer lead (form D) also give good results.

As far as blind holes are concerned we recommend taps with right-hand spiral flutes or straight fluted taps with a short chamfer lead length.

Tools with right-hand spiral flutes have the chip flow in the backward direction, i.e. up the flutes. The chamfer lead length is designed in such a way so that during the return movement chips do not jam and are reliably sheared off.

The tapping of aluminium, grey cast iron and brass requires taps with a short chamfer lead length, regardless of whether through or blind holes are required. In these materials a long chamfer lead length would act as a core drill with chip breaker grooves and would only drill the tapping size hole to the major diameter instead of cutting a thread.

Straight fluted taps without spiral point are general purpose tools and have the disadvantage of not showing optimum results in particular materials. It's well worth the effort to take the trouble of ascertaining the most suitable tool for any given metal-cutting task.



**Through hole**



**Blind hole**



Straight fluted tap  
with spiral point



Right-hand spiral fluted tap



Left-hand spiral  
fluted tap



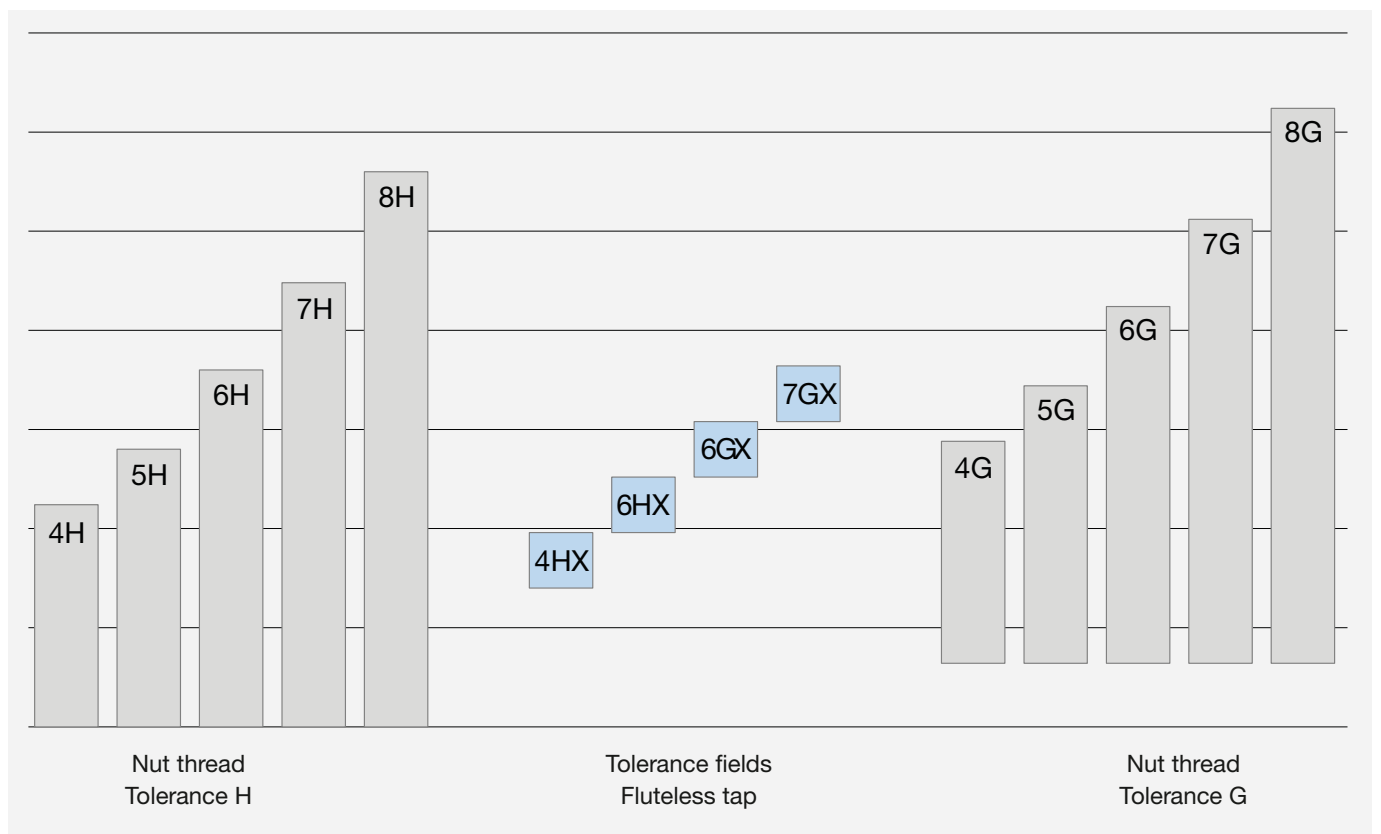
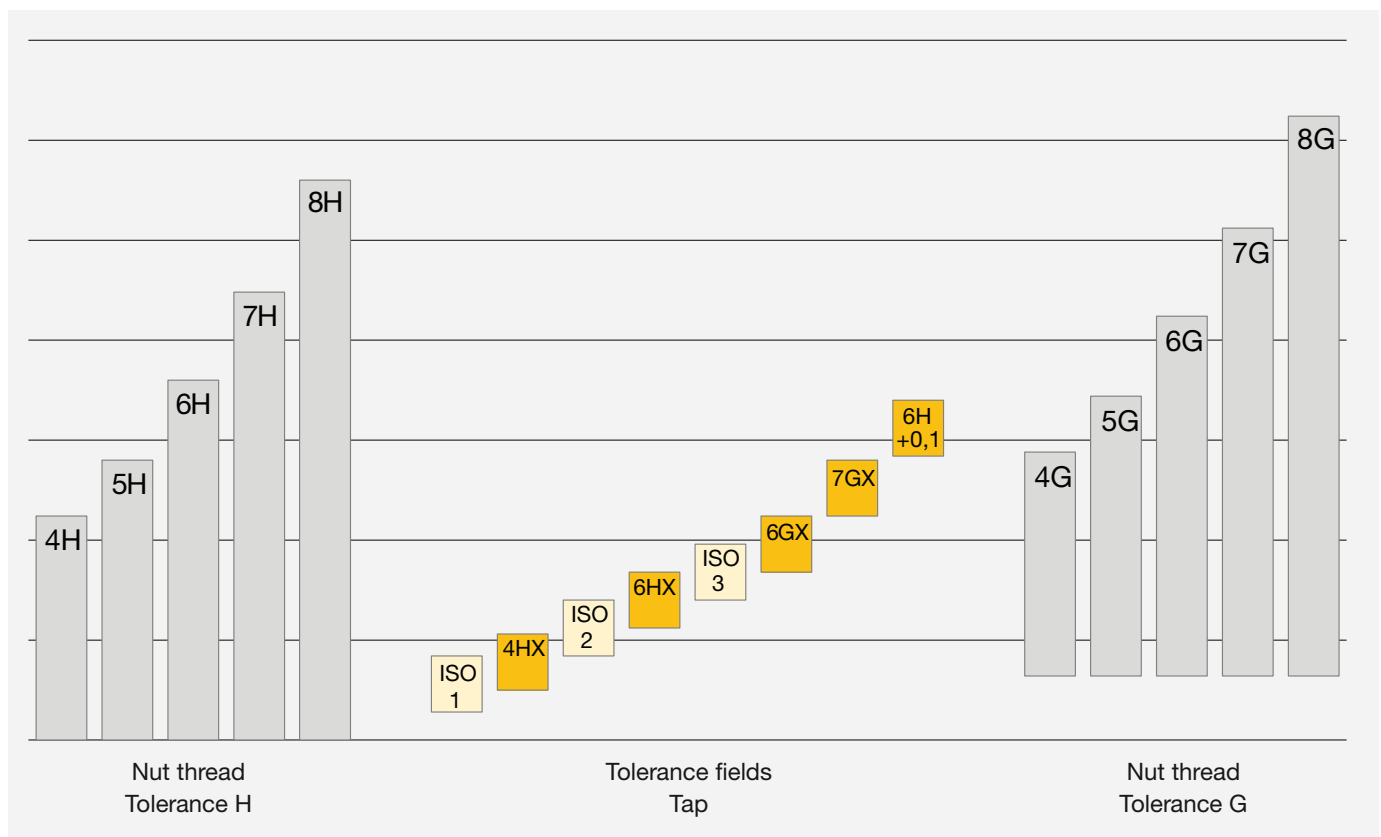
Straight fluted tap  
with short chamfer lead



Straight fluted tap  
with long chamfer lead



## Tolerance fields to DIN EN 22857



## Taps for ISO metric threads DIN EN 22857 (extract)

## Thread clearances and fits

Fits between internal and external threads are separated by a diagonal stroke, as for example 6H/6g (internal/external thread). The fit has to be selected in conjunction with the appropriate thread connection.

The tolerance zones of the tolerance classes fine, medium and coarse are allocated to three screw-in lengths short (S), normal (N) and long (L). Generally, the following rules apply for selecting a tolerance class:

**Fine tolerance zone (S):**

For precision threads, when only a small variation in the fit is permitted.

**Medium tolerance zone (N):**

## General application

**Coarse tolerance zone (L):**

There are no special precision requirements and in cases where production difficulties may occur, e.g. thread production in hot-rolled rods, deep blind holes or plastic components.

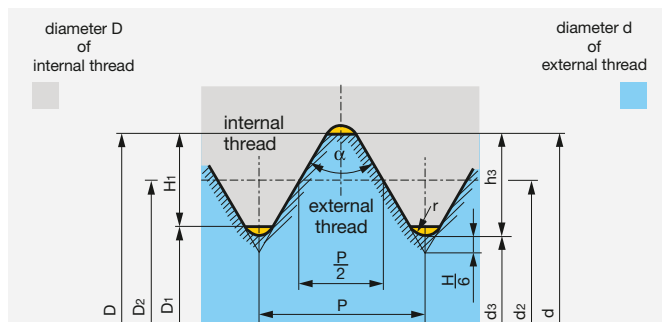
### Screw-in lengths

The quality of thread connection is also affected by the screw-in length. The ISO tolerance system was, especially as regards the pitch diameter, divided into three groups, i.e.

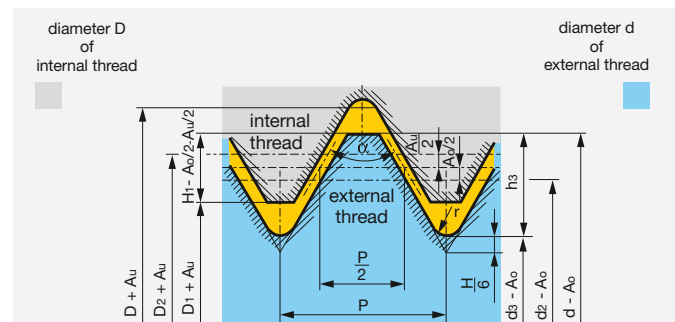
S (Short) = short screw-in length  
N (Normal) = normal screw-in length  
L (Long) = long screw-in length

The following fit should be selected for normal screw-in length N:  
To ensure a tighter fit of thread connections, we recommend  
for short screw-in lengths a narrower fit. As far as long screw-  
in lengths are concerned, fits with a larger tolerance must be  
used to compensate for pitch deviations.

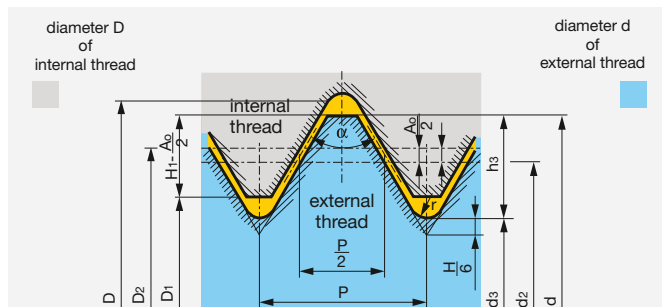
### Thread fits with different flank clearance



Zero profile of thread fit without flank clearance (H/h-fit).



Thread fit with wide flank clearance (G/g-fit or G/e-fit) in external and internal thread.



Thread fit with narrow flank (H/g- or H/e-fit) by basic deviation of external thread.

### Explanation of symbols

|                |   |                                        |
|----------------|---|----------------------------------------|
| D              | = | Ø nom. of internal thread              |
| D <sub>1</sub> | = | Tapping size hole Ø of internal thread |
| D <sub>2</sub> | = | Basic pitch Ø of internal thread       |
| d              | = | Ø nom. of external thread              |
| d <sub>2</sub> | = | Basic pitch Ø of external thread       |
| d <sub>3</sub> | = | Tapping size hole Ø of external thread |
| P              | = | Pitch                                  |
| α              | = | Included angle of thread               |
| H              | = | Height of peak to peak thread profile  |
| A <sub>o</sub> | = | Upper tolerance limit                  |
| A <sub>u</sub> | = | Lower tolerance limit                  |



## Thread production by pressure deformation

Fluteless taps are used for the forming of internal threads without chip removal. In contrast to conventional tapping where material is cut from the workpiece, thread forming is a pressure deformation process without chip removal for the production of internal threads. During the process the material is cold formed without interrupting the grain flow.

According to DIN 8583, thread forming is described as “pressing the thread into the workpiece with a tool possessing a spiral working area”. The spiral threaded, polygonal portion of the fluteless tap is “screwed” into the pre-drilled workpiece with an appropriate constant feed rate equal to the thread pitch. Hereby the thread profile is pressed gradually via the forming lead into the material of the workpiece so to speak. Subsequently, the pressure in the deformation zone exceeds the compression limit, the workpiece becomes ductile and is deformed. The material yields radially, “flows” along the thread profile in the unoccupied base of the tool and forms the minor diameter of the nut thread. The flow process creates the process specific form pockets (claws).

The tapping size hole diameter is heavily dependent on the formability of the material, the workpiece geometry and the required effective depth of the thread. In comparison to conventional tapping, a larger diameter tapping size hole should be selected. With a larger diameter tapping size hole the load on the tool is reduced whilst increasing the tool life. Thanks to the uninterrupted grain flow, the loading capacity of the thread remains sufficient with a 50% effective thread depth.

The partially formed crests of the thread with decreasing effective thread depth are a typical characteristic of threads produced by the thread forming process. With the flanks of the thread fully formed, they have no influence on the tensile strength of the thread. If necessary, the required deformation level of the thread should be determined by performing a test.

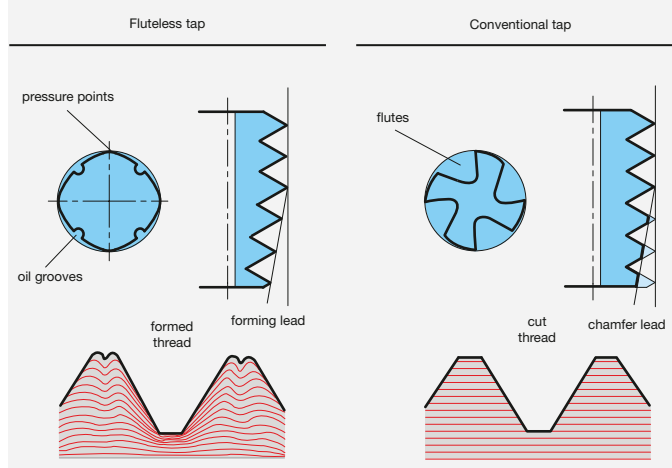
Lubrication is of significant importance. The lubrication prevents material from building up on the thread flanks and ensures that the necessary torque for the forming process is not too high. Therefore, under no circumstances should there ever be a break-down in lubrication! Preference should be given to lubricants such as cooling agents or oils containing graphite such as those used in rolling processes. Always follow the rule: “The better the lubrication the easier the thread forming process!”

### It offers the following advantages

- no chip formation.
- one tool for the production of threads in through and blind holes.
- application in wide range of materials.
- no cutting errors.
- pitch and angle of thread errors that can occur with thread cutting are eliminated.
- internal threads produced by thread forming possess a higher tensile strength particularly at the thread flanks thanks to the so-called “uninterrupted grain flow” and the cold forming process.
- the surface of the thread is improved.
- fluteless taps can be applied at higher speeds because the formability of many materials increases with the forming speed. This does not have a negative effect on the tool life.
- reduced danger of breakage through rigid design

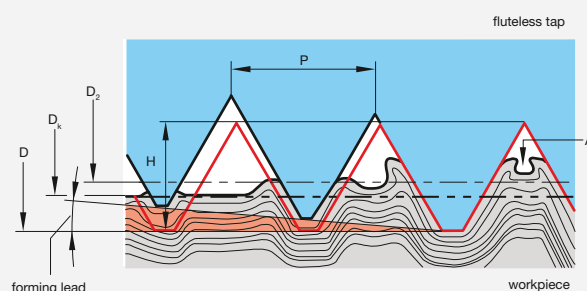
#### Process

The production of internal threads without chip removal (thread forming) in comparison to conventional tapping



Flow characteristics of the material during thread forming and the deformation process

$D$  = nom.- $\varnothing$   
 $D_2$  = flank- $\varnothing$   
 $D_k$  = hole- $\varnothing$   
 $H$  = profile height  
 $P$  = pitch  
 $A$  = form pocket (claw)  
 — finished nut thread



## “Profile” – Gühring’s new fluteless tap generation

### Characteristics and advantages

Conventional fluteless taps, produced by a grinding process only, show traces of microscopic, very fine grinding marks on the surface of the tool. This also applies to the threaded portion of the tool required to perform the thread forming operation.

This surface topography (structure) has a negative effect on the friction between the tool and the material to be re-formed as well as on the herewith associated heat development, on the necessary torque and last but not least on the wear of the pressure points of the fluteless tap. In addition, the “grinding marks” encourage the build-up of the material to be re-formed in the thread flanks of the fluteless tap. This is also called cold welding.

Thanks to a special process to improve the surface topography (structure), Gühring’s new Profile fluteless taps no longer possess these “grinding marks”. This has been confirmed in research and tool life studies in varying materials under production conditions.

For the user, a longer tool life and increased cutting speeds are the benefits of this special process. The tool life can be increased considerably depending on the material to be machined and the application conditions. A 100% increase in tool life is not unusual.

The improved surface topography is not only of benefit to tools with bright finish. Particularly coated tools also benefit from the new process. Outer contour and forming lead greatly determine the performance of the fluteless tap. Numerous tests have shown that fluteless taps with optimal pressure point geometry and quantity achieve increased tool life and dimensional accuracy.

Further improvements in quality are achieved when the fluteless tap is produced completely in one setting and with one grinding wheel - set-up with a special roll. Pitch errors between the thread crests and former lead transition area do not occur as with the conventional grinding process.

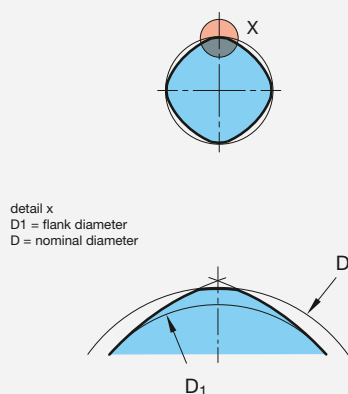


Surface of a conventional fluteless tap

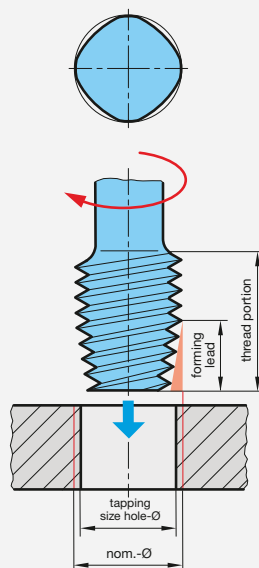


Optimised surface of a Gühring Profile fluteless tap

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  $\geq 1 \times D$



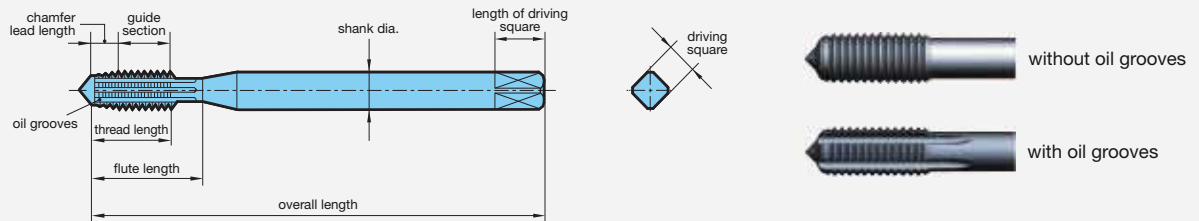
with fluteless taps with oil grooves  
for all thread depths



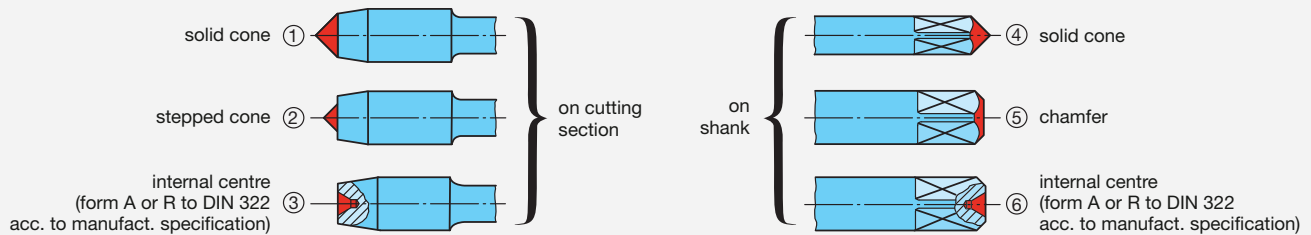


## Definitions, angles, centres, thread tolerances and fits

### Thread portion



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



| Thread dia. range<br>mm | Centre on cutting section        |                        | Centre on shank |
|-------------------------|----------------------------------|------------------------|-----------------|
|                         | with chamfer forms<br>A, C, D, E | with chamfer form<br>B |                 |
| ≤ 5.6                   | ①                                | ①                      | ④⑤⑥             |
| > 5.6 ... 12.8          | ①②③                              | ①②③                    | ④⑤⑥             |
| > 12.8                  | ③                                | ③                      | ⑥               |

### Thread tolerances and fits

Fits between internal and external threads are separated by a diagonal stroke, as for example 6H/6g (internal/external thread). The fit has to be selected in conjunction with the appropriate thread connection.

The tolerance zones of the tolerance classes fine, medium and coarse are allocated to three screw-in lengths short S), normal (N) and long (L). Generally, the following rules apply for selecting a tolerance class:

#### Fine tolerance zone (S):

For precision threads, when only a small variation in the fit is permitted.

#### Screw-in lengths

The quality of thread connection is also affected by the screw-in length. The ISO tolerance system was, especially as regards the pitch diameter, divided into three groups, i.e.

- S (Short) = short screw-in length
- N (Normal) = normal screw-in length
- L (Long) = long screw-in length

#### Medium tolerance zone (N):

General application

#### Coarse tolerance zone (L):

There are no special precision requirements and in cases where production difficulties may occur, e.g. thread production in hot-rolled rods, deep blind holes or plastic components.

The following fit should be selected for normal screw-in length N: To ensure a tighter fit of thread connections, we recommend for short screw-in lengths a narrower fit.

## Tapping size hole diameter

With fluteless tapping, the tapping size hole diameter influences the distinction of the formed thread. A too small tapping size hole diameter results in an over-forming of the thread which must definitely be prevented because this can lead to

tool breakage. A too large tapping size hole is acceptable with certain tolerances because formed threads have a sufficient loading capacity from a 50% bearing depth.

The thread M18x1.5 mm example clearly shows the influence of the tapping size hole diameter selection:

|             |       |       |       |        |        |
|-------------|-------|-------|-------|--------|--------|
| M 18 x 1.00 | 17.55 | 17.52 | 17.62 | 16.917 | 17.217 |
| M 18 x 1.50 | 17.30 | 17.26 | 17.38 | 16.376 | 16.751 |
| M 18 x 2.00 | 17.10 | 17.05 | 17.20 | 15.835 | 16.310 |

Pre-drilling Ø 17.1 mm



Pre-drilling Ø 17.3 mm

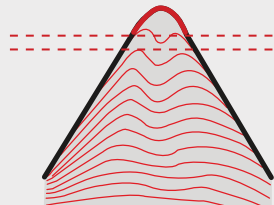


Pre-drilling Ø 17.4 mm



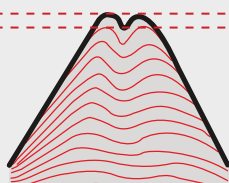
### Tapping size hole diameter is too small:

- thread over-formed
- no form pocket (claw)
- profile too high



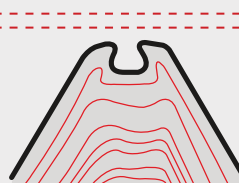
### Optimal tapping size hole diameter:

- thread fully formed
- small form pocket (claw)
- optimal height of profile



### Tapping size hole diameter is too large:

- thread not formed
- large form pocket (claw)
- height of profile too low

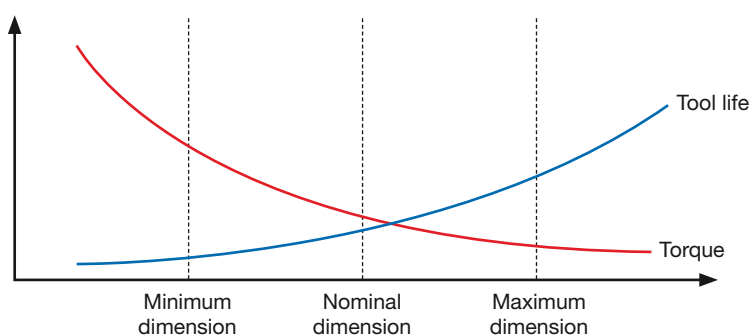


min.  
max.

Tapping size hole diameter tolerance zone to DIN 13, part 50

## Influence of the tapping size hole on tool life, torque and process reliability

The optimisation of the pre-drilling diameter is especially worthwhile in mass production. The larger it is, the longer the tool life and the less the required torque is. The graphic clearly shows the relationship.

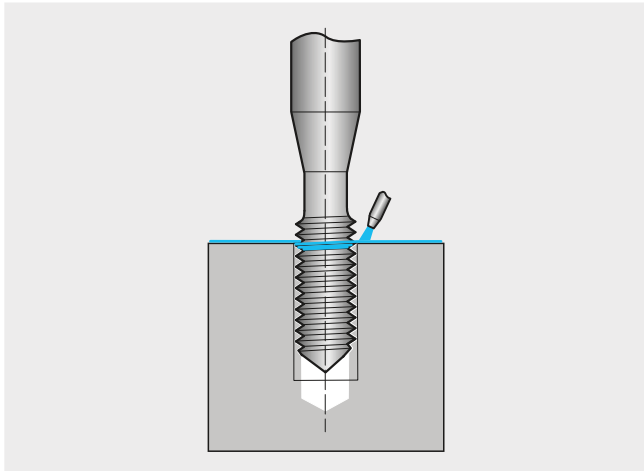




## Lubrication for thread forming

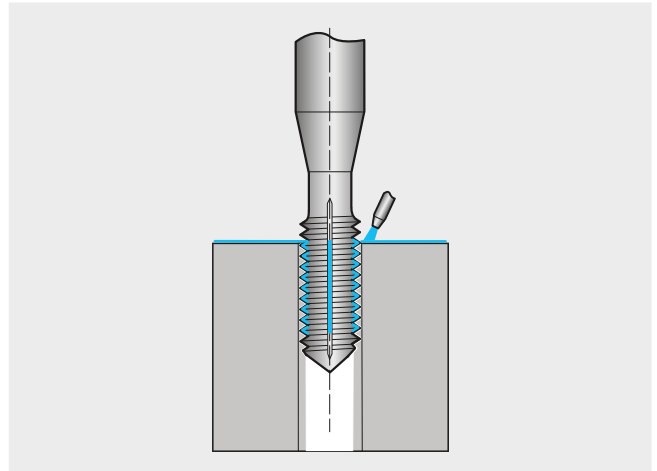
For tool design four different cases should be differentiated between.

**Vertical machining of a blind hole**



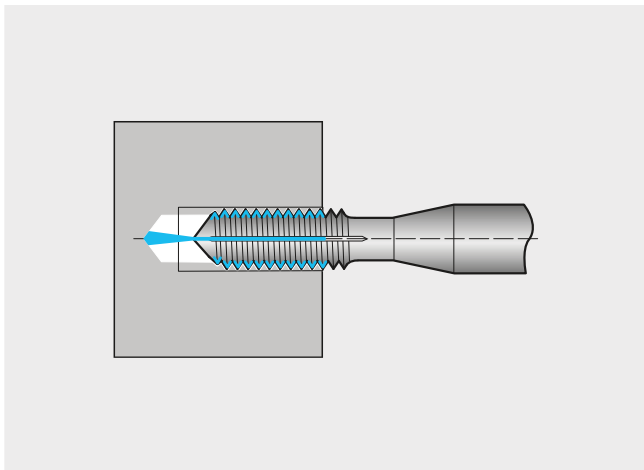
Lubrication grooves and internal coolant delivery is not necessary; external coolant delivery is sufficient (Axial coolant is recommended for very deep threads).

**Vertical machining of a through hole (> 1.5x $D_N$ )**



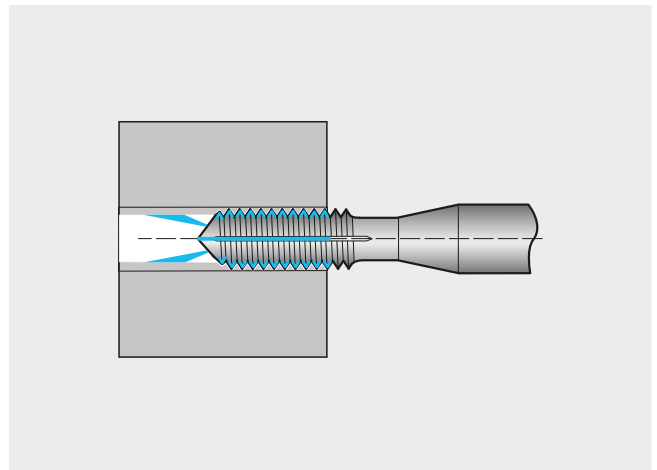
Lubrication grooves are required; internal coolant delivery is not necessary. Via the lubrication grooves the externally delivered coolant can advance to the form edges (Radial coolant is recommended for very deep threads).

**Horizontal machining of blind hole**



Lubrication grooves and internal coolant delivery is necessary. Axial coolant exit is sufficient.

**Horizontal machining of through hole**



Lubrication grooves are required. Internal coolant delivery with radial exit is recommended.

## Cooling lubricants with fluteless taps

With fluteless taps the main task of the coolant is lubrication. The better the lubrication with the maximum concentration, the longer the tool life.

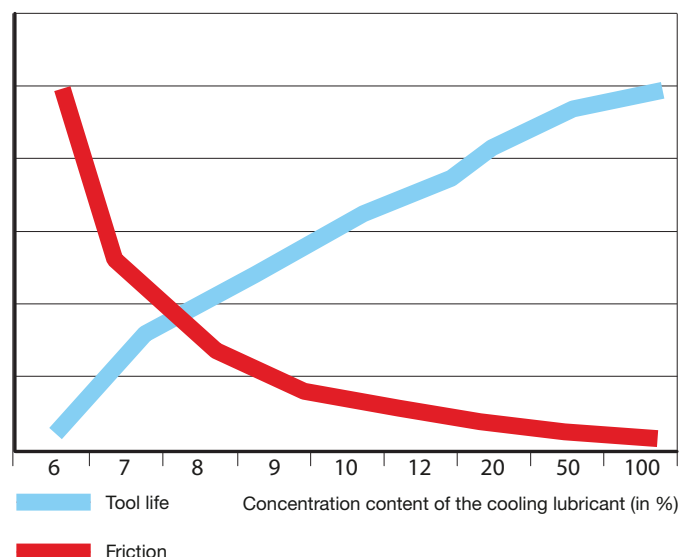
There are two different types of lubricant:

### Oil based lubricants

These are mineral oils with the best lubricating characteristics. They reduce friction and achieve optimal life.

### Soluble lubricants

These soluble lubricants are a concentrate thinned to an emulsion prior to the use with water. The concentration must not be below 6%. A content more than 12% is ideal in order to achieve a long life thanks to a good lubrication effect.



Gühring's tool dispensing systems TM 326, TM 426 and TM 526 optimise your tool storage and your tool management. Gain increased security of your tool stock and increase the transparency of your tool management!



Tool Management  
Powered by

**GÜHRING**



**GÜHRING**



# GÜHRING

P.O. Box 100247 • 72423 Albstadt  
Herderstrasse 50-54 • 72458 Albstadt

T +49 74 31 17-0  
F +49 74 31 17-21279

info@guehring.de  
www.guehring.de

No liability can be accepted for printing errors or technical changes of any kind.  
Our Conditions of Sale and Terms of Payment apply. Available on request.