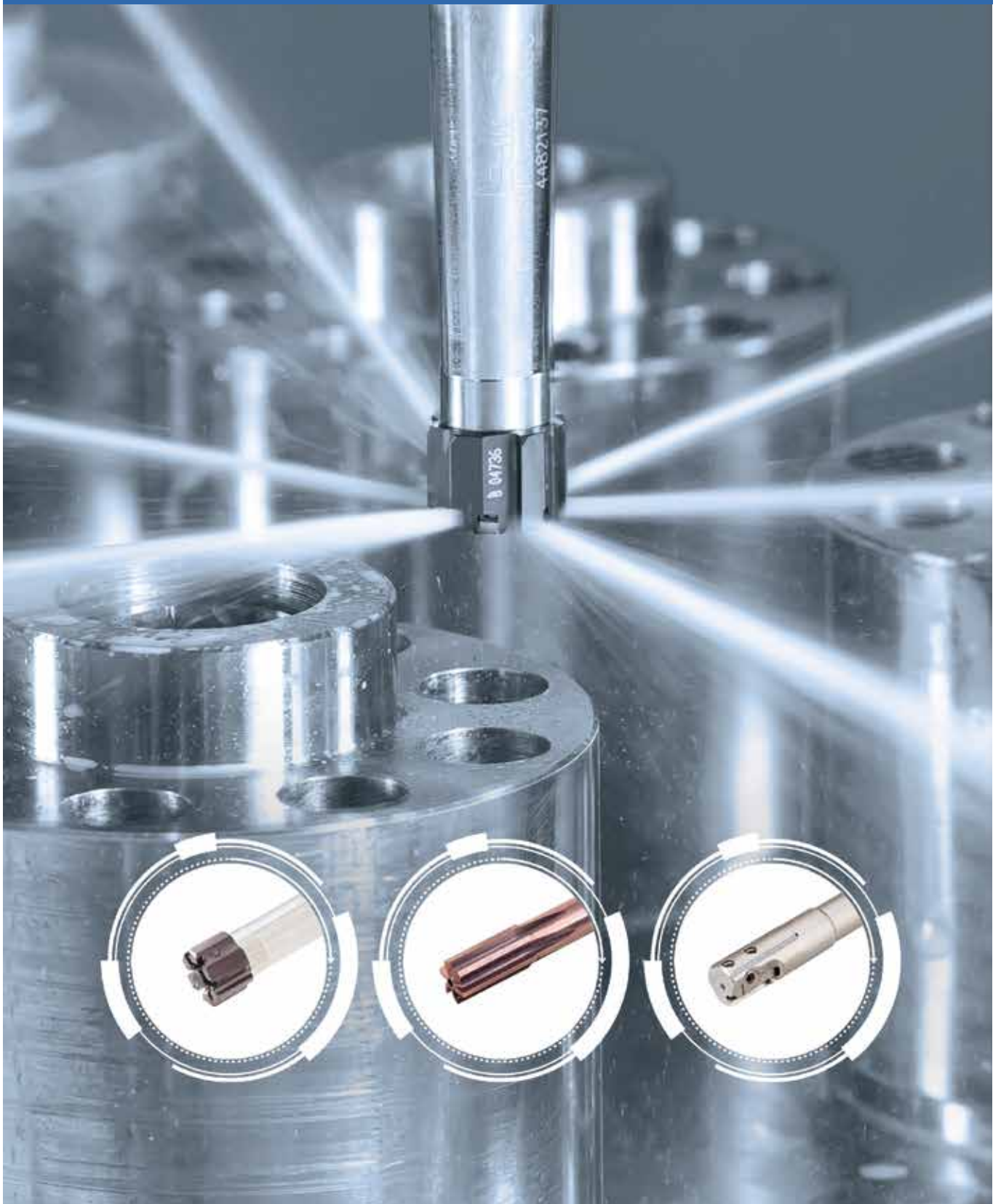
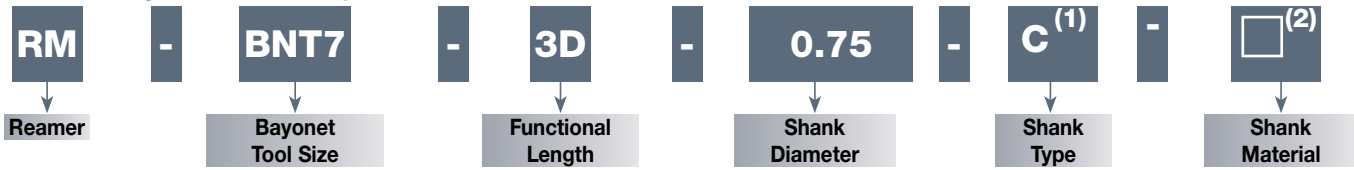


# HIGH PRECISION REAMING



**Holder Designation Code Key**



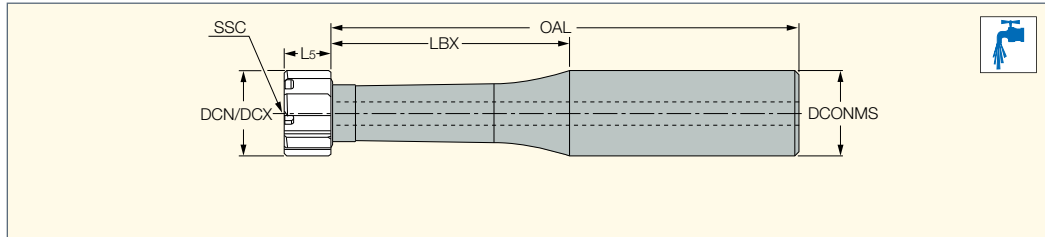
(1) C- cylindrical, W-Weldon, M-Morse



(2) No letter - Steel (default), C-Carbide, W- Heavy metal

**BAYOT-REAM**

**RM-BNT (Shanks)**

Shanks for the BAYO T-REAM Interchangeable Head Reamers



| Designation         | ULDR <sup>(1)</sup> | DCN <sup>(2)</sup> | DCX <sup>(3)</sup> | LBX   | OAL    | L5   | DCONMS | SSC <sup>(4)</sup> |  |  |
|---------------------|---------------------|--------------------|--------------------|-------|--------|------|--------|--------------------|---|---|
| RM-BNT5-1.5D-0.625C | 1.5                 | .4528              | .5315              | .80   | 2.687  | .374 | .625   | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-1.5D-0.625C | 1.5                 | .5316              | .6299              | .95   | 2.835  | .374 | .625   | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-1.5D-0.75C  | 1.5                 | .6300              | .7874              | 1.18  | 3.150  | .421 | .750   | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-1.5D-0.75C  | 1.5                 | .7875              | 1.0000             | 1.50  | 3.468  | .508 | .750   | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-1.5D-1.25C  | 1.5                 | 1.0001             | 1.2600             | 1.89  | 4.252  | .508 | 1.250  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT5-3D-0.625C   | 3.0                 | .4528              | .5315              | 1.59  | 3.476  | .374 | .625   | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-3D-0.625C   | 3.0                 | .5316              | .6299              | 1.89  | 3.776  | .374 | .625   | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-3D-0.75C    | 3.0                 | .6300              | .7874              | 2.36  | 4.329  | .421 | .750   | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-3D-0.75C    | 3.0                 | .7875              | 1.0000             | 2.95  | 4.922  | .508 | .750   | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-3D-1.25C    | 3.0                 | 1.0001             | 1.2600             | 3.71  | 6.072  | .508 | 1.250  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT5-5D-0.625C   | 5.0                 | .4528              | .5315              | 2.66  | 4.546  | .374 | .625   | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-5D-0.625C   | 5.0                 | .5316              | .6299              | 3.15  | 5.036  | .374 | .625   | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-5D-0.75C    | 5.0                 | .6300              | .7874              | 3.93  | 5.899  | .421 | .750   | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-5D-0.75C    | 5.0                 | .7875              | 1.0000             | 4.92  | 6.882  | .508 | .750   | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-5D-1.25C    | 5.0                 | 1.0001             | 1.2600             | 6.23  | 8.592  | .508 | 1.250  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT5-8D-.625C    | 8.0                 | .4528              | .5315              | 4.26  | 6.146  | .374 | .625   | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-8D-.625C    | 8.0                 | .5316              | .6299              | 5.04  | 6.926  | .374 | .625   | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-8D-0.75C    | 8.0                 | .6300              | .7874              | 6.30  | 8.269  | .421 | .750   | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-8D-0.75C    | 8.0                 | .7875              | 1.0000             | 7.87  | 9.842  | .508 | .750   | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-8D-1.25C    | 8.0                 | 1.0001             | 1.2600             | 10.01 | 12.372 | .508 | 1.250  | BN9                | RM-BN9-SR   | RM-BN9-K  |

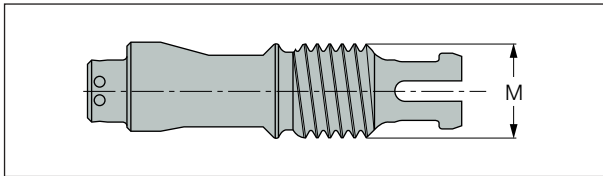
(1) Usable length diameter ratio

(2) Cutting diameter minimum

(3) Cutting diameter maximum

(4) Connection size

**Bayonet Screw**



| Designation | Head Diameter   | Bayonet Size | M  |
|-------------|-----------------|--------------|----|
| RM-BN5-SR   | .4528 - .5315   | BN5          | M5 |
| RM-BN6-SR   | .5315 - .6299   | BN6          | M6 |
| RM-BN7-SR   | .6300 - .7874   | BN7          | M7 |
| RM-BN8-SR   | .7874 - 1.0000  | BN8          | M8 |
| RM-BN9-SR   | 1.0000 - 1.2600 | BN9          | M9 |

**Clamping Key**



| Designation | Head Diameter   | Bayonet Size |
|-------------|-----------------|--------------|
| RM-BN5-K    | .4528 - .5315   | BN5          |
| RM-BN6-K    | .5315 - .6299   | BN6          |
| RM-BN7-K    | .6300 - .7874   | BN7          |
| RM-BN8-K    | .7874 - 1.0000  | BN8          |
| RM-BN9-K    | 1.0000 - 1.2600 | BN9          |

**Holder Designation Code Key**

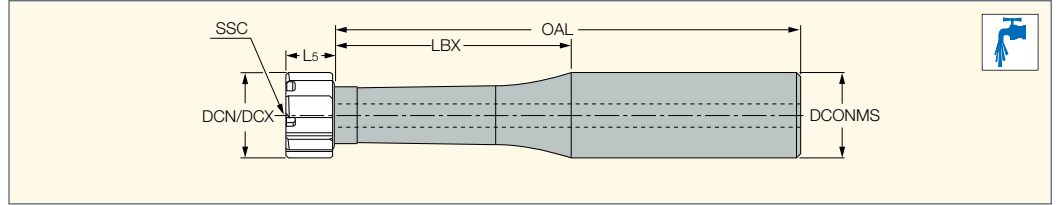




(1) C- cylindrical, W-Weldon, M-Morse

(2) No letter - Steel (default), C-Carbide, W- Heavy metal

**BAYOT-REAM**

**RM-BNT (Shanks)**  
Shanks for BAYO T-REAM  
Interchangeable Head Reamers



| M E T R I C      |                     |                    |                    |       |        |       |        |                    |   |   |
|------------------|---------------------|--------------------|--------------------|-------|--------|-------|--------|--------------------|---|---|
| Designation      | ULDR <sup>(1)</sup> | DCN <sup>(2)</sup> | DCX <sup>(3)</sup> | LBX   | OAL    | L5    | DCONMS | SSC <sup>(4)</sup> |  |  |
| RM-BNT5-1.5D-16C | 1.5                 | 11.501             | 13.500             | 20.3  | 68.25  | 9.50  | 16.00  | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-1.5D-16C | 1.5                 | 13.501             | 16.000             | 24.0  | 72.00  | 9.50  | 16.00  | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-1.5D-20C | 1.5                 | 16.001             | 20.000             | 30.0  | 80.00  | 10.70 | 20.00  | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-1.5D-20C | 1.5                 | 20.001             | 25.400             | 38.1  | 88.10  | 12.90 | 20.00  | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-1.5D-25C | 1.5                 | 25.401             | 32.000             | 48.0  | 104.00 | 12.90 | 25.00  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT9-1.5D-32C | 1.5                 | 25.401             | 32.000             | 48.0  | 108.00 | 12.90 | 32.00  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT5-3D-16C   | 3.0                 | 11.501             | 13.500             | 40.5  | 88.50  | 9.50  | 16.00  | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-3D-16C   | 3.0                 | 13.501             | 16.000             | 48.0  | 96.00  | 9.50  | 16.00  | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-3D-20C   | 3.0                 | 16.001             | 20.000             | 60.0  | 110.00 | 10.70 | 20.00  | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-3D-20C   | 3.0                 | 20.001             | 25.400             | 75.0  | 125.00 | 12.90 | 20.00  | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-3D-25C   | 3.0                 | 25.401             | 32.000             | 94.2  | 150.20 | 12.90 | 25.00  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT9-3D-32C   | 3.0                 | 25.401             | 32.000             | 94.2  | 154.20 | 12.90 | 32.00  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT5-5D-16C   | 5.0                 | 11.501             | 13.500             | 67.7  | 115.70 | 9.50  | 16.00  | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-5D-16C   | 5.0                 | 13.501             | 16.000             | 80.0  | 128.00 | 9.50  | 16.00  | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-5D-20C   | 5.0                 | 16.001             | 20.000             | 100.0 | 150.00 | 10.70 | 20.00  | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-5D-20C   | 5.0                 | 20.001             | 25.400             | 125.0 | 175.00 | 12.90 | 20.00  | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-5D-32C   | 5.0                 | 25.401             | 32.000             | 158.2 | 218.20 | 12.90 | 32.00  | BN9                | RM-BN9-SR   | RM-BN9-K  |
| RM-BNT5-8D-16C   | 8.0                 | 11.501             | 13.500             | 108.2 | 156.20 | 9.50  | 16.00  | BN5                | RM-BN5-SR   | RM-BN5-K  |
| RM-BNT6-8D-16C   | 8.0                 | 13.501             | 16.000             | 128.0 | 176.00 | 9.50  | 16.00  | BN6                | RM-BN6-SR   | RM-BN6-K  |
| RM-BNT7-8D-20C   | 8.0                 | 16.001             | 20.000             | 160.0 | 210.00 | 10.70 | 20.00  | BN7                | RM-BN7-SR   | RM-BN7-K  |
| RM-BNT8-8D-20C   | 8.0                 | 20.001             | 25.400             | 200.0 | 250.00 | 12.90 | 20.00  | BN8                | RM-BN8-SR   | RM-BN8-K  |
| RM-BNT9-8D-32C   | 8.0                 | 25.401             | 32.000             | 254.2 | 314.20 | 12.90 | 32.00  | BN9                | RM-BN9-SR   | RM-BN9-K  |

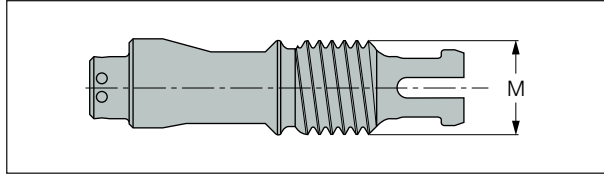
(1) Usable length diameter ratio

(2) Reamer min. diameter

(3) Reamer max. diameter

(4) Connection size

**Bayonet Screw**



| Designation | Head Diameter | Bayonet Size | M  |
|-------------|---------------|--------------|----|
| RM-BN5-SR   | 11.501-13.500 | BN5          | M5 |
| RM-BN6-SR   | 13.501-16.000 | BN6          | M6 |
| RM-BN7-SR   | 16.001-20.000 | BN7          | M7 |
| RM-BN8-SR   | 20.001-25.400 | BN8          | M8 |
| RM-BN9-SR   | 25.401-32.000 | BN9          | M9 |

**Clamping Key**

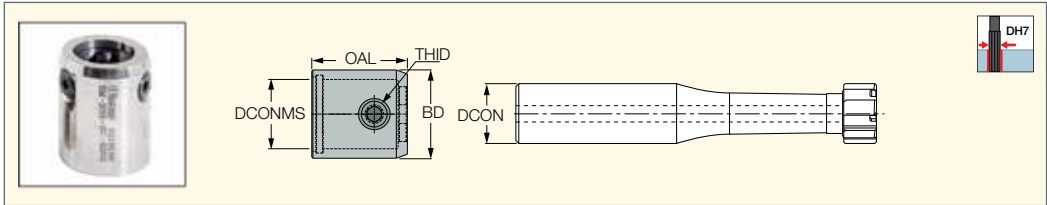



| Designation | Head Diameter | Bayonet Size |
|-------------|---------------|--------------|
| RM-BN5-K    | 11.501-13.500 | BN5          |
| RM-BN6-K    | 13.501-16.000 | BN6          |
| RM-BN7-K    | 16.001-20.000 | BN7          |
| RM-BN8-K    | 20.001-25.400 | BN8          |
| RM-BN9-K    | 25.401-32.000 | BN9          |

**Accessories**

**BAYOT-REAM**

**RM-BN-RC-RING**  
Runout Adjustment Rings for  
RM-BNT Reamer Holders



| Designation    | BD     | OAL   | DCONMS | THID   | SS <sup>(1)</sup> | DCON <sup>(2)</sup> |  |
|----------------|--------|-------|--------|--------|-------------------|---------------------|---|
| RM-BN5-RC-RING | .7874  | .787  | .638   | M5x0.5 | RM-BNT5           | .630                | RM-BN5-RC-SR  |
| RM-BN6-RC-RING | .7874  | .866  | .638   | M6x0.5 | RM-BNT6           | .630                | RM-BN6-RC-SR  |
| RM-BN7-RC-RING | .9449  | 1.024 | .795   | M8x0.5 | RM-BNT7           | .787                | RM-BN7/8/9-RC-SR  |
| RM-BN8-RC-RING | 1.0630 | 1.299 | .795   | M8x0.5 | RM-BNT8           | .787                | RM-BN7/8/9-RC-SR  |
| RM-BN9-RC-RING | 1.5354 | 1.378 | 1.268  | M8x0.5 | RM-BNT9           | 1.260               | RM-BN7/8/9-RC-SR  |

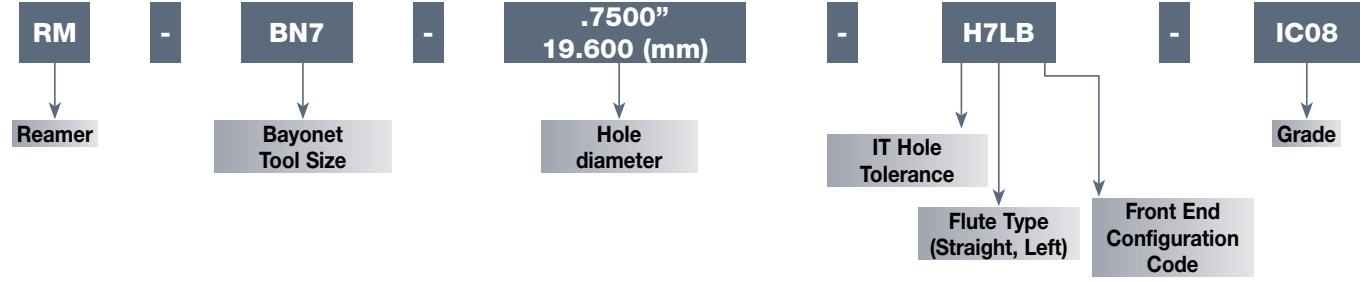
<sup>(1)</sup> Reamer holder shank size

<sup>(2)</sup> RM-BNT reamer holder shank size





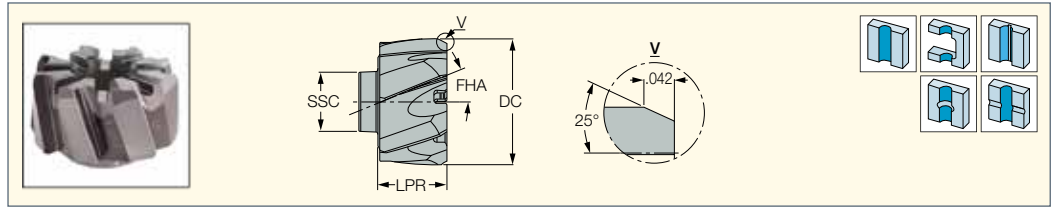
**Designation Code Key**



**BAYOT-REAM**

**RM-BN-H7LB**

Quick Change Left-Hand Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming Through Holes



| Designation        | Dimensions         |        |      |                    |      | Tough ↔ Hard |       |
|--------------------|--------------------|--------|------|--------------------|------|--------------|-------|
|                    | SSC <sup>(1)</sup> | DC     | LPR  | NOF <sup>(2)</sup> | FHA  | IC08         | IC908 |
| RM-BN5-0.5000-H7LB | BN5                | .5000  | .374 | 6                  | 20.0 | ●            | ●     |
| RM-BN6-0.6250-H7LB | BN6                | .6250  | .374 | 6                  | 20.0 | ●            | ●     |
| RM-BN7-0.7500-H7LB | BN7                | .7500  | .421 | 6                  | 20.0 | ●            | ●     |
| RM-BN8-1.0000-H7LB | BN8                | 1.0000 | .508 | 8                  | 20.0 | ●            | ●     |
| RM-BN9-1.0000-H7LB | BN9                | 1.0000 | .508 | 8                  | 20.0 | ●            | ●     |
| RM-BN9-1.2500-H7LB | BN9                | 1.2500 | .508 | 8                  | 20.0 | ●            | ●     |

• For user guide, see pages 380-385

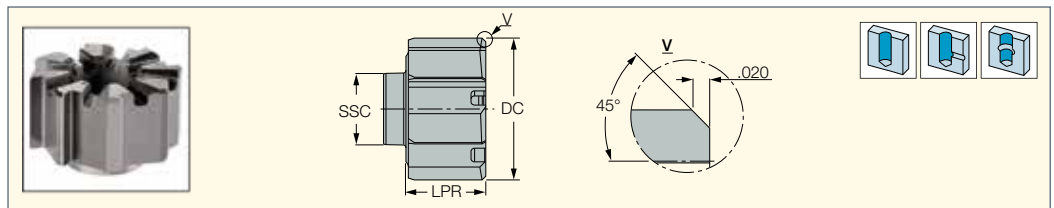
<sup>(1)</sup> Seat size code

<sup>(2)</sup> Number of flutes

**BAYOT-REAM**

**RM-BN-H7SA**

Quick Change Straight Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming Blind Holes



| Designation                       | Dimensions         |        |      |                    |      | Tough ↔ Hard |       |
|-----------------------------------|--------------------|--------|------|--------------------|------|--------------|-------|
|                                   | SSC <sup>(2)</sup> | DC     | LPR  | NOF <sup>(3)</sup> | FHA  | IC08         | IC908 |
| RM-BN5-0.5000-H7SA                | BN5                | .5000  | .374 | 6                  | 20.0 | ●            | ●     |
| RM-BN6-0.6250-H7SA                | BN6                | .6250  | .374 | 6                  | 20.0 | ●            | ●     |
| RM-BN7-0.7500-H7SA                | BN7                | .7500  | .421 | 6                  | 20.0 | ●            | ●     |
| RM-BN8-1.0000-H7SA                | BN8                | 1.0000 | .508 | 6                  | 20.0 | ●            | ●     |
| RM-BN9-1.0000-H7SA <sup>(1)</sup> | BN9                | 1.0000 | .508 | 8                  | 20.0 | ●            | ●     |
| RM-BN9-1.2500-H7SA <sup>(1)</sup> | BN9                | 1.2500 | .508 | 8                  | 20.0 | ●            | ●     |

• For user guide, see pages 380-385

<sup>(1)</sup> The uncoated fine grain IC08 is available on request

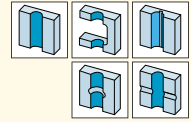
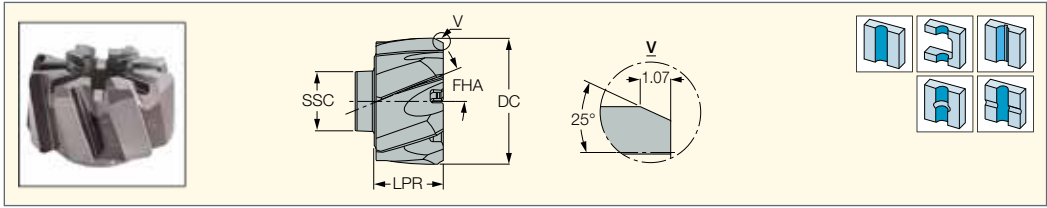
<sup>(2)</sup> Seat size code

<sup>(3)</sup> Number of flutes

**BAYOT-REAM**

**RM-BN-H7LB**

Quick Change Left-Hand Flute  
Interchangeable Solid Carbide  
Reaming Heads for High Speed  
Reaming Through Holes



**M E T R I C**

| Designation                       | Dimensions         |        |       |                    |      | Tough ↔ Hard |       |
|-----------------------------------|--------------------|--------|-------|--------------------|------|--------------|-------|
|                                   | SSC <sup>(2)</sup> | DC     | LPR   | NOF <sup>(3)</sup> | FHA  | IC08         | IC908 |
| RM-BN5-11.501-H7LB                | BN5                | 11.501 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN5-12.000-H7LB                | BN5                | 12.000 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN5-13.000-H7LB                | BN5                | 13.000 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN5-13.500-H7LB                | BN5                | 13.500 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN6-13.501-H7LB                | BN6                | 13.501 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN6-14.000-H7LB                | BN6                | 14.000 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN6-15.000-H7LB                | BN6                | 15.000 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN6-16.000-H7LB                | BN6                | 16.000 | 9.50  | 6                  | 20.0 | ●            | ●     |
| RM-BN7-16.001-H7LB                | BN7                | 16.001 | 10.70 | 6                  | 20.0 | ●            | ●     |
| RM-BN7-17.000-H7LB                | BN7                | 17.000 | 10.70 | 6                  | 20.0 | ●            | ●     |
| RM-BN7-18.000-H7LB                | BN7                | 18.000 | 10.70 | 6                  | 20.0 | ●            | ●     |
| RM-BN7-19.000-H7LB                | BN7                | 19.000 | 10.70 | 6                  | 20.0 | ●            | ●     |
| RM-BN7-20.000-H7LB                | BN7                | 20.000 | 10.70 | 6                  | 20.0 | ●            | ●     |
| RM-BN8-20.001-H7LB                | BN8                | 20.001 | 12.90 | 8                  | 20.0 | ●            | ●     |
| RM-BN8-21.000-H7LB                | BN8                | 21.000 | 12.90 | 8                  | 20.0 | ●            | ●     |
| RM-BN8-22.000-H7LB                | BN8                | 22.000 | 12.90 | 8                  | 20.0 | ●            | ●     |
| RM-BN8-23.000-H7LB                | BN8                | 23.000 | 12.90 | 8                  | 20.0 | ●            | ●     |
| RM-BN8-24.000-H7LB                | BN8                | 24.000 | 12.90 | 8                  | 20.0 | ●            | ●     |
| RM-BN8-25.000-H7LB                | BN8                | 25.000 | 12.90 | 8                  | 20.0 | ●            | ●     |
| RM-BN9-26.000-H7LB <sup>(1)</sup> | BN9                | 26.000 | 12.90 | 8                  | 20.0 |              | ●     |
| RM-BN9-27.000-H7LB <sup>(1)</sup> | BN9                | 27.000 | 12.90 | 8                  | 20.0 |              | ●     |
| RM-BN9-28.000-H7LB <sup>(1)</sup> | BN9                | 28.000 | 12.90 | 8                  | 20.0 |              | ●     |
| RM-BN9-29.000-H7LB <sup>(1)</sup> | BN9                | 29.000 | 12.90 | 8                  | 20.0 |              | ●     |
| RM-BN9-30.000-H7LB <sup>(1)</sup> | BN9                | 30.000 | 12.90 | 8                  | 20.0 |              | ●     |
| RM-BN9-31.000-H7LB <sup>(1)</sup> | BN9                | 31.000 | 12.90 | 8                  | 20.0 |              | ●     |
| RM-BN9-32.000-H7LB <sup>(1)</sup> | BN9                | 32.000 | 12.90 | 8                  | 20.0 |              | ●     |

• For user guide, see pages 380-385

<sup>(1)</sup> The uncoated fine grain IC08 is available on request

<sup>(2)</sup> Seat size code

<sup>(3)</sup> Number of flutes

**Complementary Grades (on request):**

**IC30N** cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel, low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm<sup>2</sup>) and nodular iron (GGG40, GGG60, etc.)

**ID5 (PCD)** recommended for high speed reaming of aluminum (special cases).

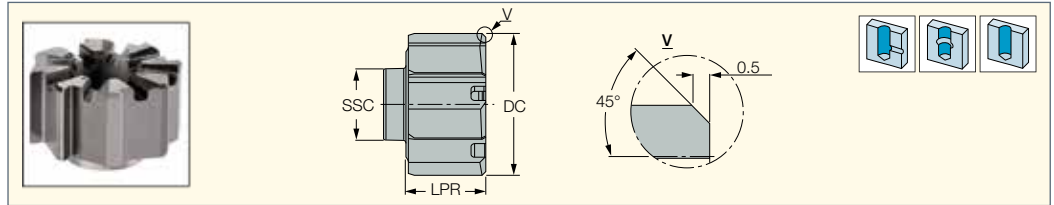
**RN01** (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.



# BAYOT-REAM

## RM-BN-H7SA

Quick Change Straight Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming Blind Holes



| M E T R I C                       |                    |        |       |                    |              |       |  |
|-----------------------------------|--------------------|--------|-------|--------------------|--------------|-------|--|
| Designation                       | Dimensions         |        |       |                    | Tough ↔ Hard |       |  |
|                                   | SSC <sup>(2)</sup> | DC     | LPR   | NOF <sup>(3)</sup> | IC08         | IC908 |  |
| RM-BN5-11.501-H7SA                | BN5                | 11.501 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN5-12.000-H7SA                | BN5                | 12.000 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN5-13.000-H7SA                | BN5                | 13.000 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN5-13.500-H7SA                | BN5                | 13.500 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN6-13.501-H7SA                | BN6                | 13.501 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN6-14.000-H7SA                | BN6                | 14.000 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN6-15.000-H7SA                | BN6                | 15.000 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN6-16.000-H7SA                | BN6                | 16.000 | 9.50  | 6                  | ●            | ●     |  |
| RM-BN7-16.001-H7SA                | BN7                | 16.001 | 10.70 | 6                  | ●            | ●     |  |
| RM-BN7-17.000-H7SA                | BN7                | 17.000 | 10.70 | 6                  | ●            | ●     |  |
| RM-BN7-18.000-H7SA                | BN7                | 18.000 | 10.70 | 6                  | ●            | ●     |  |
| RM-BN7-19.000-H7SA                | BN7                | 19.000 | 10.70 | 6                  | ●            | ●     |  |
| RM-BN7-20.000-H7SA                | BN7                | 20.000 | 10.70 | 6                  | ●            | ●     |  |
| RM-BN8-20.001-H7SA                | BN8                | 20.001 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN8-21.000-H7SA                | BN8                | 21.000 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN8-22.000-H7SA                | BN8                | 22.000 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN8-23.000-H7SA                | BN8                | 23.000 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN8-24.000-H7SA                | BN8                | 24.000 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN8-25.000-H7SA                | BN8                | 25.000 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN9-26.000-H7SA                | BN9                | 26.000 | 12.90 | 8                  | ●            | ●     |  |
| RM-BN9-27.000-H7SA <sup>(1)</sup> | BN9                | 27.000 | 12.90 | 8                  |              | ●     |  |
| RM-BN9-28.000-H7SA <sup>(1)</sup> | BN9                | 28.000 | 12.90 | 8                  |              | ●     |  |
| RM-BN9-29.000-H7SA <sup>(1)</sup> | BN9                | 29.000 | 12.90 | 8                  |              | ●     |  |
| RM-BN9-30.000-H7SA <sup>(1)</sup> | BN9                | 30.000 | 12.90 | 8                  |              | ●     |  |
| RM-BN9-31.000-H7SA <sup>(1)</sup> | BN9                | 31.000 | 12.90 | 8                  |              | ●     |  |
| RM-BN9-32.000-H7SA <sup>(1)</sup> | BN9                | 32.000 | 12.90 | 8                  |              | ●     |  |

• For user guide, see pages 380-385

<sup>(1)</sup> The uncoated fine grain IC08 is available on request

<sup>(2)</sup> Seat size code

<sup>(3)</sup> Number of flutes

### Complementary Grades (on request):

**IC30N** cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel, low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm<sup>2</sup>) and nodular iron (GGG40, GGG60, etc.)

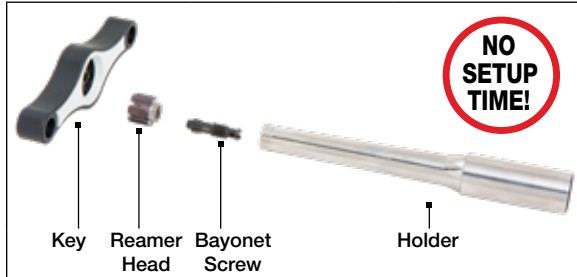
**ID5 (PCD)** recommended for high speed reaming aluminum (special cases).

**RN01** (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.

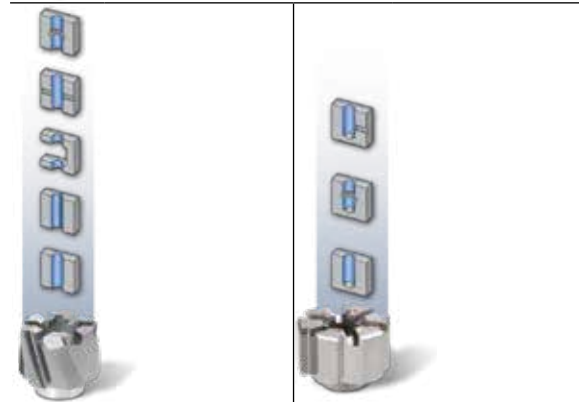
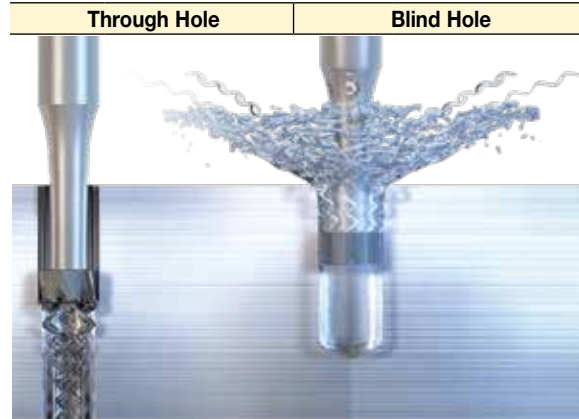


The BAYO T-REAM Line is Available in 5 Sizes

Each size has its own diameter range and holder.  
 For example:  
 The same RM-BN7 holder can hold  
 any head between Ø.630-.787"



| RM-BN9                  | RM-BN8                 | RM-BN7                | RM-BN6                | RM-BN5                |
|-------------------------|------------------------|-----------------------|-----------------------|-----------------------|
|                         |                        |                       |                       |                       |
| RM-BN9<br>Ø1.000-1.260" | RM-BN8<br>Ø.787-1.000" | RM-BN7<br>Ø.630-.787" | RM-BN6<br>Ø.532-.630" | RM-BN5<br>Ø.453-.532" |



**Left-Hand Flute**  
 The left-hand spiral is designed especially for through hole reaming. The chips are pushed forward after formation.

**Straight Flute**  
 The coolant flow assists the chip evacuation process. It directs the just-formed chips backwards. The chips pass through the straight flutes and are pushed out of the hole, without causing damage to the reamer or hole surface.

**ATTENTION:** Cutting tools can break during use. To avoid injury always use safety precautions such as gloves, shields and eye protection.

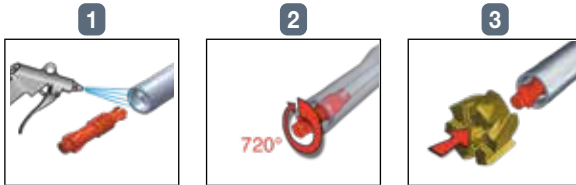
**Assembly Instructions (BN5-BN9)**

**First Assembly**

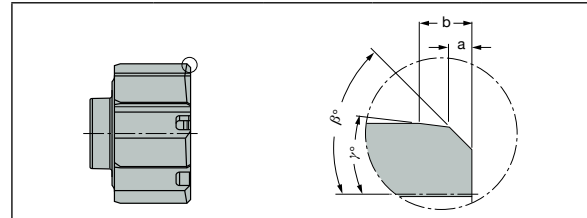
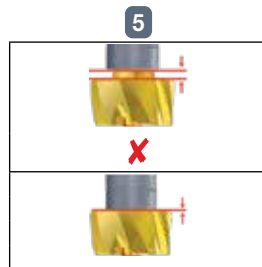
- Clean the toolholder pocket (Fig. 1)
- Clean the reamer head clamping cone
- Insert the clamping screw into the holder and rotate it 2-3 turns in a clockwise direction (Fig. 2)
- Clamp the reaming head on the screw; note, BN8 and BN9 can be assembled only in a specific position relative to the screw (rotate the head until locating the correct position) (Fig. 3)
- Manually rotate the reaming head until it sits firmly in the pocket
- Tighten with the special key (Fig. 4)
- Make sure there is no face gap between the toolholder and the reaming head (Fig. 5)

**Indexing**

- Release the reaming head with the key, turning in a counterclockwise direction until it rotates freely
- Rotate another one turn by hand
- Remove the reamer head from the tool; the clamping screw should remain inside
- Clean the pocket of the toolholder (Fig. 1)
- Clean the cone on the new reamer head
- Clamp the reaming head on the screw; note, BN8 and BN9 can be assembled only in a specific position relative to the screw (rotate the head until locating the correct position) (Fig. 3)
- Manually rotate the reaming head. In the beginning it should rotate without the screw and then (after 1/6 of a turn) it should engage with the screw. Rotate until it sits firmly in the pocket. If the screw rotates together with the reaming head from the beginning, remove the reaming head and open the screw another one turn.
- Tighten with the special key (Fig. 4)
- Make sure that there is no face gap between the toolholder and the reaming head (Fig. 5)



- BN9: 186-204 Lbfxinch
- BN8: 150-177 Lbfxinch
- BN7: 115-133 Lbfxinch
- BN6: 71-89 Lbfxinch
- BN5: 62-71 Lbfxinch



| Lead Code / Parameter | $\beta^\circ$                   | a [inch] | $g^\circ$ | b [inch] |
|-----------------------|---------------------------------|----------|-----------|----------|
| A                     | 45°                             | .020     | -         | -        |
| B                     | 25°                             | .042     | -         | -        |
| C                     | 45°                             | .020     | 8°        | .030     |
| D                     | 30°                             | .020     | 4°        | .073     |
| E                     | 45°                             | .008     | -         | -        |
| F                     | 90°                             | -        | -         | -        |
| G                     | 75°                             | .006     | -         | -        |
| X                     | Specially Tailored (undesigned) |          |           |          |

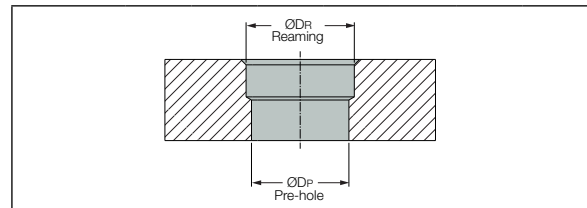
When choosing a reamer, it is important to select a lead geometry that covers the reaming allowance.

**Reaming Allowance**

Reaming allowance is the stock material which should be removed by reaming. It is recommended to leave different reaming allowances depending on the workpiece material and the pre-hole quality. Pre-hole should be smooth and straight, free of deep scratches.

**Complementary Grades (on request):**

IC30N cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel, low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <160 ksi) and nodular iron (GGG40, GGG60, etc.) ID5 (PCD) recommended for high speed reaming aluminum (special cases). RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.



| Material            | Hole $\varnothing$ inch |             |             |             |             |             |                     |
|---------------------|-------------------------|-------------|-------------|-------------|-------------|-------------|---------------------|
|                     | < .374                  | .375-.453   | .454-.531   | .532-.630   | .631-1.260  | >1.260      |                     |
| Steel and Cast Iron | .0030-.0040             | .0030-.0060 | .0040-.0080 | .0040-.0120 | .0040-.0120 | .0080-.0160 | inch/ $\varnothing$ |
| Aluminum and Brass  | .0030-.0040             | .0040-.0060 | .0060-.0100 | .0080-.0120 | .0080-.0160 | .0080-.0200 | inch/ $\varnothing$ |

$\Delta$  - Reaming allowance

$\Delta = \varnothing DR - \varnothing DP$



## Recommended Cutting Conditions for BAYO T-REAM High Speed Reaming Heads

| ISO                    | Material   | Condition                    | Material No.(1)             | Through Hole               |                              |                              |                              | Interrupted Through Hole     |                              |                              |                              |                              |
|------------------------|--|------------------------------|-----------------------------|----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
|                        |  |                              |                             | FIRST choice               |                              | Second choice                |                              | FIRST choice                 |                              | Second choice                |                              |                              |
| P                      | Non-alloy steel and cast steel, free cutting steel           | Annealed                     | 1                           | IC908                      | LB                           | IC30N                        | LA                           | IC908                        | LB                           | IC908                        | SA                           |                              |
|                        |  | Annealed                     | 2                           | V <sub>c</sub> = 260 - 660 |                              | V <sub>c</sub> = 300 - 790   |                              | V <sub>c</sub> = 200 - 390   |                              | V <sub>c</sub> = 200 - 390   |                              |                              |
|                        |  | Quenched and tempered        | 3                           | BN4 - BN6                  | f <sub>z</sub> = .003 - .008 | BN4 - BN6                    | f <sub>z</sub> = .003 - .008 | BN4 - BN6                    | f <sub>z</sub> = .002 - .007 | BN4 - BN6                    | f <sub>z</sub> = .002 - .006 |                              |
|                        |  | Annealed                     | 4                           |                            |                              |                              |                              |                              |                              |                              |                              |                              |
|                        |  | Quenched and tempered        | 5                           | BN7 - BN9                  | f <sub>z</sub> = .005 - .011 | BN7 - BN9                    | f <sub>z</sub> = .005 - .011 | BN7 - BN9                    | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .003 - .006 |                              |
|                        | Low alloy and cast steel (less than 5% of alloying elements) | Annealed                     | 6                           | IC908                      | LB                           | IC30N                        | LA                           | IC908                        | LB                           | IC908                        | SA                           |                              |
|                        |  | Quenched and tempered        | 7                           | V <sub>c</sub> = 260 - 660 |                              | V <sub>c</sub> = 300 - 790   |                              | V <sub>c</sub> = 200 - 390   |                              | V <sub>c</sub> = 200 - 390   |                              |                              |
|                        |  |                              | 8                           | BN4 - BN6                  | f <sub>z</sub> = .003 - .008 | BN4 - BN6                    | f <sub>z</sub> = .003 - .008 | BN4 - BN6                    | f <sub>z</sub> = .002 - .007 | BN4 - BN6                    | f <sub>z</sub> = .002 - .006 |                              |
|                        | High alloyed steel, cast steel and tool steel                | Annealed                     | 10                          | IC908                      | LB                           | IC908                        | SA                           | IC908                        | LB                           | IC908                        | SA                           |                              |
|                        |  |                              | 11                          | V <sub>c</sub> = 65 - 200  |                              | V <sub>c</sub> = 65 - 200    |                              | V <sub>c</sub> = 65 - 200    |                              | V <sub>c</sub> = 65 - 200    |                              |                              |
|                        |  | Ferritic/martensitic         | 11                          | BN4 - BN6                  | f <sub>z</sub> = .002 - .005 | BN4 - BN6                    | f <sub>z</sub> = .002 - .004 | BN4 - BN6                    | f <sub>z</sub> = .002 - .004 | BN4 - BN6                    | f <sub>z</sub> = .001 - .004 |                              |
|                        | Stainless steel and cast steel                               | Martensitic                  | 12                          | IC908                      | LB                           | IC908                        | SA                           | IC908                        | LB                           | IC908                        | SA                           |                              |
| Ferritic / martensitic |  | 13                           | V <sub>c</sub> = 65 - 130   |                            | V <sub>c</sub> = 65 - 130    |                              | V <sub>c</sub> = 65 - 130    |                              | V <sub>c</sub> = 65 - 130    |                              |                              |                              |
| M                      | Stainless steel and cast steel                               | Austenitic, duplex           | 14                          | BN7 - BN9                  | f <sub>z</sub> = .003 - .007 | BN7 - BN9                    | f <sub>z</sub> = .002 - .006 | BN7 - BN9                    | f <sub>z</sub> = .002 - .006 | BN7 - BN9                    | f <sub>z</sub> = .002 - .004 |                              |
|                        |  | Gray cast iron (GG)          | Ferritic / pearlitic        | 15                         | IC908                        | LB                           | IC908                        | SA                           | IC908                        | LB                           | IC908                        | SA                           |
|                        | Pearlitic / martensitic                                      |                              | 16                          | V <sub>c</sub> = 390 - 720 |                              | V <sub>c</sub> = 390 - 720   |                              | V <sub>c</sub> = 260 - 660   |                              | V <sub>c</sub> = 260 - 660   |                              |                              |
|                        | Nodular cast iron (GGG)                                      | Ferritic                     | 17                          | IC908                      | SA or LB                     | IC30N                        | LA                           | IC908                        | LB                           | IC908                        | SA                           |                              |
|                        |  |                              | 18                          | V <sub>c</sub> = 530 - 920 |                              | V <sub>c</sub> = 530 - 980   |                              | V <sub>c</sub> = 490 - 820   |                              | V <sub>c</sub> = 490 - 820   |                              |                              |
|                        |  | Pearlitic                    | 18                          | BN4 - BN6                  | f <sub>z</sub> = .004 - .008 | BN4 - BN6                    | f <sub>z</sub> = .004 - .008 | BN4 - BN6                    | f <sub>z</sub> = .002 - .006 | BN4 - BN6                    | f <sub>z</sub> = .002 - .006 |                              |
|                        | Malleable cast iron  | Ferritic                     | 19                          | IC908                      | SA or LB                     | IC30N                        | LA or SA                     | IC908                        | LB                           | IC908                        | SA                           |                              |
|                        |  |                              | 20                          | V <sub>c</sub> = 330 - 720 |                              | V <sub>c</sub> = 330 - 790   |                              | V <sub>c</sub> = 330 - 720   |                              | V <sub>c</sub> = 330 - 720   |                              |                              |
|                        | K  | Aluminum-wrought alloys      | Not hardenable              | 21                         | RN01                         | LB or SG                     | ID5                          | SG                           | RN01                         | LB                           | ID5                          | SG                           |
|                        |  |                              | Hardenable                  | 22                         | V <sub>c</sub> = 490 - 1310  |                              | V <sub>c</sub> = 660 - 1640  |                              | V <sub>c</sub> = 490 - 1150  |                              | V <sub>c</sub> = 660 - 1640  |                              |
|                        |  | Aluminum-cast alloys         | Not hardenable              | 23                         |                              |                              |                              |                              |                              |                              |                              |                              |
|                        |  |                              | Hardenable                  | 24                         | BN4 - BN6                    | f <sub>z</sub> = .003 - .006 | BN4 - BN6                    | f <sub>z</sub> = .003 - .008 | BN4 - BN6                    | f <sub>z</sub> = .003 - .006 | BN4 - BN6                    | f <sub>z</sub> = .003 - .008 |
| Copper alloys          |  | Free cutting                 | 25                          | BN7 - BN9                  | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .009 | BN7 - BN9                    | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .009 |                              |
|                        |  |                              | 26                          | IC30N                      | SA or SG                     | IC08                         | SA or SG                     | IC08                         | SG or SA                     |                              |                              |                              |
|                        |  | Brass                        | 27                          | V <sub>c</sub> = 590 - 790 |                              | V <sub>c</sub> = 100 - 330   |                              | V <sub>c</sub> = 100 - 330   |                              |                              |                              |                              |
| Non metallic           |  | Duroplastics, fiber plastics | 28                          | BN4 - BN6                  | f <sub>z</sub> = .002 - .006 | BN4 - BN6                    | f <sub>z</sub> = .002 - .005 | BN4 - BN6                    | f <sub>z</sub> = .002 - .005 |                              |                              |                              |
|                        |  |                              | 28                          | BN7 - BN9                  | f <sub>z</sub> = .003 - .008 | BN7 - BN9                    | f <sub>z</sub> = .002 - .006 | BN7 - BN9                    | f <sub>z</sub> = .002 - .006 |                              |                              |                              |
| S                      |  | High temperature alloys      | Free cutting                | 29                         | IC908                        | SA                           | IC908                        | LB                           | IC908                        | SA                           | IC908                        | LB                           |
|                        |  |                              |                             | 30                         | V <sub>c</sub> = 80 - 260    |                              | V <sub>c</sub> = 80 - 260    |                              | V <sub>c</sub> = 80 - 260    |                              | V <sub>c</sub> = 80 - 260    |                              |
|                        |  |                              | Hard rubber                 | 30                         | BN4 - BN6                    | f <sub>z</sub> = .002 - .004 | BN4 - BN6                    | f <sub>z</sub> = .002 - .005 | BN4 - BN6                    | f <sub>z</sub> = .002 - .004 | BN4 - BN6                    | f <sub>z</sub> = .002 - .005 |
|                        | 30   |                              |                             | BN7 - BN9                  | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .009 | BN7 - BN9                    | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .009 |                              |
|                        | 31   |                              |                             | IC908                      | L *                          | IC908                        | S *                          | IC908                        | L *                          | IC908                        | S *                          |                              |
|                        | Titanium alloys  | Hardened                     | 32                          | V <sub>c</sub> = 50 - 160  |                              | V <sub>c</sub> = 50 - 160    |                              | V <sub>c</sub> = 50 - 160    |                              | V <sub>c</sub> = 50 - 160    |                              |                              |
|                        |  |                              | 33                          |                            |                              |                              |                              |                              |                              |                              |                              |                              |
|                        |  | Pure                         | 34                          | BN4 - BN6                  | f <sub>z</sub> = .002 - .004 | BN4 - BN6                    | f <sub>z</sub> = .002 - .004 | BN4 - BN6                    | f <sub>z</sub> = .001 - .003 | BN4 - BN6                    | f <sub>z</sub> = .001 - .003 |                              |
|                        |  |                              | 35                          |                            |                              |                              |                              |                              |                              |                              |                              |                              |
|                        |  |                              | Alpha+beta alloys, hardened | 35                         | BN7 - BN9                    | f <sub>z</sub> = .002 - .005 | BN7 - BN9                    | f <sub>z</sub> = .002 - .005 | BN7 - BN9                    | f <sub>z</sub> = .002 - .004 | BN7 - BN9                    | f <sub>z</sub> = .002 - .004 |
|                        | H  | Hardened steel               | Hardened                    | 38                         | IC908                        | LB                           | IC908                        | SA                           | IC908                        | LB                           | IC908                        | SA                           |
|                        |  |                              | 39                          | V <sub>c</sub> = 80 - 160  |                              | V <sub>c</sub> = 80 - 160    |                              | V <sub>c</sub> = 80 - 160    |                              | V <sub>c</sub> = 80 - 160    |                              |                              |
| Chilled cast iron      |  | Cast                         | 40                          | BN4 - BN6                  | f <sub>z</sub> = .002 - .005 | BN4 - BN6                    | f <sub>z</sub> = .002 - .005 | BN4 - BN6                    | f <sub>z</sub> = .002 - .006 | BN4 - BN6                    | f <sub>z</sub> = .002 - .005 |                              |
|                        |  | Cast iron                    | 41                          | BN7 - BN9                  | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .008 | BN7 - BN9                    | f <sub>z</sub> = .004 - .008 |                              |

\* Standard edge geometries are not suitable for reaming titanium and high temperature alloys.

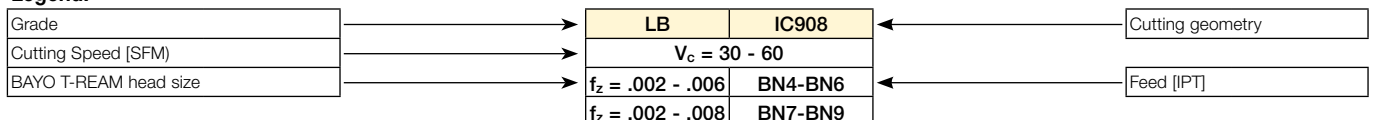
In order to choose a proper geometry, ask for our recommendations.

- The given cutting data recommendations refer to the short holders (3xD effective reaming overhang).
- For longer holders, the cutting speed should be reduced proportionally.
- For relatively large leading angles (spot-facing geometries), the feed should be reduced up to 30%.
- All the given cutting data recommendations refer to the machines with spindle through coolant supply.


(1) For material groups see pages 573-604

| Blind Hole                  |                              |                             |                              | Interrupted Blind Hole     |                              |                             |                              | IC08                                 |                              |
|-----------------------------|------------------------------|-----------------------------|------------------------------|----------------------------|------------------------------|-----------------------------|------------------------------|--------------------------------------|------------------------------|
| FIRST choice                |                              | Second choice               |                              | FIRST choice               |                              | Second choice               |                              | Through Hole - LB<br>Blind Hole - SA |                              |
| IC908                       | SA                           | IC30N                       | SA                           | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 20 - 35             |                              |
| V <sub>c</sub> = 200 - 530  |                              | V <sub>c</sub> = 300 - 660  |                              | V <sub>c</sub> = 200 - 390 |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                  | f <sub>z</sub> = .002 - .006 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .002 - .007 |
| BN7 - BN9                   | f <sub>z</sub> = .003 - .008 | BN7 - BN9                   | f <sub>z</sub> = .003 - .008 | BN7 - BN9                  | f <sub>z</sub> = .003 - .006 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .003 - .008 |
| IC908                       | SA                           | IC30N                       | SA                           | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 20 - 35             |                              |
| V <sub>c</sub> = 200-530    |                              | V <sub>c</sub> = 300 - 600  |                              | V <sub>c</sub> = 200 - 390 |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                  | f <sub>z</sub> = .002 - .006 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .002 - .007 |
| BN7 - BN9                   | f <sub>z</sub> = .003 - .008 | BN7 - BN9                   | f <sub>z</sub> = .003 - .008 | BN7 - BN9                  | f <sub>z</sub> = .003 - .006 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .003 - .008 |
| IC908                       | SA                           |                             |                              | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 20 - 35             |                              |
| V <sub>c</sub> = 65 - 200   |                              |                             |                              | V <sub>c</sub> = 65 - 200  |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .004 |                             |                              | BN4 - BN6                  | f <sub>z</sub> = .001 - .003 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .001 - .003 |
| BN7 - BN9                   | f <sub>z</sub> = .002 - .005 |                             |                              | BN7 - BN9                  | f <sub>z</sub> = .002 - .004 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .002 - .004 |
| IC908                       | SA                           |                             |                              | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 15 - 25             |                              |
| V <sub>c</sub> = 65 - 130   |                              |                             |                              | V <sub>c</sub> = 65 - 130  |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .004 |                             |                              | BN4 - BN6                  | f <sub>z</sub> = .001 - .003 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .001 - .003 |
| BN7 - BN9                   | f <sub>z</sub> = .002 - .005 |                             |                              | BN7 - BN9                  | f <sub>z</sub> = .002 - .004 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .002 - .004 |
| IC908                       | SA                           |                             |                              | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 25 - 65             |                              |
| V <sub>c</sub> = 260 - 660  |                              |                             |                              | V <sub>c</sub> = 200 - 390 |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .007 |                             |                              | BN4 - BN6                  | f <sub>z</sub> = .002 - .005 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .003 - .006 |
| BN7 - BN9                   | f <sub>z</sub> = .003 - .009 |                             |                              | BN7 - BN9                  | f <sub>z</sub> = .003 - .007 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .004 - .008 |
| IC908                       | SA                           | IC30N                       | SA                           | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 30 - 65             |                              |
| V <sub>c</sub> = 530 - 920  |                              | V <sub>c</sub> = 530 - 920  |                              | V <sub>c</sub> = 530 - 790 |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                  | f <sub>z</sub> = .002 - .006 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .002 - .006 |
| BN7 - BN9                   | f <sub>z</sub> = .003 - .009 | BN7 - BN9                   | f <sub>z</sub> = .003 - .009 | BN7 - BN9                  | f <sub>z</sub> = .003 - .007 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .003 - .008 |
| IC908                       | SA                           | IC30N                       | SA                           | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 35 - 65             |                              |
| V <sub>c</sub> = 330 - 720  |                              | V <sub>c</sub> = 330 - 790  |                              | V <sub>c</sub> = 330 - 720 |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                   | f <sub>z</sub> = .002 - .007 | BN4 - BN6                  | f <sub>z</sub> = .002 - .006 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .002 - .006 |
| BN7 - BN9                   | f <sub>z</sub> = .003 - .009 | BN7 - BN9                   | f <sub>z</sub> = .003 - .009 | BN7 - BN9                  | f <sub>z</sub> = .003 - .008 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .003 - .006 |
| RN01                        | SG or SA                     | ID5                         | SG or SA                     | RN01                       | SG or SA                     | ID5                         | SG or SA                     | V <sub>c</sub> = 35 - 100            |                              |
| V <sub>c</sub> = 490 - 1310 |                              | V <sub>c</sub> = 660 - 1310 |                              | V <sub>c</sub> = 490 - 980 |                              | V <sub>c</sub> = 660 - 1310 |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .003 - .006 | BN4 - BN6                   | f <sub>z</sub> = .003 - .006 | BN4 - BN6                  | f <sub>z</sub> = .003 - .006 | BN4 - BN6                   | f <sub>z</sub> = .003 - .006 | BN4 - BN6                            | f <sub>z</sub> = .002 - .005 |
| BN7 - BN9                   | f <sub>z</sub> = .004 - .008 | BN7 - BN9                   | f <sub>z</sub> = .004 - .009 | BN7 - BN9                  | f <sub>z</sub> = .004 - .008 | BN7 - BN9                   | f <sub>z</sub> = .004 - .009 | BN7 - BN9                            | f <sub>z</sub> = .003 - .006 |
| IC30N                       | SG or SA                     | IC08                        | SG or SA                     | IC08                       | SG or SA                     |                             |                              | V <sub>c</sub> = 100 - 330           |                              |
| V <sub>c</sub> = 590 - 790  |                              | V <sub>c</sub> = 100 - 330  |                              | V <sub>c</sub> = 100 - 330 |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .006 | BN4 - BN6                   | f <sub>z</sub> = .002 - .005 | BN4 - BN6                  | f <sub>z</sub> = .002 - .005 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .002 - .005 |
| BN7 - BN9                   | f <sub>z</sub> = .003 - .008 | BN7 - BN9                   | f <sub>z</sub> = .002 - .006 | BN7 - BN9                  | f <sub>z</sub> = .002 - .006 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .002 - .006 |
| IC908                       | SA                           |                             |                              | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 35 - 65             |                              |
| V <sub>c</sub> = 80 - 260   |                              |                             |                              | V <sub>c</sub> = 80 - 260  |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .005 |                             |                              | BN4 - BN6                  | f <sub>z</sub> = .002 - .004 |                             |                              | BN4 - BN6                            | f <sub>z</sub> = .002 - .005 |
| BN7 - BN9                   | f <sub>z</sub> = .004 - .008 |                             |                              | BN7 - BN9                  | f <sub>z</sub> = .004 - .008 |                             |                              | BN7 - BN9                            | f <sub>z</sub> = .003 - .006 |
| IC908                       | S*                           |                             |                              | IC908                      | S*                           |                             |                              | V <sub>c</sub> = 35 - 65             |                              |
| V <sub>c</sub> = 50 - 160   |                              |                             |                              | V <sub>c</sub> = 50 - 160  |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .001 - .003 |                             |                              | BN4 - BN6                  | f <sub>z</sub> = .001 - .003 |                             |                              |                                      |                              |
| BN7 - BN9                   | f <sub>z</sub> = .002 - .004 |                             |                              | BN7 - BN9                  | f <sub>z</sub> = .002 - .004 |                             |                              |                                      |                              |
| IC908                       | SA                           |                             |                              | IC908                      | SA                           |                             |                              | V <sub>c</sub> = 35 - 65             |                              |
| V <sub>c</sub> = 80 - 160   |                              |                             |                              | V <sub>c</sub> = 80 - 160  |                              |                             |                              |                                      |                              |
| BN4 - BN6                   | f <sub>z</sub> = .002 - .005 |                             |                              | BN4 - BN6                  | f <sub>z</sub> = .002 - .005 |                             |                              |                                      |                              |
| BN7 - BN9                   | f <sub>z</sub> = .004 - .008 |                             |                              | BN7 - BN9                  | f <sub>z</sub> = .004 - .008 |                             |                              |                                      |                              |

**Legend:**



| Solutions                |                         | Cutting Data/<br>Allowance |                                 |                    | Tool; Toolholder |                    |                            |                                   |                     |                           | Workpiece                    | Machine         |                  | Machining Process                            |                        |   |                      |                 |
|--------------------------|-------------------------|----------------------------|---------------------------------|--------------------|------------------|--------------------|----------------------------|-----------------------------------|---------------------|---------------------------|------------------------------|-----------------|------------------|--|------------------------|---|----------------------|-----------------|
|                          |                         | Feed fz                    | Spindle speed min <sup>-1</sup> | Diameter allowance | Geometry angle   | Runout maximum 5µm | Wear check / Change insert | Optimize tool length and diameter | Floating chuck GFIS | ADJ chuck FineFit/RC RING | Workpiece fixture / Pressure | Coolant mixture | Coolant pressure | Angle error / Centric error / Axis deviation | Spindle speed on entry | Entry geometry / Chamfer / Oblique surface at entry | Feed in and out same | Chip evacuation |
| Hole too large           | Vibration               | ●                          |                                 |                    | ●                |                    |                            |                                   |                     |                           | ●                            | ●               | ●                |  | ●                      | ●   |                      |                 |
|                          | Runout error            |                            |                                 |                    |                  | ●                  |                            | ●                                 | ●                   |                           |                              |                 |                  |  |                        |   |                      |                 |
|                          | Built up edge           | ●                          | ●                               | ●                  |                  |                    | ●                          |                                   |                     |                           |                              |                 |                  |  | ●                      |   |                      |                 |
|                          | Diameter allowance      |                            |                                 | ●                  |                  |                    |                            |                                   |                     |                           |                              |                 |                  |  |                        |   |                      | ●               |
| Hole too small           | Tool wear               |                            |                                 |                    |                  |                    | ●                          |                                   |                     | ●                         | ●                            | ●               | ●                |  |                        | ●   |                      |                 |
|                          | Compression of material |                            |                                 |                    | ●                |                    | ●                          |                                   |                     | ●                         | ●                            |                 |                  |  | ●                      | ●   |                      |                 |
|                          | Compression of clamping |                            |                                 | ●                  | ●                |                    |                            |                                   |                     |                           |                              |                 |                  |  |                        |   |                      |                 |
|                          | Diameter allowance      |                            |                                 | ●                  |                  |                    |                            |                                   |                     |                           |                              |                 |                  |  |                        |   |                      |                 |
| Tapered hole             | Deformation by clamping |                            |                                 | ●                  |                  |                    |                            |                                   |                     | ●                         | ●                            |                 |                  |  |                        |   |                      |                 |
|                          | Unequal wall thickness  |                            |                                 | ●                  | ●                |                    |                            |                                   |                     |                           |                              |                 |                  |  |                        |   |                      |                 |
| Machine                  | Machine                 |                            |                                 |                    |                  | ●                  |                            | ●                                 | ●                   |                           |                              |                 | ●                |  |                        |   |                      |                 |
|                          | Chip flow               |                            |                                 |                    |                  |                    |                            |                                   |                     |                           |                              | ●               | ●                |  |                        |   |                      | ●               |
| Hole shows chatter marks | Vibration               | ●                          | ●                               | ●                  | ●                |                    | ●                          | ●                                 |                     | ●                         | ●                            | ●               |                  | ●  | ●                      |   |                      |                 |
|                          | Runout error            |                            |                                 |                    |                  | ●                  |                            | ●                                 | ●                   |                           |                              |                 | ●                |  |                        |   |                      |                 |
| Insufficient surface     | Vibration               | ●                          | ●                               |                    | ●                |                    | ●                          | ●                                 |                     | ●                         | ●                            |                 |                  | ●  | ●                      |   |                      |                 |
|                          | Built up edge           | ●                          | ●                               |                    |                  |                    | ●                          |                                   |                     |                           |                              | ●               | ●                |  |                        |   |                      |                 |
|                          | Runout error            |                            |                                 |                    |                  | ●                  |                            | ●                                 | ●                   |                           |                              |                 |                  |  |                        |   |                      |                 |
|                          | Cutting geometry        |                            |                                 |                    |                  |                    | ●                          | ●                                 |                     |                           |                              |                 |                  |  |                        |   |                      | ●               |
|                          | Machine                 |                            |                                 |                    |                  |                    |                            |                                   |                     | ●                         | ●                            |                 | ●                |  |                        |   |                      |                 |

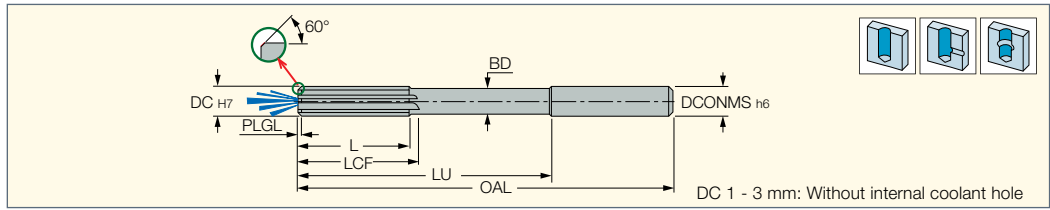
| Solutions               |   | Cutting Data/<br>Allowance   |                                 | Tool; Toolholder   |                |                    |                            |                                   |                     |                           | Workpiece                    | Machine         |                  |  | Machining Process      |   |                      |                 |   |
|-------------------------|---|--|---------------------------------|--------------------|----------------|--------------------|----------------------------|-----------------------------------|---------------------|---------------------------|------------------------------|-----------------|------------------|--|------------------------|---|----------------------|-----------------|---|
|                         |   | Feed fZ  | Spindle speed min <sup>-1</sup> | Diameter allowance | Geometry angle | Runout maximum 5µm | Wear check / Change insert | Optimize tool length and diameter | Floating chuck GFIS | ADJ chuck FineFit/RC RING | Workpiece fixture / Pressure | Coolant mixture | Coolant pressure | Angle error / Centric error / Axis deviation | Spindle speed on entry | Entry geometry / Chamfer / Oblique surface at entry | Feed in and out same | Chip evacuation |   |
| Problem                 | Retraction marks                          | Built up edge  | ●                               | ●                  |                |                    | ●                          | ●                                 | ●                   | ●                         | ●                            | ●               | ●                |  | ●                      |   |                      |                 |   |
|                         |   | Compression of material  |                                 |                    | ●              | ●                  |                            | ●                                 | ●                   | ●                         | ●                            | ●               |                  |  |                        | ●   | ●                    |                 |   |
|                         |   | Compression of clamping  |                                 |                    |                |                    |                            |                                   |                     |                           |                              |                 |                  |  |                        |   |                      |                 |   |
|                         | Slight defect in shape / noncircular hole |  | Tool wear                       |                    |                | ●                  |                            |                                   | ●                   |                           |                              |                 |                  |  |                        |   |                      |                 | ● |
| Chip flow               |   |  |                                 |                    | ●              |                    |                            |                                   |                     |                           |                              | ●               | ●                |  |                        |   |                      |                 | ● |
| Machine                 |   |  |                                 |                    |                | ●                  | ●                          | ●                                 | ●                   | ●                         |                              |                 |                  | ●  |                        | ●   | ●                    |                 | ● |
| Compression of clamping |   |  |                                 |                    | ●              |                    |                            |                                   |                     |                           | ●                            |                 |                  |  |                        |   |                      |                 |   |

- check / optimize
- increase / improve
- reduce / decrease
- apply / use



**SOLIDH-REAM**

**RM-MTR-H7S-CS-C**  
 UOP Solid Carbide Reamers  
 with Straight Flutes, Unequal  
 Pitch and Coolant Holes for High  
 Speed Reaming Blind Holes



**M E T R I C**

| Designation          | Dimensions |       |       |      |      |      |        |                    |        |                    | EVO |
|----------------------|------------|-------|-------|------|------|------|--------|--------------------|--------|--------------------|-----|
|                      | DC         | L     | PLGL  | LCF  | BD   | LU   | OAL    | NOF <sup>(1)</sup> | DCONMS | CSP <sup>(2)</sup> |     |
| RM-MTR-0100-H7S-CS-C | 1.000      | 6.00  | 0.100 | 11.0 | 0.90 | 21.0 | 50.00  | 3                  | 4.00   | 0                  | ●   |
| RM-MTR-0150-H7S-CS-C | 1.500      | 9.00  | 0.150 | 15.0 | 1.10 | 21.0 | 50.00  | 3                  | 4.00   | 0                  | ●   |
| RM-MTR-0200-H7S-CS-C | 2.000      | 12.00 | 0.150 | 16.0 | 1.60 | 21.0 | 50.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0250-H7S-CS-C | 2.500      | 12.00 | 0.200 | 19.0 | 2.10 | 31.0 | 60.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0300-H7S-CS-C | 3.000      | 12.00 | 0.250 | 21.0 | 2.40 | 31.0 | 60.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0350-H7S-CS-C | 3.500      | 12.00 | 0.250 | 21.0 | 2.90 | 40.0 | 68.00  | 4                  | 4.00   | 1                  | ●   |
| RM-MTR-0400-H7S-CS-C | 4.000      | 12.00 | 0.400 | 17.0 | 3.40 | 40.0 | 68.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0450-H7S-CS-C | 4.500      | 12.00 | 0.400 | 17.0 | 3.40 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0500-H7S-CS-C | 5.000      | 12.00 | 0.400 | 17.0 | 3.80 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0550-H7S-CS-C | 5.500      | 12.00 | 0.400 | 17.0 | 4.10 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0600-H7S-CS-C | 6.000      | 12.00 | 0.400 | 17.0 | 4.50 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0650-H7S-CS-C | 6.500      | 15.00 | 0.400 | 20.0 | 5.20 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0700-H7S-CS-C | 7.000      | 15.00 | 0.400 | 20.0 | 5.60 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0750-H7S-CS-C | 7.500      | 15.00 | 0.400 | 20.0 | 6.00 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0800-H7S-CS-C | 8.000      | 15.00 | 0.400 | 20.0 | 6.40 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0850-H7S-CS-C | 8.500      | 18.00 | 0.400 | 23.0 | 6.80 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-0900-H7S-CS-C | 9.000      | 18.00 | 0.400 | 23.0 | 7.20 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-0950-H7S-CS-C | 9.500      | 18.00 | 0.400 | 23.0 | 7.60 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-1000-H7S-CS-C | 10.000     | 18.00 | 0.500 | 23.0 | 8.00 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-1050-H7S-CS-C | 10.500     | 18.00 | 0.500 | 23.0 | 8.40 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |
| RM-MTR-1100-H7S-CS-C | 11.000     | 18.00 | 0.500 | 23.0 | 8.80 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |
| RM-MTR-1150-H7S-CS-C | 11.500     | 18.00 | 0.500 | 23.0 | 9.20 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |
| RM-MTR-1200-H7S-CS-C | 12.000     | 18.00 | 0.500 | 23.0 | 9.60 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |

• EVO is a hard submicron IC07 carbide substrate with an ultra-thin silicon based PVD coating, obtained by High Density Plasma (HDP) technology • Hole tolerance: H7 manufacturing tolerance according to DIN 1420

<sup>(1)</sup> Number of flutes

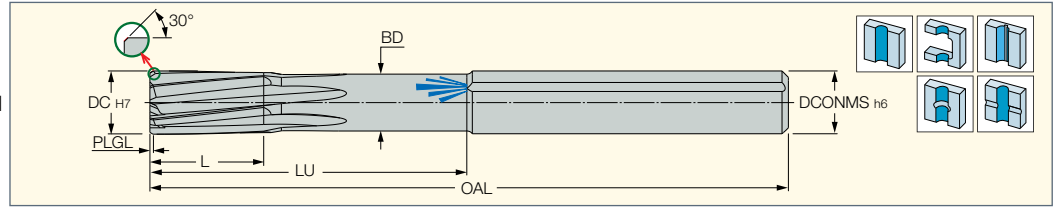
<sup>(2)</sup> 0 - Without coolant supply, 1 - With coolant supply





**SOLIDH-REAM**

**RM-MTR-H7N-CS-C**  
Solid Carbide Reamers with Helical Flutes, Unequal Pitch and Coolant Grooves for High Speed Reaming of Through Holes



| M E T R I C          |            |       |       |      |      |        |                    |        |                    |     |
|----------------------|------------|-------|-------|------|------|--------|--------------------|--------|--------------------|-----|
| Designation          | Dimensions |       |       |      |      |        |                    |        |                    | EVO |
|                      | DC         | L     | PLGL  | BD   | LU   | OAL    | NOF <sup>(1)</sup> | DCONMS | CSP <sup>(2)</sup> |     |
| RM-MTR-0100-H7N-CS-C | 1.000      | 6.00  | 0.200 | 0.80 | 21.0 | 50.00  | 3                  | 4.00   | 0                  | ●   |
| RM-MTR-0150-H7N-CS-C | 1.500      | 7.00  | 0.350 | 1.10 | 21.0 | 50.00  | 3                  | 4.00   | 0                  | ●   |
| RM-MTR-0200-H7N-CS-C | 2.000      | 9.00  | 0.450 | 1.50 | 21.0 | 50.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0250-H7N-CS-C | 2.500      | 12.00 | 0.550 | 1.90 | 31.0 | 60.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0300-H7N-CS-C | 3.000      | 12.00 | 0.700 | 2.20 | 31.0 | 60.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0350-H7N-CS-C | 3.500      | 12.00 | 0.700 | 2.60 | 40.0 | 68.00  | 4                  | 4.00   | 0                  | ●   |
| RM-MTR-0400-H7N-CS-C | 4.000      | 12.00 | 0.700 | 3.00 | 40.0 | 68.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0450-H7N-CS-C | 4.500      | 12.00 | 0.900 | 3.40 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0500-H7N-CS-C | 5.000      | 12.00 | 0.900 | 3.80 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0550-H7N-CS-C | 5.500      | 12.00 | 0.900 | 4.10 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0600-H7N-CS-C | 6.000      | 12.00 | 0.900 | 4.50 | 40.0 | 76.00  | 4                  | 6.00   | 1                  | ●   |
| RM-MTR-0650-H7N-CS-C | 6.500      | 15.00 | 0.900 | 5.20 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0700-H7N-CS-C | 7.000      | 15.00 | 0.900 | 5.60 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0750-H7N-CS-C | 7.500      | 15.00 | 0.900 | 6.00 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0800-H7N-CS-C | 8.000      | 15.00 | 0.900 | 6.40 | 65.0 | 101.00 | 6                  | 8.00   | 1                  | ●   |
| RM-MTR-0850-H7N-CS-C | 8.500      | 18.00 | 0.950 | 6.80 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-0900-H7N-CS-C | 9.000      | 18.00 | 0.950 | 7.20 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-0950-H7N-CS-C | 9.500      | 18.00 | 0.950 | 7.60 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-1000-H7N-CS-C | 10.000     | 18.00 | 0.950 | 8.00 | 61.0 | 101.00 | 6                  | 10.00  | 1                  | ●   |
| RM-MTR-1050-H7N-CS-C | 10.500     | 18.00 | 1.050 | 8.40 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |
| RM-MTR-1100-H7N-CS-C | 11.000     | 18.00 | 1.050 | 8.80 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |
| RM-MTR-1150-H7N-CS-C | 11.500     | 18.00 | 1.050 | 9.20 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |
| RM-MTR-1200-H7N-CS-C | 12.000     | 18.00 | 1.050 | 9.60 | 85.0 | 130.00 | 6                  | 12.00  | 1                  | ●   |

● EVO is a hard submicron IC07 carbide substrate with an ultra-thin silicon based PVD coating, obtained by High Density Plasma (HDP) technology • Hole tolerance: H7 manufacturing tolerance according to DIN 1420

<sup>(1)</sup> Number of flutes

<sup>(2)</sup> 0 - Without coolant supply, 1 - With coolant supply

**RM-MTR Cutting Speed Recommendations**

| ISO | Main Material Group      | Material Type                                   | ISCAR Material Group | V <sub>c</sub> SFM |
|-----|--------------------------|---|----------------------|--------------------|
| P   | Steel                    | Non-alloy and alloy steel                       | 1-10                 | 400-820            |
|     |                          | High alloy and tool steel                       | 11                   | 230-400            |
|     |                          | Ferritic and martensitic stainless steel        | 12,13                | 200-400            |
| M   | Stainless steel          | Austenitic stainless steel                      | 14                   | 200-400            |
|     |                          | Duplex and super duplex stainless steel         |                      | 82-200             |
| K   | Cast iron                | Grey cast iron                                  | 15-16                | 230-400            |
|     |                          | Nodular cast iron                               | 17-18                | 200-360            |
|     |                          | Malleable cast iron                             | 19-20                | 200-360            |
| N   | Non-ferrous metals       | Aluminium alloys                                | 21-24                | 490-980            |
| S   | Superalloys and titanium | Fe- based HRSA                                  | 31-32                | 130-260            |
|     |                          | Ni- or Co- based HRSA                           | 33-35                | 82-160             |
|     |                          | Titanium or titanium alloys                     | 36-37                | 100-260            |
| H   | Hard materials           | Hardened steel and cast iron, chilled cast iron | 38,40-41             | 82-200             |

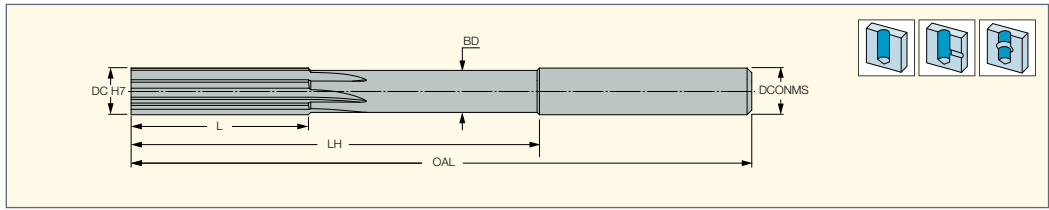
**Feed Recommendations**

| Reamer Diameter inch | Feed IPR  |
|----------------------|-----------|
| .004-.006            | .002-.004 |
| .008-.014            | .004-.008 |
| .016-.020            | .004-.016 |
| .022-.030            | .006-.028 |
| .032-.040            | .020-.056 |
| .042-.048            | .032-.064 |

Runout max .0002"

**SOLIDH-REAM**

**RM-FCR-H7S-CS-C**  
 DIN 212C Solid Carbide Reamers  
 with Straight Flutes and a  
 Cylindrical Shank for Blind Holes



**M E T R I C**

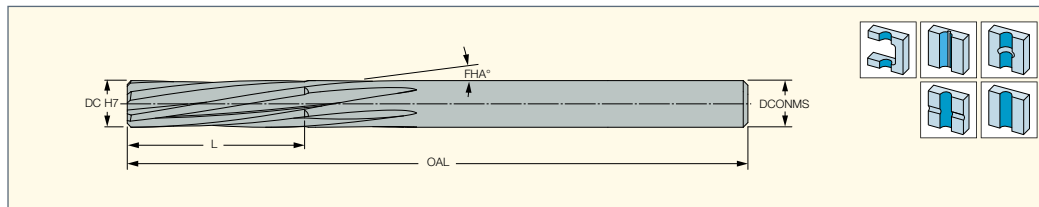
| Designation          | Dimensions |       |       |       |        |                    |        | IC07 |
|----------------------|------------|-------|-------|-------|--------|--------------------|--------|------|
|                      | DC         | L     | LH    | BD    | OAL    | NOF <sup>(1)</sup> | DCONMS |      |
| RM-FCR-0300-H7S-CS-C | 3.00       | 15.00 | 30.0  | -     | 61.00  | 6                  | 3.00   | ●    |
| RM-FCR-0320-H7S-CS-C | 3.20       | 18.00 | 33.0  | -     | 70.00  | 6                  | 3.20   | ●    |
| RM-FCR-0350-H7S-CS-C | 3.50       | 18.00 | 33.0  | -     | 70.00  | 6                  | 3.50   | ●    |
| RM-FCR-0400-H7S-CS-C | 4.00       | 19.00 | 44.0  | 3.50  | 75.00  | 6                  | 4.00   | ●    |
| RM-FCR-0450-H7S-CS-C | 4.50       | 21.00 | 46.0  | 4.00  | 80.00  | 6                  | 4.50   | ●    |
| RM-FCR-0500-H7S-CS-C | 5.00       | 23.00 | 53.0  | 4.30  | 86.00  | 6                  | 5.00   | ●    |
| RM-FCR-0550-H7S-CS-C | 5.50       | 26.00 | 56.0  | 4.50  | 93.00  | 6                  | 5.60   | ●    |
| RM-FCR-0600-H7S-CS-C | 6.00       | 26.00 | 56.0  | 5.00  | 93.00  | 6                  | 5.60   | ●    |
| RM-FCR-0650-H7S-CS-C | 6.50       | 28.00 | 63.0  | 5.50  | 101.00 | 6                  | 6.30   | ●    |
| RM-FCR-0700-H7S-CS-C | 7.00       | 31.00 | 69.0  | 6.50  | 109.00 | 6                  | 7.10   | ●    |
| RM-FCR-0750-H7S-CS-C | 7.50       | 31.00 | 69.0  | 6.50  | 109.00 | 6                  | 7.10   | ●    |
| RM-FCR-0800-H7S-CS-C | 8.00       | 33.00 | 75.0  | 7.00  | 117.00 | 6                  | 8.00   | ●    |
| RM-FCR-0850-H7S-CS-C | 8.50       | 33.00 | 75.0  | 7.00  | 117.00 | 6                  | 8.00   | ●    |
| RM-FCR-0900-H7S-CS-C | 9.00       | 36.00 | 81.0  | 8.00  | 125.00 | 6                  | 9.00   | ●    |
| RM-FCR-0950-H7S-CS-C | 9.50       | 36.00 | 81.0  | 8.00  | 125.00 | 6                  | 9.00   | ●    |
| RM-FCR-1000-H7S-CS-C | 10.00      | 38.00 | 87.0  | 9.00  | 133.00 | 6                  | 10.00  | ●    |
| RM-FCR-1050-H7S-CS-C | 10.50      | 38.00 | 87.0  | 9.00  | 133.00 | 6                  | 10.00  | ●    |
| RM-FCR-1100-H7S-CS-C | 11.00      | 41.00 | 96.0  | 9.00  | 142.00 | 6                  | 10.00  | ●    |
| RM-FCR-1200-H7S-CS-C | 12.00      | 44.00 | 105.0 | 9.00  | 151.00 | 6                  | 10.00  | ●    |
| RM-FCR-1300-H7S-CS-C | 13.00      | 44.00 | 105.0 | 9.00  | 151.00 | 6                  | 10.00  | ●    |
| RM-FCR-1400-H7S-CS-C | 14.00      | 47.00 | 110.0 | 11.50 | 160.00 | 8                  | 12.50  | ●    |
| RM-FCR-1500-H7S-CS-C | 15.00      | 50.00 | 112.0 | 11.50 | 162.00 | 8                  | 12.50  | ●    |
| RM-FCR-1600-H7S-CS-C | 16.00      | 52.00 | 120.0 | 11.50 | 170.00 | 8                  | 12.50  | ●    |

• Hole tolerance: H7 manufacturing tolerance according to DIN1420 • Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated • Special diameters are available on request • For user guide and cutting conditions, see pages 393-398

<sup>(1)</sup> Number of flutes

## SOLIDH-REAM

**RM-FCR-H7N-CS-C**  
DIN 212B Solid Carbide  
Reamers with Helical Flutes  
and a Cylindrical Shank  
for Through Holes



| M E T R I C          |            |       |        |                    |      |        |      |
|----------------------|------------|-------|--------|--------------------|------|--------|------|
| Designation          | Dimensions |       |        |                    |      |        | IC07 |
|                      | DC         | L     | OAL    | NOF <sup>(1)</sup> | FHA  | DCONMS |      |
| RM-FCR-0300-H7N-CS-C | 3.00       | 15.00 | 61.00  | 5                  | 10.0 | 3.00   | ●    |
| RM-FCR-0350-H7N-CS-C | 3.50       | 18.00 | 70.00  | 5                  | 10.0 | 3.50   | ●    |
| RM-FCR-0400-H7N-CS-C | 4.00       | 19.00 | 75.00  | 5                  | 10.0 | 4.00   | ●    |
| RM-FCR-0450-H7N-CS-C | 4.50       | 21.00 | 80.00  | 5                  | 10.0 | 4.50   | ●    |
| RM-FCR-0500-H7N-CS-C | 5.00       | 23.00 | 86.00  | 5                  | 10.0 | 5.00   | ●    |
| RM-FCR-0550-H7N-CS-C | 5.50       | 26.00 | 93.00  | 6                  | 10.0 | 5.50   | ●    |
| RM-FCR-0600-H7N-CS-C | 6.00       | 26.00 | 93.00  | 6                  | 10.0 | 6.00   | ●    |
| RM-FCR-0650-H7N-CS-C | 6.50       | 28.00 | 101.00 | 6                  | 10.0 | 6.50   | ●    |
| RM-FCR-0700-H7N-CS-C | 7.00       | 31.00 | 109.00 | 6                  | 10.0 | 7.00   | ●    |
| RM-FCR-0750-H7N-CS-C | 7.50       | 33.00 | 117.00 | 6                  | 10.0 | 7.50   | ●    |
| RM-FCR-0800-H7N-CS-C | 8.00       | 33.00 | 117.00 | 6                  | 10.0 | 8.00   | ●    |
| RM-FCR-0850-H7N-CS-C | 8.50       | 36.00 | 125.00 | 6                  | 10.0 | 8.50   | ●    |
| RM-FCR-0900-H7N-CS-C | 9.00       | 36.00 | 125.00 | 6                  | 10.0 | 9.00   | ●    |
| RM-FCR-0950-H7N-CS-C | 9.50       | 38.00 | 133.00 | 6                  | 10.0 | 9.50   | ●    |
| RM-FCR-1000-H7N-CS-C | 10.00      | 38.00 | 133.00 | 6                  | 10.0 | 10.00  | ●    |
| RM-FCR-1050-H7N-CS-C | 10.50      | 41.00 | 142.00 | 7                  | 10.0 | 10.50  | ●    |
| RM-FCR-1100-H7N-CS-C | 11.00      | 41.00 | 142.00 | 7                  | 10.0 | 11.00  | ●    |
| RM-FCR-1200-H7N-CS-C | 12.00      | 44.00 | 151.00 | 7                  | 10.0 | 12.00  | ●    |
| RM-FCR-1300-H7N-CS-C | 13.00      | 44.00 | 151.00 | 7                  | 10.0 | 13.00  | ●    |
| RM-FCR-1400-H7N-CS-C | 14.00      | 47.00 | 160.00 | 7                  | 10.0 | 14.00  | ●    |
| RM-FCR-1500-H7N-CS-C | 15.00      | 50.00 | 162.00 | 7                  | 10.0 | 15.00  | ●    |
| RM-FCR-1600-H7N-CS-C | 16.00      | 52.00 | 170.00 | 7                  | 10.0 | 16.00  | ●    |

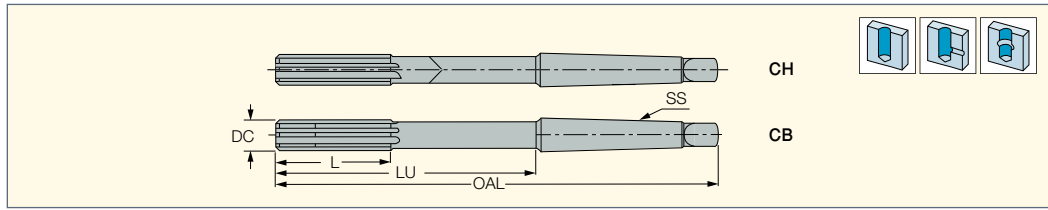
• Hole tolerance: H7 manufacturing tolerance according to DIN1420 • Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated • Special diameters are available on request • For user guide and cutting conditions, see pages 393-398

<sup>(1)</sup> Number of flutes



**SOLIDH-REAM**

**RM-SHR-H7S-MT**  
 DIN 8094 Solid Carbide Reamers  
 with Straight Flutes and a Morse  
 Taper Shank for Blind Holes



**M E T R I C**

| Designation            | Dimensions |        |       |       |                    |     | IC07 |
|------------------------|------------|--------|-------|-------|--------------------|-----|------|
|                        | DC         | OAL    | LU    | L     | NOF <sup>(1)</sup> | SS  |      |
| RM-SHR-0500-H7S-MT1-CH | 5.000      | 133.00 | 67.5  | 23.00 | 4                  | MT1 | ●    |
| RM-SHR-0600-H7S-MT1-CH | 6.000      | 138.00 | 72.5  | 26.00 | 4                  | MT1 | ●    |
| RM-SHR-0700-H7S-MT1-CH | 7.000      | 150.00 | 84.5  | 31.00 | 4                  | MT1 | ●    |
| RM-SHR-0800-H7S-MT1-CH | 8.000      | 156.00 | 90.5  | 33.00 | 4                  | MT1 | ●    |
| RM-SHR-0900-H7S-MT1-CH | 9.000      | 162.00 | 96.5  | 36.00 | 4                  | MT1 | ●    |
| RM-SHR-1000-H7S-MT1-CH | 10.000     | 168.00 | 102.5 | 38.00 | 6                  | MT1 | ●    |
| RM-SHR-1100-H7S-MT1-CH | 11.000     | 175.00 | 109.5 | 41.00 | 6                  | MT1 | ●    |
| RM-SHR-1300-H7S-MT1-CH | 13.000     | 182.00 | 116.5 | 44.00 | 6                  | MT1 | ●    |
| RM-SHR-1400-H7S-MT1-CH | 14.000     | 189.00 | 123.5 | 47.00 | 6                  | MT1 | ●    |
| RM-SHR-1500-H7S-MT2-CH | 15.000     | 204.00 | 124.0 | 50.00 | 6                  | MT2 | ●    |
| RM-SHR-1600-H7S-MT2-CH | 16.000     | 210.00 | 130.0 | 52.00 | 6                  | MT2 | ●    |
| RM-SHR-1700-H7S-MT2-CB | 17.000     | 214.00 | 134.0 | 54.00 | 6                  | MT2 | ●    |
| RM-SHR-1800-H7S-MT2-CB | 18.000     | 219.00 | 139.0 | 56.00 | 6                  | MT2 | ●    |
| RM-SHR-1900-H7S-MT2-CB | 19.000     | 223.00 | 143.0 | 58.00 | 6                  | MT2 | ●    |
| RM-SHR-2000-H7S-MT2-CB | 20.000     | 228.00 | 148.0 | 60.00 | 6                  | MT2 | ●    |
| RM-SHR-2200-H7S-MT2-CB | 22.000     | 237.00 | 157.0 | 64.00 | 8                  | MT2 | ●    |
| RM-SHR-2400-H7S-MT3-CB | 24.000     | 268.00 | 169.0 | 68.00 | 8                  | MT3 | ●    |
| RM-SHR-2500-H7S-MT3-CB | 25.000     | 268.00 | 169.0 | 68.00 | 8                  | MT3 | ●    |
| RM-SHR-2600-H7S-MT3-CB | 26.000     | 273.00 | 174.0 | 70.00 | 8                  | MT3 | ●    |
| RM-SHR-2800-H7S-MT3-CB | 28.000     | 277.00 | 178.0 | 71.00 | 8                  | MT3 | ●    |
| RM-SHR-3000-H7S-MT3-CB | 30.000     | 281.00 | 182.0 | 73.00 | 8                  | MT3 | ●    |
| RM-SHR-3200-H7S-MT4-CB | 32.000     | 317.00 | 193.0 | 77.00 | 8                  | MT4 | ●    |
| RM-SHR-3400-H7S-MT4-CB | 34.000     | 321.00 | 197.0 | 78.00 | 8                  | MT4 | ●    |
| RM-SHR-3600-H7S-MT4-CB | 36.000     | 325.00 | 201.0 | 79.00 | 8                  | MT4 | ●    |
| RM-SHR-4000-H7S-MT4-CB | 40.000     | 329.00 | 205.0 | 81.00 | 8                  | MT4 | ●    |

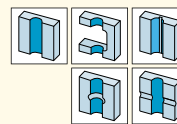
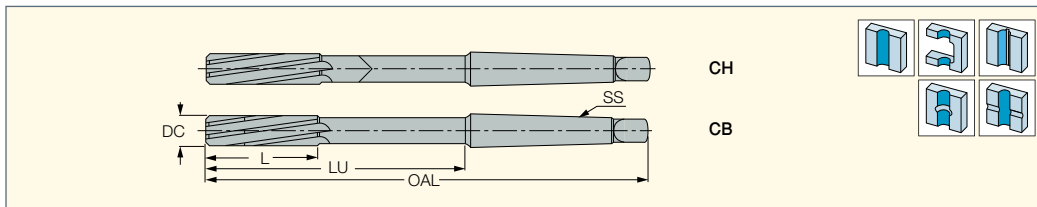
• Requires a price and delivery time quotation • Available only upon request • -CH: Brazed solid carbide head • -CB: Brazed solid carbide tips • Hole tolerance: H7 manufacturing tolerance according to DIN 1420 • Available grades: IC07 (uncoated), optional: IC907 (TiAlN PVD coated) • For user guide and cutting conditions, see pages 393-398

<sup>(1)</sup> Number of flutes



# SOLIDH-REAM

**RM-SHR-H7N-MT**  
 DIN 8093 Solid Carbide Reamers  
 with Spiral Flutes and a Morse  
 Taper Shank for Through Holes



## M E T R I C

| Designation            | Dimensions |        |       |       |                    |     | IC07 |
|------------------------|------------|--------|-------|-------|--------------------|-----|------|
|                        | DC         | OAL    | LU    | L     | NOF <sup>(1)</sup> | SS  |      |
| RM-SHR-0500-H7N-MT1-CH | 5.000      | 133.00 | 67.5  | 23.00 | 4                  | MT1 | ●    |
| RM-SHR-0600-H7N-MT1-CH | 6.000      | 138.00 | 72.5  | 26.00 | 4                  | TM1 | ●    |
| RM-SHR-0700-H7N-MT1-CH | 7.000      | 150.00 | 84.5  | 31.00 | 4                  | MT1 | ●    |
| RM-SHR-0800-H7N-MT1-CH | 8.000      | 156.00 | 90.5  | 33.00 | 4                  | MT1 | ●    |
| RM-SHR-0900-H7N-MT1-CH | 9.000      | 162.00 | 96.5  | 36.00 | 4                  | MT1 | ●    |
| RM-SHR-1000-H7N-MT1-CH | 10.000     | 168.00 | 102.5 | 38.00 | 6                  | MT1 | ●    |
| RM-SHR-1100-H7N-MT1-CH | 11.000     | 175.00 | 109.5 | 41.00 | 6                  | MT1 | ●    |
| RM-SHR-1200-H7N-MT1-CH | 12.000     | 182.00 | 116.5 | 44.00 | 6                  | MT1 | ●    |
| RM-SHR-1300-H7N-MT1-CH | 13.000     | 182.00 | 116.5 | 44.00 | 6                  | MT1 | ●    |
| RM-SHR-1400-H7N-MT1-CH | 14.000     | 189.00 | 123.5 | 47.00 | 6                  | MT1 | ●    |
| RM-SHR-1500-H7N-MT2-CH | 15.000     | 204.00 | 124.0 | 50.00 | 6                  | MT2 | ●    |
| RM-SHR-1600-H7N-MT2-CH | 16.000     | 210.00 | 130.0 | 52.00 | 6                  | MT2 | ●    |
| RM-SHR-1800-H7N-MT2-CB | 18.000     | 219.00 | 139.0 | 56.00 | 6                  | MT2 | ●    |
| RM-SHR-1900-H7N-MT2-CB | 19.000     | 223.00 | 143.0 | 58.00 | 6                  | MT2 | ●    |
| RM-SHR-2000-H7N-MT2-CB | 20.000     | 228.00 | 148.0 | 60.00 | 6                  | MT2 | ●    |
| RM-SHR-2200-H7N-MT2-CB | 22.000     | 237.00 | 157.0 | 64.00 | 8                  | MT2 | ●    |
| RM-SHR-2500-H7N-MT3-CB | 25.000     | 268.00 | 169.0 | 68.00 | 8                  | MT3 | ●    |
| RM-SHR-2600-H7N-MT3-CB | 26.000     | 273.00 | 174.0 | 70.00 | 8                  | MT3 | ●    |
| RM-SHR-2800-H7N-MT3-CB | 28.000     | 277.00 | 178.0 | 71.00 | 8                  | MT3 | ●    |
| RM-SHR-3000-H7N-MT3-CB | 30.000     | 281.00 | 182.0 | 73.00 | 8                  | MT3 | ●    |
| RM-SHR-3200-H7N-MT4-CB | 32.000     | 317.00 | 193.0 | 77.00 | 8                  | MT4 | ●    |
| RM-SHR-3400-H7N-MT4-CB | 34.000     | 321.00 | 197.0 | 78.00 | 8                  | MT4 | ●    |
| RM-SHR-3500-H7N-MT4-CB | 35.000     | 321.00 | 197.0 | 78.00 | 8                  | MT4 | ●    |
| RM-SHR-3600-H7N-MT4-CB | 36.000     | 325.00 | 201.0 | 79.00 | 8                  | MT4 | ●    |
| RM-SHR-3800-H7N-MT4-CB | 38.000     | 329.00 | 205.0 | 81.00 | 8                  | MT4 | ●    |

• Requires a price and delivery time quotation • Available only upon request • -CH: Brazed solid carbide head • -CB: Brazed solid carbide tips • Hole tolerance: H7 manufacturing tolerance according to DIN 1420 • Available grades: IC07 (uncoated), optional: IC907 (TiAlN PVD coated) • For user guide and cutting conditions, see pages 393-398

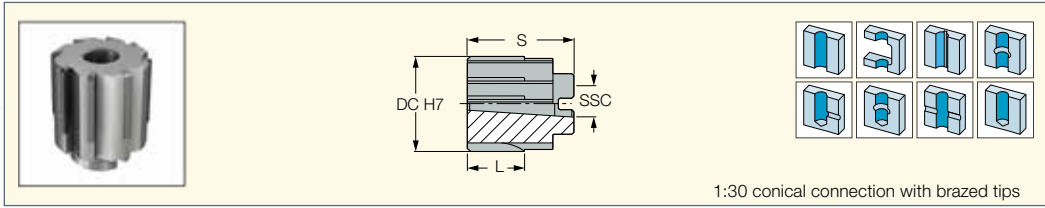
<sup>(1)</sup> Number of flutes





**SOLIDH-REAM**

**RM-SR-H7S**  
DIN 8054 Brazed Carbide Tip  
Shell Reamers with Straight Flutes



1:30 conical connection with brazed tips

**M E T R I C**

| Designation       | Dimensions |       |       |                    |                    |   | IC07 |
|-------------------|------------|-------|-------|--------------------|--------------------|---|------|
|                   | DC         | S     | L     | SSC <sup>(1)</sup> | NOF <sup>(2)</sup> |   |      |
| RM-SR25.000H7S-13 | 25.000     | 45.00 | 30.00 | 13                 | 6                  | ● |      |
| RM-SR30.000H7S-13 | 30.000     | 45.00 | 30.00 | 13                 | 6                  | ● |      |
| RM-SR34.000H7S-13 | 34.000     | 45.00 | 30.00 | 13                 | 8                  | ● |      |
| RM-SR35.000H7S-13 | 35.000     | 45.00 | 30.00 | 13                 | 8                  | ● |      |
| RM-SR36.000H7S-16 | 36.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR37.000H7S-16 | 37.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR38.000H7S-16 | 38.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR40.000H7S-16 | 40.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR42.000H7S-16 | 42.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR44.000H7S-16 | 44.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR45.000H7S-16 | 45.000     | 50.00 | 30.00 | 16                 | 8                  | ● |      |
| RM-SR48.000H7S-19 | 48.000     | 56.00 | 30.00 | 19                 | 10                 | ● |      |
| RM-SR50.000H7S-19 | 50.000     | 56.00 | 30.00 | 19                 | 10                 | ● |      |
| RM-SR55.000H7S-22 | 55.000     | 63.00 | 30.00 | 22                 | 10                 | ● |      |
| RM-SR58.000H7S-22 | 58.000     | 63.00 | 30.00 | 22                 | 10                 | ● |      |
| RM-SR60.000H7S-22 | 60.000     | 63.00 | 30.00 | 22                 | 10                 | ● |      |
| RM-SR70.000H7S-27 | 70.000     | 71.00 | 30.00 | 27                 | 12                 | ● |      |

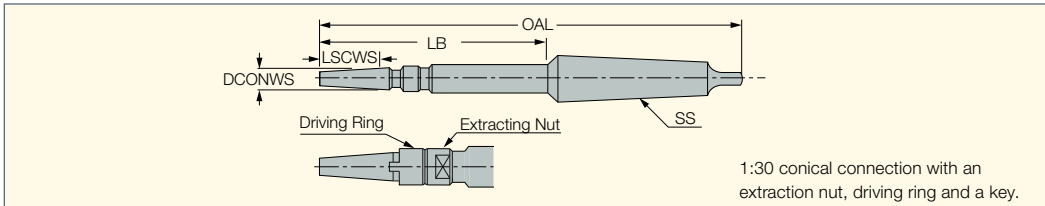
• Available only upon request • Right-hand, H7 manufacturing tolerance according to DIN 1420 • For user guide and cutting conditions, see pages 393-398

<sup>(1)</sup> Requires a price and delivery time quotation

<sup>(2)</sup> Seat size code

**SOLIDH-REAM**

**RM-SRH-Q-MT**  
DIN 217 Shell Reamer Shanks  
with a Morse Taper Connection



1:30 conical connection with an extraction nut, driving ring and a key.

**M E T R I C**

| Designation    | DCONWS | DCN <sup>(1)</sup> | DCX <sup>(2)</sup> | OAL    | LB     | LSCWS | SS  |
|----------------|--------|--------------------|--------------------|--------|--------|-------|-----|
| RM-SRH Q13-MT3 | 13.00  | 25.00              | 35.00              | 250.00 | 149.46 | 45.00 | MT3 |
| RM-SRH Q16-MT3 | 16.00  | 36.00              | 45.00              | 261.00 | 160.45 | 50.00 | MT3 |
| RM-SRH Q19-MT3 | 19.00  | 48.00              | 52.00              | 298.00 | 173.54 | 56.00 | MT3 |
| RM-SRH Q19-MT4 | 19.00  | 48.00              | 52.00              | 273.00 | 174.00 | 56.00 | MT4 |
| RM-SRH Q22-MT3 | 22.00  | 55.00              | 62.00              | 312.00 | 187.54 | 63.00 | MT3 |
| RM-SRH Q22-MT4 | 22.00  | 55.00              | 62.00              | 312.00 | 188.00 | 63.00 | MT4 |
| RM-SRH Q27-MT4 | 27.00  | 65.00              | 75.00              | 359.00 | 198.80 | 71.00 | MT4 |
| RM-SRH Q27-MT5 | 27.00  | 65.00              | 75.00              | 327.00 | 200.63 | 71.00 | MT5 |

• Available only upon request

<sup>(1)</sup> Minimum insert diameter

<sup>(2)</sup> Maximum insert diameter

**Machining Conditions for Solid Carbide Reamers**

| Material  | Tensile Strength or Brinell Hardness ksi bzw. HB | Reamer Diameter inch | Reaming Allowance Relative to Diameter | Feed IPR  | Cutting Speed SFM             |
|---|--|----------------------|--|-----------|-------------------------------|
| Steel   | up to 145  | up to .4             | .0015-.004                             | .006-.010 | 20-65                         |
|   |  | .4-1.0               | .004-.010                              | .008-.014 |                               |
|   |  | 1.0-1.6              | .010-.015                              | .012-.020 |                               |
|   | 145-203  | up to .4             | .0015-.004                             | .005-.008 | 20-50                         |
|   |  | .4-1.0               | .004-.010                              | .006-.012 |                               |
|   |  | 1.0-1.6              | .010-.015                              | .008-.016 |                               |
| Cast steel  | 85-72  | up to .4             | .0015-.004                             | .006-.010 | 35-65                         |
|   |  | .4-1.0               | .004-.010                              | .008-.016 |                               |
|   |  | 1.0-1.6              | .010-.015                              | .012-.020 |                               |
|   | 58-102   | up to .4             | .0015-.004                             | .005-.008 | 20-50                         |
|   |  | .4-1.0               | .004-.010                              | .006-.012 |                               |
|   |  | 1.0-1.6              | .010-.015                              | .008-.016 |                               |
| Titanium Titanium Alloy                           | 72-188   | up to .4             | .002-.005                              | .005-.008 | 20-50                         |
|   |  | .4-1.0               | .004-.010                              | .006-.012 |                               |
|   |  | 1.0-1.6              | .010-.015                              | .008-.016 |                               |
| Grey cast iron                                    | up to 220 HB                                     | up to .4             | .002-.005                              | .008-.012 | 35-80                         |
|   |  | .4-1.0               | .004-.012                              | .012-.018 |                               |
|   |  | 1.0-1.6              | .012-.019                              | .016-.028 |                               |
|   | over 220 HB                                      | up to .4             | .002-.005                              | .006-.010 | 35-65                         |
|   |  | .4-1.0               | .004-.012                              | .008-.014 |                               |
|   |  | 1.0-1.6              | .012-.019                              | .012-.020 |                               |
| Spheroidal graphite Cast iron Malleable cast iron |  | up to .4             | .002-.005                              | .006-.010 | 25-45                         |
|   |  | .4-1.0               | .004-.010                              | .008-.016 |                               |
|   |  | 1.0-1.6              | .010-.015                              | .012-.024 |                               |
| Aluminum alloy                                    | over 80HB  | up to .4             | .002-.005                              | .008-.012 | Si<7% 30-100<br>Si>7% 100-195 |
|   |  | .4-1.0               | .004-.012                              | .012-.020 |                               |
|   |  | 1.0-1.6              | .012-.019                              | .016-.028 |                               |
| Copper  |  | up to .4             | .004-.008                              | .012-.024 | 65-195                        |
|   |  | .4-1.0               | .008-.015                              | .016-.031 |                               |
|   |  | 1.0-1.6              | .015-.023                              | .020-.040 |                               |
| Brass Red bronze Cast bronze                      |  | up to .4             | .002-.005                              | .008-.012 | 50-165                        |
|   |  | .4-1.0               | .004-.012                              | .012-.020 |                               |
|   |  | 1.0-1.6              | .012-.019                              | .016-.028 |                               |
| Thermoset polymers                                |  | up to .4             | .004-.010                              | .012-.024 | 50-100                        |
|   |  | .4-1.0               | .008-.015                              | .016-.031 |                               |
|   |  | 1.0-1.6              | .015-.023                              | .031-.040 |                               |



## Reamer Manufacturing Tolerances

| Nominal Diameter of Reamer D1 in mm |       | Reamer Manufacturing Tolerances DIN 1420   |      |      |      |      |      |       |      |      |      |       |      |      |
|-------------------------------------|-------|--|------|------|------|------|------|-------|------|------|------|-------|------|------|
|                                     |       | Admissible maximum and minimum reamer dimensions of nominal diameter d1 in µm for drilling tolerance range |      |      |      |      |      |       |      |      |      |       |      |      |
| Over                                | Up to | A9   | A11  | B8   | B9   | B10  | B11  | C8    | C9   | C10  | C11  |       |      |      |
| 1                                   | 3     | +291   | +321 | +151 | +161 | +174 | +191 | + 71  | + 81 | + 94 | +111 |       |      |      |
|                                     |       | +282   | +300 | +146 | +152 | +160 | +170 | + 66  | + 72 | + 80 | + 90 |       |      |      |
| 3                                   | 6     | +295   | +333 | +155 | +165 | +180 | +203 | + 85  | + 95 | +110 | +133 |       |      |      |
|                                     |       | +284   | +306 | +148 | +154 | +163 | +176 | + 78  | + 84 | + 93 | +106 |       |      |      |
| 6                                   | 10    | +310   | +356 | +168 | +180 | +199 | +226 | + 98  | +110 | +129 | +156 |       |      |      |
|                                     |       | +297   | +324 | +160 | +167 | +178 | +194 | + 90  | + 97 | +108 | +124 |       |      |      |
| 10                                  | 18    | +326   | +383 | +172 | +186 | +209 | +243 | +117  | +131 | +154 | +188 |       |      |      |
|                                     |       | +310   | +344 | +162 | +170 | +184 | +204 | +107  | +115 | +129 | +149 |       |      |      |
| 18                                  | 30    | +344   | +410 | +188 | +204 | +231 | +270 | +138  | +154 | +181 | +220 |       |      |      |
|                                     |       | +325   | +364 | +176 | +185 | +201 | +224 | +126  | +135 | +151 | +174 |       |      |      |
| 30                                  | 40    | +362   | +446 | +203 | +222 | +255 | +206 | +153  | +172 | +205 | +256 |       |      |      |
|                                     |       | +340   | +390 | +189 | +200 | +220 | +250 | +139  | +150 | +170 | +200 |       |      |      |
| 40                                  | 50    | +372   | +456 | +213 | +232 | +265 | +316 | +163  | +182 | +215 | +266 |       |      |      |
|                                     |       | +350   | +400 | +199 | +210 | +230 | +260 | +149  | +160 | +180 | +210 |       |      |      |
| 50                                  | 65    | +402   | +501 | +229 | +252 | +292 | +351 | +179  | +202 | +242 | +301 |       |      |      |
|                                     |       | +376   | +434 | +212 | +226 | +250 | +284 | +162  | +176 | +200 | +234 |       |      |      |
| 65                                  | 80    | +422   | +521 | +239 | +262 | +302 | +361 | +189  | +212 | +252 | +311 |       |      |      |
|                                     |       | +396   | +454 | +222 | +236 | +260 | +294 | +172  | +186 | +210 | +244 |       |      |      |
| 80                                  | 100   | +453   | +567 | +265 | +293 | +339 | +407 | +215  | +243 | +289 | +357 |       |      |      |
|                                     |       | +422   | +490 | +246 | +262 | +290 | +330 | +196  | +212 | +240 | +280 |       |      |      |
| 100                                 | 120   | +483   | +597 | +285 | +313 | +359 | +427 | +225  | +253 | +299 | +367 |       |      |      |
|                                     |       | +452   | +520 | +266 | +282 | +310 | +350 | +206  | +222 | +250 | +290 |       |      |      |
| 120                                 | 140   | +545   | +672 | +313 | +345 | +396 | +472 | +253  | +285 | +336 | +412 |       |      |      |
|                                     |       | +510   | +584 | +290 | +310 | +340 | +384 | +230  | +250 | +280 | +324 |       |      |      |
| 140                                 | 160   | +605   | +732 | +333 | +365 | +416 | +492 | +263  | +295 | +346 | +422 |       |      |      |
|                                     |       | +570   | +644 | +310 | +330 | +360 | +404 | +240  | +260 | +290 | +334 |       |      |      |
| 160                                 | 180   | +665   | +792 | +363 | +395 | +446 | +522 | +283  | +315 | +366 | +442 |       |      |      |
|                                     |       | +630   | +704 | +340 | +360 | +390 | +434 | +260  | +280 | +310 | +354 |       |      |      |
| Over                                | Up to | D8   | D9   | D10  | D11  | E7   | E8   | E9    | F6   | F7   | F8   | F9    | G6   | G7   |
| 1                                   | 3     | + 31   | + 41 | + 54 | + 71 | + 22 | + 25 | + 35  | + 11 | + 14 | + 17 | + 27  | + 7  | + 10 |
|                                     |       | + 26   | + 32 | + 40 | + 50 | + 18 | + 20 | + 26  | + 8  | + 10 | + 12 | + 18  | + 4  | + 6  |
| 3                                   | 6     | + 45   | + 55 | + 70 | + 93 | + 30 | + 35 | + 45  | + 16 | + 20 | + 25 | + 35  | + 10 | + 14 |
|                                     |       | + 38   | + 44 | + 53 | + 66 | + 25 | + 28 | + 34  | + 13 | + 15 | + 18 | + 24  | + 7  | + 9  |
| 6                                   | 10    | + 58   | + 70 | + 89 | +116 | + 37 | + 43 | + 55  | + 20 | + 25 | + 31 | + 43  | + 12 | + 17 |
|                                     |       | + 50   | + 57 | + 68 | + 84 | + 31 | + 35 | + 42  | + 16 | + 19 | + 23 | + 30  | + 8  | + 11 |
| 10                                  | 18    | + 72   | + 86 | +109 | +143 | + 47 | + 54 | + 68  | + 25 | + 31 | + 38 | + 52  | + 15 | + 21 |
|                                     |       | + 62   | + 70 | + 84 | +104 | + 40 | + 44 | + 52  | + 21 | + 24 | + 28 | + 36  | + 11 | + 14 |
| 18                                  | 30    | + 93   | +109 | +136 | +175 | + 57 | + 68 | + 84  | + 31 | + 37 | + 48 | + 64  | + 18 | + 24 |
|                                     |       | + 81   | + 90 | +106 | +129 | + 49 | + 56 | + 65  | + 26 | + 29 | + 36 | + 45  | + 13 | + 16 |
| 30                                  | 50    | +113   | +132 | +165 | +216 | + 71 | + 83 | + 102 | + 38 | + 46 | + 58 | + 77  | + 22 | + 30 |
|                                     |       | + 99   | +110 | +130 | +160 | + 62 | + 69 | + 80  | + 32 | + 37 | + 44 | + 55  | + 16 | + 21 |
| 50                                  | 80    | +139   | +162 | +202 | +261 | + 5  | + 99 | +122  | + 46 | + 55 | + 69 | + 92  | + 26 | + 35 |
|                                     |       | +122   | +136 | +160 | +194 | + 74 | + 82 | + 96  | + 39 | + 44 | + 52 | + 66  | + 19 | + 24 |
| 80                                  | 120   | +165   | +193 | +239 | +307 | +101 | +117 | +145  | + 54 | + 65 | + 81 | +109  | + 30 | + 41 |
|                                     |       | +146   | +162 | +190 | +230 | + 88 | + 98 | +114  | + 46 | + 52 | + 62 | + 78  | + 22 | + 28 |
| 120                                 | 180   | +198   | +230 | +281 | +357 | +119 | +138 | +170  | + 64 | + 77 | + 96 | + 128 | + 35 | + 48 |
|                                     |       | +175   | +195 | +225 | +269 | +105 | +115 | +135  | + 55 | + 63 | + 73 | + 93  | + 26 | + 34 |

**Reamer Manufacturing Tolerances (continued)**

| Nominal Diameter of Reamer D1 in mm |       | Reamer Manufacturing Tolerances DIN 1420   |     |      |      |      |      |      |      |      |      |      |      |     |     |
|-------------------------------------|-------|--|-----|------|------|------|------|------|------|------|------|------|------|-----|-----|
|                                     |       | Admissible maximum and minimum reamer dimensions of nominal diameter d1 in µm for drilling tolerance range |     |      |      |      |      |      |      |      |      |      |      |     |     |
| Over                                | Up to | R6   | R7  | S6   | S7   | T6   | U6   | U7   | U10  | X10  | X11  | Z10  | Z11  |     |     |
| 1                                   | 3     | -11  | -12 | -15  | -16  | -19  | -19  | -20  | -24  | -26  | -29  | -32  | -35  |     |     |
|                                     |       | -14  | -16 | -18  | -20  | -22  | -22  | -24  | -38  | -40  | -50  | -46  | -56  |     |     |
| 3                                   | 6     | -14  | -13 | -18  | -17  | -22  | -22  | -21  | -31  | -36  | -40  | -43  | -47  |     |     |
|                                     |       | -17  | -18 | -21  | -22  | -25  | -25  | -26  | -48  | -53  | -67  | -60  | -56  |     |     |
| 6                                   | 10    | -18  | -16 | -22  | -20  | -27  | -27  | -25  | -37  | -43  | -48  | -51  | -47  |     |     |
|                                     |       | -22  | -22 | -26  | -26  | -31  | -31  | -31  | -58  | -64  | -80  | -72  | -74  |     |     |
| 10                                  | 14    | -22  | -19 | -27  | -24  | -32  | -32  | -29  | -44  | -51  | -57  | -61  | -56  |     |     |
|                                     |       | -26  | -26 | -31  | -31  | -36  | -36  | -36  | -69  | -76  | -96  | -86  | -88  |     |     |
| 14                                  | 18    | -22  | -19 | -27  | -24  | -32  | -32  | -29  | -44  | -56  | -62  | -71  | -67  |     |     |
|                                     |       | -26  | -26 | -31  | -31  | -36  | -36  | -36  | -69  | -81  | -101 | -96  | -106 |     |     |
| 18                                  | 24    | -26  | -24 | -33  | -31  | -39  | -39  | -37  | -54  | -67  | -74  | -86  | -77  |     |     |
|                                     |       | -31  | -32 | -38  | -39  | -44  | -44  | -45  | -84  | -97  | -120 | -116 | -116 |     |     |
| 24                                  | 30    | -26  | -24 | -33  | -31  | -39  | -46  | -44  | -61  | -77  | -84  | -101 | -108 |     |     |
|                                     |       | -31  | -32 | -38  | -39  | -44  | -51  | -52  | -69  | -107 | -130 | -131 | -154 |     |     |
| 30                                  | 40    | -32  | -29 | -41  | -38  | -46  | -58  | -55  | -75  | -95  | -104 | -127 | -136 |     |     |
|                                     |       | -38  | -38 | -47  | -47  | -52  | -64  | -64  | -110 | -130 | -160 | -162 | -192 |     |     |
| 40                                  | 50    | -32  | -29 | -41  | -38  | -52  | -68  | -65  | -85  | -112 | -121 | -151 | -160 |     |     |
|                                     |       | -38  | -38 | -47  | -47  | -58  | -74  | -74  | -120 | -147 | -177 | -186 | -216 |     |     |
| 50                                  | 65    | -38  | -35 | -50  | -47  | -63  | -84  | -81  | -105 | -140 | -151 | -190 | -201 |     |     |
|                                     |       | -45  | -46 | -57  | -58  | -70  | -91  | -92  | -147 | -182 | -218 | -232 | -268 |     |     |
| 65                                  | 80    | -40  | -37 | -56  | -53  | -72  | -99  | -96  | -120 | -164 | -175 | -228 | -239 |     |     |
|                                     |       | -47  | -48 | -63  | -64  | -79  | -106 | -107 | -162 | -206 | -242 | -170 | -306 |     |     |
| 80                                  | 100   | -48  | -44 | -68  | -64  | -88  | -121 | -117 | -145 | -199 | -211 | -179 | -291 |     |     |
|                                     |       | -56  | -57 | -76  | -77  | -96  | -129 | -130 | -194 | -248 | -288 | -328 | -368 |     |     |
| 100                                 | 120   | -51  | -47 | -76  | -72  | -101 | -141 | -139 | -165 | -231 | -243 | -331 | -343 |     |     |
|                                     |       | -59  | -60 | -84  | -85  | -109 | -149 | -150 | -214 | -280 | -320 | -380 | -420 |     |     |
| 120                                 | 140   | -60  | -54 | -89  | -83  | -119 | -167 | -161 | -194 | -272 | -286 | -389 | -403 |     |     |
|                                     |       | -69  | -68 | -98  | -97  | -128 | -176 | -175 | -250 | -328 | -374 | -445 | -491 |     |     |
| 140                                 | 160   | -62  | -56 | -97  | -91  | -131 | -187 | -181 | -214 | -304 | -318 | -439 | -453 |     |     |
|                                     |       | -71  | -70 | -106 | -105 | -140 | -196 | -195 | -270 | -360 | -406 | -495 | -541 |     |     |
| Over                                | Up to | H6   | H7  | H8   | H9   | H10  | H11  | H12  | J6   | J7   | J8   | JS6  | JS7  | JS8 | JS9 |
| 1                                   | 3     | +5   | +8  | +11  | +21  | +34  | +51  | +85  | +1   | +2   | +3   | +2   | +3   | +4  | +8  |
|                                     |       | +2   | +4  | +6   | +12  | +20  | +30  | +50  | -2   | -2   | -2   | -1   | -1   | -1  | -1  |
| 3                                   | 6     | +6   | +10 | +15  | +25  | +40  | +63  | +102 | +3   | +4   | +7   | +2   | +4   | +6  | +10 |
|                                     |       | +3   | +5  | +8   | +14  | +23  | +30  | +60  | 0    | -1   | 0    | -1   | -1   | -1  | -1  |
| 6                                   | 10    | +7   | +12 | +18  | +30  | +49  | +76  | +127 | +3   | +5   | +8   | +3   | +5   | +7  | +12 |
|                                     |       | +3   | +6  | +10  | +17  | +28  | +44  | +74  | -1   | -1   | 0    | -1   | -1   | -1  | -1  |
| 10                                  | 16    | +9   | +15 | +22  | +36  | +59  | +93  | +153 | +4   | +7   | +10  | +3   | +6   | +9  | +15 |
|                                     |       | +5   | +8  | +12  | +20  | +34  | +54  | +90  | 0    | 0    | 0    | -1   | -1   | -1  | -1  |
| 18                                  | 30    | +11  | +17 | +28  | +44  | +71  | +110 | +178 | +6   | +8   | +15  | +4   | +7   | +11 | +18 |
|                                     |       | +6   | +9  | +16  | +25  | +41  | +64  | +104 | +1   | 0    | +3   | -1   | -1   | -1  | -1  |
| 30                                  | 50    | +13  | +21 | +33  | +52  | +85  | +136 | +212 | +7   | +10  | +18  | +5   | +8   | +13 | +21 |
|                                     |       | +7   | +12 | +19  | +30  | +50  | +80  | +124 | +1   | +1   | +4   | -1   | -1   | -1  | -1  |
| 50                                  | 80    | +16  | +25 | +39  | +62  | +102 | +161 | +255 | +10  | +13  | +21  | +6   | +10  | +16 | +25 |
|                                     |       | +9   | +14 | +22  | +36  | +60  | +94  | +150 | +3   | +2   | +4   | -1   | -1   | -1  | -1  |
| 90                                  | 120   | +18  | +29 | +45  | +73  | +119 | +187 | +297 | +12  | +16  | +25  | +7   | +12  | +18 | +30 |
|                                     |       | +10  | +16 | +26  | +42  | +70  | +110 | +174 | +4   | +3   | +6   | -1   | -1   | -1  | -1  |
| 120                                 | 180   | +21  | +34 | +53  | +85  | +136 | +212 | +360 | +14  | +20  | +31  | +8   | +16  | +22 | +35 |
|                                     |       | +12  | +20 | +30  | +50  | +80  | +124 | +200 | +5   | +6   | +8   | -1   | 0    | -1  | 0   |

## Reamer Manufacturing Tolerances (continued)

| Nominal Diameter of Reamer D1 in mm |       | Reamer Manufacturing Tolerances DIN 1420  |    |     |     |     |     |     |     |     |     |     |      |     |     |
|-------------------------------------|-------|---|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|
|                                     |       | Admissible maximum and minimum reamer dimensions of nominal diameter d1 in $\mu\text{m}$ for drilling tolerance range |    |     |     |     |     |     |     |     |     |     |      |     |     |
| Over                                | Up to | K6  | K7 | K8  | M6  | M7  | M8  | N6  | N7  | N8  | N9  | N10 | N11  | P6  | P7  |
| 1                                   | 3     | -1  | -2 | -3  | -3  | -4  | -5  | -5  | -6  | -7  | -8  | -10 | -13  | -7  | -8  |
|                                     |       | -4  | -6 | -8  | -6  | -8  | -10 | -8  | -10 | -12 | -17 | -24 | -34  | -10 | -12 |
| 3                                   | 6     | 0   | +1 | +2  | -3  | -2  | -1  | -7  | -6  | -5  | -5  | -8  | -12  | -11 | -10 |
|                                     |       | -3  | -4 | -5  | -6  | -7  | -8  | -10 | -11 | -12 | -16 | -25 | -39  | -14 | -15 |
| 6                                   | 10    | 0   | +2 | +2  | -5  | -3  | -3  | -9  | -7  | -7  | -6  | -9  | -14  | -14 | -12 |
|                                     |       | -4  | -4 | -6  | -9  | -9  | -11 | -13 | -13 | -15 | -19 | -30 | -46  | -18 | -18 |
| 10                                  | 18    | 0   | +3 | +3  | -6  | -3  | -3  | -11 | -8  | -8  | -7  | -11 | -17  | -17 | -14 |
|                                     |       | -4  | -4 | -7  | -10 | -10 | -13 | -15 | -15 | -18 | -23 | -36 | -56  | -21 | -21 |
| 18                                  | 30    | 0   | +2 | +5  | -6  | -4  | -1  | -13 | -11 | -8  | -8  | -13 | -20  | -20 | -18 |
|                                     |       | -5  | -6 | -7  | -11 | -12 | -13 | -18 | -19 | -20 | -27 | -43 | -66  | -25 | -26 |
| 30                                  | 50    | 0   | +3 | +6  | -7  | -4  | -1  | -15 | -12 | -9  | -10 | -15 | -24  | -24 | -21 |
|                                     |       | -6  | -6 | -8  | -13 | -13 | -15 | -21 | -21 | -23 | -32 | -50 | -80  | -30 | -30 |
| 50                                  | 80    | +1  | +4 | +7  | -8  | -5  | -2  | -17 | -14 | -11 | -12 | -18 | -29  | -29 | -26 |
|                                     |       | -6  | -7 | -10 | -15 | -16 | -19 | -24 | -25 | -28 | -38 | -60 | -96  | -36 | -37 |
| 80                                  | 120   | 0   | +4 | +7  | -10 | -6  | -3  | -20 | -16 | -13 | -14 | -21 | -33  | -34 | -30 |
|                                     |       | -8  | -9 | -12 | -18 | -19 | -22 | -28 | -29 | -32 | -45 | -70 | -110 | -42 | -43 |
| 120                                 | 180   | 0   | +6 | +10 | -12 | -6  | -2  | -24 | -18 | -14 | -15 | -24 | -38  | -40 | -34 |
|                                     |       | -9  | -8 | -13 | -21 | -20 | -25 | -33 | -32 | -37 | -50 | -80 | -126 | -49 | +48 |



### Cutting Speed

The cutting speed has the highest influence on the surface quality of the reamed hole and on the life of the tool. Increasing the cutting speed beyond the optimum speed will cause increased tool wear due to the increased cutting temperature. The increased speed also causes an increase in the built-up edge (material that is welded to the cutting edge). The built-up edge damages the surface finish and shortens the life of the tool. In order to achieve high surface quality and longer tool life, the cutting speed for reaming should be kept relatively low.

### Feed Rate

The feed rate directly influences the wear on the cutting edge. As the feed rate is increased, the cutting forces increase almost proportionally. The feed, however, has less influence on the machined surface quality and tool wear than the cutting speed (i.e. the feed can be varied in a relatively wide range without having material influence the quality of the machined hole and the respective tool life). It is therefore recommended to select the highest possible feed in order to shorten reaming times without significantly reducing the tool life.

### Reaming Allowance

The reaming allowance (the amount of material to be reamed) also influences the tool life. In order to achieve high tool life, the reaming allowance should be kept at a reasonable minimum considering the process to be performed. If the reaming allowance is too small, it may result in a high dimensional variation (inability to maintain the required tolerances) and a decrease in the machined surface quality. When reaming materials that have surface defects or have been welded or flame cut, the reaming allowance should be increased so these factors do not appear on the reamed surface.

### Coolant/Lubrication

The high degree of friction between the tool and the wall being reamed demands the use of a fluid for lubrication and cooling. Using lubrication is more critical for maintaining tolerances than using a coolant. General cutting oils and emulsions may be used. It should be noted that in some cases emulsions will yield a better surface finish than cutting oils. Emulsions are thinner fluids that are able to reach and more uniformly lubricate the cutting edges better than viscous cutting oils (especially when performing deep applications). In order to determine the most suitable lubricant for a particular application, tests should be run on the material to be cut, on a case-to-case basis.

### Reaming Prerequisites

In order to achieve high tolerances for reaming applications, there are certain requirements that must be considered.

- 1 Condition of the tool - If the tool is reground, both an exact concentricity and high quality grinding are indispensable.
- 2 Workpiece material - Axis shifting and warping (i.e. incorrect hole positioning) can only be corrected to a certain degree when reaming. A critical factor is the initial opening in the workpiece. This opening must be even, or if the prepared hole is countersunk, a cone countersink must be used. Failure to properly prepare the initial opening can result in irregular countersinking that leads to the reamer being pushed out of its proper alignment. Ideally, pre-machining should be performed in a chuck to avoid alignment defects.
- 3 Through holes - For best results, the holes to be reamed should extend completely through the workpiece material. This allows for easy exit of both the cutting fluid and the reamed material. Negative flute reamers are advantageous in through hole reaming.
- 4 Blind holes - Use straight flute reamers for blind holes.



**High Speed Reaming System with Internal Coolant Holes**

The **INDEX-H-REAM** standard line covers reaming applications of .315-1.25" hole diameters.

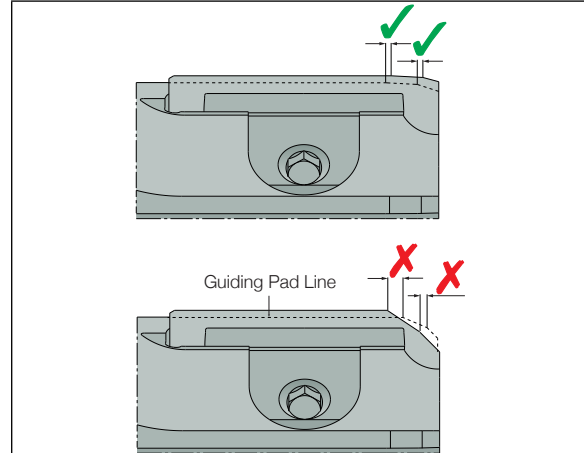
The indexable cutting insert has two cutting corners with 4 lead angle options and 3 rake angle variations, covering most workpiece material types.

The **INDEX-H-REAM** single indexable insert with carbide pads provides a combination of economical and high precision results on a very wide range of materials.

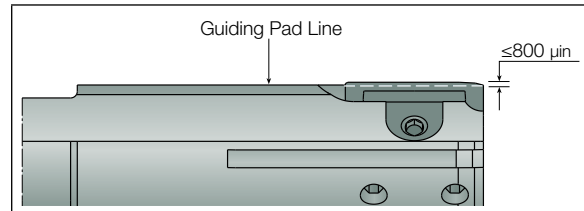


**Important**

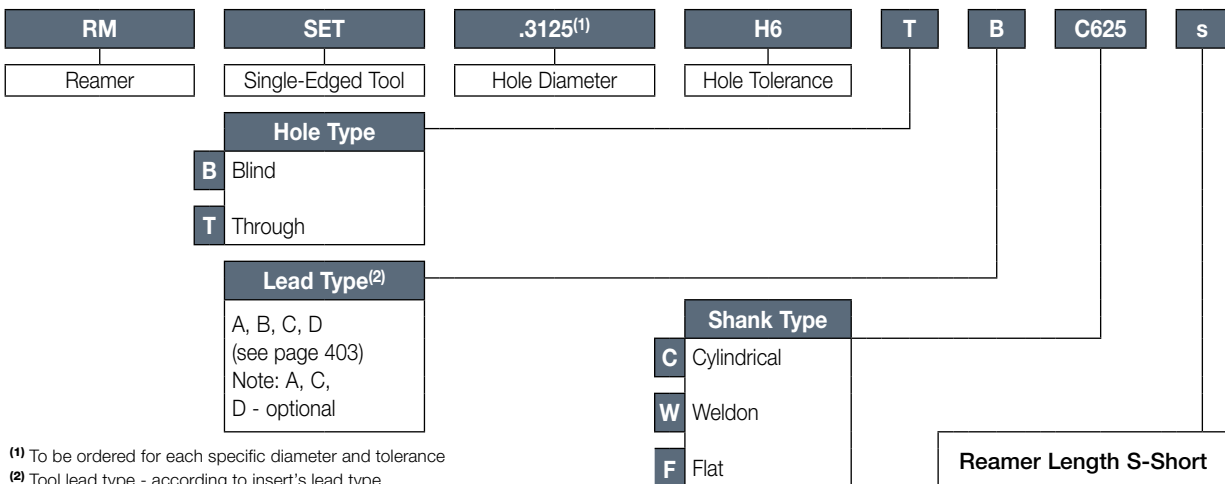
Lead type of the tool (pads) should be compatible with the lead type of the insert. Using an improper insert will damage the tool and the reamed part.



The guiding pads are precisely ground for a specific diameter, and therefore, can only be used for reaming on appropriate hole sizes. The adjustment mechanism is designed for a specific diameter setting and for wear compensation (a few microns only). The same tool can not be used for reaming different diameters.



**Tool Designation Code Key**

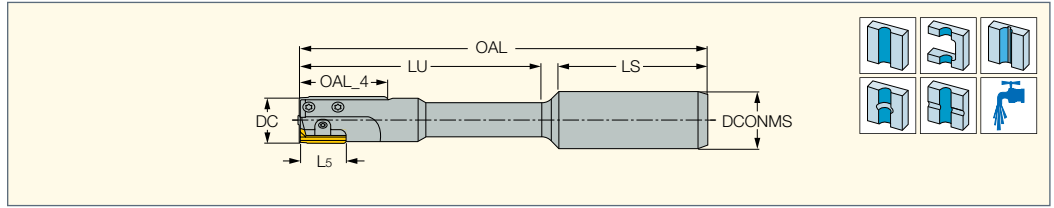


<sup>(1)</sup> To be ordered for each specific diameter and tolerance  
<sup>(2)</sup> Tool lead type - according to insert's lead type

**INDEXH-REAM**

**RM-SET-T-B**

Single-Edged Indexable  
Reamers for Through Holes



| Designation            | DC    | L5   | OAL <sub>4</sub> <sup>(1)</sup> | LU    | LS   | OAL   | DCONMS | SSC <sup>(2)</sup> |
|------------------------|-------|------|---------------------------------|-------|------|-------|--------|--------------------|
| RM-SET.5000H6T-B-C625S | .5000 | .670 | 1.180                           | 3.350 | 1.77 | 5.310 | .625   | 3.0                |
| RM-SET.8125H6T-B-C1S   | .8125 | .670 | 1.180                           | 4.330 | 2.20 | 6.730 | 1.000  | 3.0                |

• For spare parts, see page 399 • For user guide and cutting conditions, see pages 403-408

<sup>(1)</sup> Pad length.

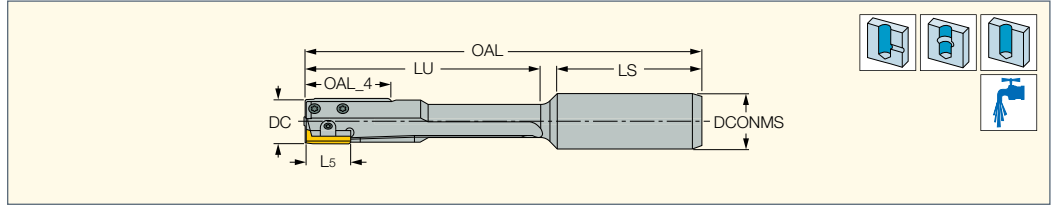
<sup>(2)</sup> Insert size

For inserts, see pages: RM-SEI-B (402)

**INDEXH-REAM**

**RM-SET-B-B**

Single-Edged Indexable  
Reamers for Blind Holes



| Designation            | DC     | L5   | OAL   | LU    | LS   | OAL <sub>4</sub> <sup>(1)</sup> | DCONMS | SSC <sup>(2)</sup> |
|------------------------|--------|------|-------|-------|------|---------------------------------|--------|--------------------|
| RM-SET.5000H6B-B-C625S | .5000  | .670 | 5.310 | 3.350 | 1.77 | 1.180                           | .625   | 3.0                |
| RM-SET.6875H6B-B-C75S  | .6875  | .670 | 6.500 | 4.330 | 1.97 | 1.180                           | .750   | 3.0                |
| RM-SET.7500H6B-B-C75S  | .7500  | .670 | 6.500 | 4.330 | 1.97 | 1.180                           | .750   | 3.0                |
| RM-SET.8125H6B-B-C1S   | .8125  | .670 | 6.730 | 4.330 | 2.20 | 1.180                           | 1.000  | 3.0                |
| RM-SET1.1875H6B-B-C1S  | 1.1875 | .870 | 8.700 | 6.300 | 2.20 | 1.180                           | 1.000  | 4.0                |

• For user guide and cutting conditions, see pages 403-408

<sup>(1)</sup> Pad length

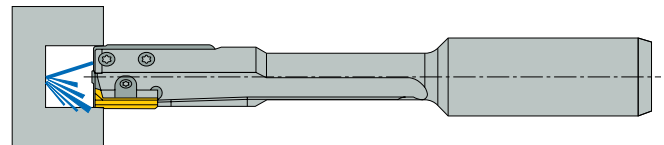
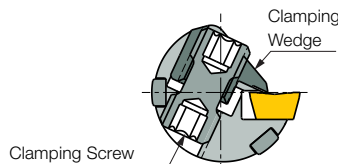
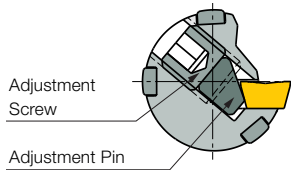
<sup>(2)</sup> Insert size

For inserts, see pages: RM-SEI-B (402)

**Spare Parts**



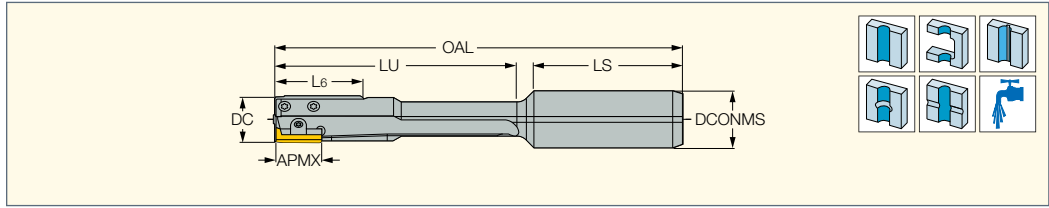
| D  | Clamping Wedge | Clamping Screw | Adjustment Screw | Adjustment Pin  | Insert Size |
|----|----------------|----------------|------------------|-----------------|-------------|
| 8  | WDG-RM-SE-1    | SR-CL-RM-SE-1  | SR-ADJ-M3x2.5    | PIN-ADJ-RM-SE-1 | 1           |
| 9  | WDG-RM-SE-1    | SR-CL-RM-SE-1  | SR-ADJ-M3x3      | PIN-ADJ-RM-SE-1 | 1           |
| 10 | WDG-RM-SE-2    | SR-CL-RM-SE-1  | SR-ADJ-M3x3      | PIN-ADJ-RM-SE-2 | 2           |
| 11 | WDG-RM-SE-2    | SR-CL-RM-SE-1  | SR-ADJ-M3x4      | PIN-ADJ-RM-SE-2 | 2           |
| 12 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x4      | PIN-ADJ-RM-SE-3 | 3           |
| 13 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x4      | PIN-ADJ-RM-SE-3 | 3           |
| 14 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x4      | PIN-ADJ-RM-SE-3 | 3           |
| 15 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x6      | PIN-ADJ-RM-SE-3 | 3           |
| 16 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x6      | PIN-ADJ-RM-SE-3 | 3           |
| 17 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x8      | PIN-ADJ-RM-SE-3 | 3           |
| 18 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x8      | PIN-ADJ-RM-SE-3 | 3           |
| 19 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x8      | PIN-ADJ-RM-SE-3 | 3           |
| 20 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 21 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 22 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 23 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 24 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 25 | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 26 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 27 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 28 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 29 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 30 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 31 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 32 | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |



**INDEXH-REAM**

**RM-SET-T-B**

Single-Edged Indexable  
Reamers for Through Holes



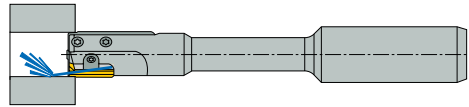
| M E T R I C            |        |       |                   |       |      |        |        |                    |
|------------------------|--------|-------|-------------------|-------|------|--------|--------|--------------------|
| Designation            | DC     | APMX  | L6 <sup>(1)</sup> | LU    | LS   | OAL    | DCONMS | SSC <sup>(2)</sup> |
| RM-SET8.000H6T-B-C16S  | 8.000  | 15.50 | 30.00             | 75.0  | 45.0 | 123.50 | 16.00  | 1.0                |
| RM-SET9.000H6T-B-C16S  | 9.000  | 15.50 | 30.00             | 75.0  | 45.0 | 123.50 | 16.00  | 1.0                |
| RM-SET10.000H6T-B-C16S | 10.000 | 15.50 | 30.00             | 75.0  | 45.0 | 123.50 | 16.00  | 2.0                |
| RM-SET11.000H6T-B-C16S | 11.000 | 15.50 | 30.00             | 75.0  | 45.0 | 123.50 | 16.00  | 2.0                |
| RM-SET12.000H6T-B-C16S | 12.000 | 17.00 | 30.00             | 85.0  | 45.0 | 135.00 | 16.00  | 3.0                |
| RM-SET13.000H6T-B-C16S | 13.000 | 17.00 | 30.00             | 85.0  | 45.0 | 135.00 | 16.00  | 3.0                |
| RM-SET14.000H6T-B-C16S | 14.000 | 17.00 | 30.00             | 85.0  | 45.0 | 135.00 | 16.00  | 3.0                |
| RM-SET15.000H6T-B-C16S | 15.000 | 17.00 | 30.00             | 85.0  | 45.0 | 135.00 | 16.00  | 3.0                |
| RM-SET16.000H6T-B-C20S | 16.000 | 17.00 | 30.00             | 110.0 | 50.0 | 165.00 | 20.00  | 3.0                |
| RM-SET17.000H6T-B-C20S | 17.000 | 17.00 | 30.00             | 110.0 | 50.0 | 165.00 | 20.00  | 3.0                |
| RM-SET18.000H6T-B-C20S | 18.000 | 17.00 | 30.00             | 110.0 | 50.0 | 165.00 | 20.00  | 3.0                |
| RM-SET19.000H6T-B-C20S | 19.000 | 17.00 | 30.00             | 110.0 | 50.0 | 165.00 | 20.00  | 3.0                |
| RM-SET20.000H6T-B-C25S | 20.000 | 17.00 | 30.00             | 110.0 | 56.0 | 171.00 | 25.00  | 3.0                |
| RM-SET21.000H6T-B-C25S | 21.000 | 17.00 | 30.00             | 110.0 | 56.0 | 171.00 | 25.00  | 3.0                |
| RM-SET22.000H6T-B-C25S | 22.000 | 17.00 | 30.00             | 130.0 | 56.0 | 191.00 | 25.00  | 3.0                |
| RM-SET23.000H6T-B-C25S | 23.000 | 17.00 | 30.00             | 130.0 | 56.0 | 191.00 | 25.00  | 3.0                |
| RM-SET24.000H6T-B-C25S | 24.000 | 17.00 | 30.00             | 130.0 | 56.0 | 191.00 | 25.00  | 3.0                |
| RM-SET25.000H6T-B-C25S | 25.000 | 17.00 | 30.00             | 130.0 | 56.0 | 191.00 | 25.00  | 3.0                |
| RM-SET26.000H6T-B-C25S | 26.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |
| RM-SET27.000H6T-B-C25S | 27.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |
| RM-SET28.000H6T-B-C25S | 28.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |
| RM-SET29.000H6T-B-C25S | 29.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |
| RM-SET30.000H6T-B-C25S | 30.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |
| RM-SET31.000H6T-B-C25S | 31.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |
| RM-SET32.000H6T-B-C25S | 32.000 | 22.50 | 30.00             | 160.0 | 56.0 | 221.00 | 25.00  | 4.0                |

• For spare parts, see page 401 • For user guide and cutting conditions, see pages 403-408

<sup>(1)</sup> Pad length

<sup>(2)</sup> Insert size

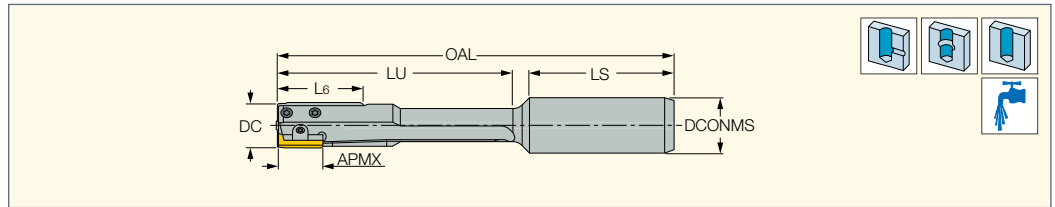
For inserts, see pages: RM-SEI-B (402)



# INDEXH-REAM

## RM-SET-B-B

Single-Edged Indexable  
Reamers for Blind Holes



| M E T R I C            |        |       |        |      |       |                   |        |                    |
|------------------------|--------|-------|--------|------|-------|-------------------|--------|--------------------|
| Designation            | DC     | APMX  | OAL    | LS   | LU    | L6 <sup>(1)</sup> | DCONMS | SSC <sup>(2)</sup> |
| RM-SET9.000H6B-B-C16S  | 9.000  | 15.50 | 123.50 | 45.0 | 75.0  | 30.00             | 16.00  | 1.0                |
| RM-SET10.000H6B-B-C16S | 10.000 | 15.50 | 123.50 | 45.0 | 75.0  | 30.00             | 16.00  | 2.0                |
| RM-SET11.000H6B-B-C16S | 11.000 | 15.50 | 123.50 | 45.0 | 75.0  | 30.00             | 16.00  | 2.0                |
| RM-SET12.000H6B-B-C16S | 12.000 | 17.00 | 135.00 | 45.0 | 85.0  | 30.00             | 16.00  | 3.0                |
| RM-SET13.000H6B-B-C16S | 13.000 | 17.00 | 135.00 | 45.0 | 85.0  | 30.00             | 16.00  | 3.0                |
| RM-SET14.000H6B-B-C16S | 14.000 | 17.00 | 135.00 | 45.0 | 85.0  | 30.00             | 16.00  | 3.0                |
| RM-SET15.000H6B-B-C16S | 15.000 | 17.00 | 135.00 | 45.0 | 85.0  | 30.00             | 16.00  | 3.0                |
| RM-SET16.000H6B-B-C20S | 16.000 | 17.00 | 165.00 | 50.0 | 110.0 | 30.00             | 20.00  | 3.0                |
| RM-SET17.000H6B-B-C20S | 17.000 | 17.00 | 165.00 | 50.0 | 110.0 | 30.00             | 20.00  | 3.0                |
| RM-SET18.000H6B-B-C20S | 18.000 | 17.00 | 165.00 | 50.0 | 110.0 | 30.00             | 20.00  | 3.0                |
| RM-SET19.000H6B-B-C20S | 19.000 | 17.00 | 165.00 | 50.0 | 110.0 | 30.00             | 20.00  | 3.0                |
| RM-SET20.000H6B-B-C25S | 20.000 | 17.00 | 171.00 | 56.0 | 110.0 | 30.00             | 25.00  | 3.0                |
| RM-SET21.000H6B-B-C25S | 21.000 | 17.00 | 171.00 | 56.0 | 110.0 | 30.00             | 25.00  | 3.0                |
| RM-SET22.000H6B-B-C25S | 22.000 | 17.00 | 191.00 | 56.0 | 130.0 | 30.00             | 25.00  | 3.0                |
| RM-SET23.000H6B-B-C25S | 23.000 | 17.00 | 191.00 | 56.0 | 130.0 | 30.00             | 25.00  | 3.0                |
| RM-SET24.000H6B-B-C25S | 24.000 | 17.00 | 191.00 | 56.0 | 130.0 | 30.00             | 25.00  | 3.0                |
| RM-SET25.000H6B-B-C25S | 25.000 | 17.00 | 191.00 | 56.0 | 130.0 | 30.00             | 25.00  | 3.0                |
| RM-SET26.000H6B-B-C25S | 26.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |
| RM-SET27.000H6B-B-C25S | 27.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |
| RM-SET28.000H6B-B-C25S | 28.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |
| RM-SET29.000H6B-B-C25S | 29.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |
| RM-SET30.000H6B-B-C25S | 30.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |
| RM-SET31.000H6B-B-C25S | 31.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |
| RM-SET32.000H6B-B-C25S | 32.000 | 22.50 | 221.00 | 56.0 | 160.0 | 30.00             | 25.00  | 4.0                |

• For user guide and cutting conditions, see pages 403-408

<sup>(1)</sup> Pad length

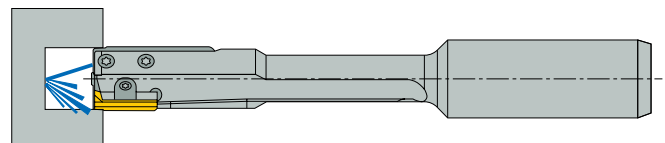
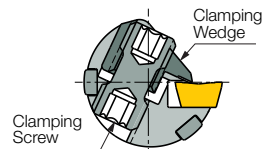
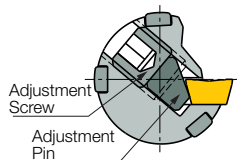
<sup>(2)</sup> Insert size

For inserts, see pages: RM-SEI-B (402)

### Spare Parts



| D [mm] | Clamping Wedge | Clamping Screw | Adjustment Screw | Adjustment Pin  | Insert Size |
|--------|----------------|----------------|------------------|-----------------|-------------|
| 8      | WDG-RM-SE-1    | SR-CL-RM-SE-1  | SR-ADJ-M3x2.5    | PIN-ADJ-RM-SE-1 | 1           |
| 9      | WDG-RM-SE-1    | SR-CL-RM-SE-1  | SR-ADJ-M3x3      | PIN-ADJ-RM-SE-1 | 1           |
| 10     | WDG-RM-SE-2    | SR-CL-RM-SE-1  | SR-ADJ-M3x3      | PIN-ADJ-RM-SE-2 | 2           |
| 11     | WDG-RM-SE-2    | SR-CL-RM-SE-1  | SR-ADJ-M3x4      | PIN-ADJ-RM-SE-2 | 2           |
| 12     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x4      | PIN-ADJ-RM-SE-3 | 3           |
| 13     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x4      | PIN-ADJ-RM-SE-3 | 3           |
| 14     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x4      | PIN-ADJ-RM-SE-3 | 3           |
| 15     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x6      | PIN-ADJ-RM-SE-3 | 3           |
| 16     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x6      | PIN-ADJ-RM-SE-3 | 3           |
| 17     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x8      | PIN-ADJ-RM-SE-3 | 3           |
| 18     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x8      | PIN-ADJ-RM-SE-3 | 3           |
| 19     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x8      | PIN-ADJ-RM-SE-3 | 3           |
| 20     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 21     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 22     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 23     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 24     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 25     | WDG-RM-SE-3    | SR-CL-RM-SE-3  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-3 | 3           |
| 26     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 27     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 28     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 29     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 30     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 31     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |
| 32     | WDG-RM-SE-4    | SR-CL-RM-SE-4  | SR-ADJ-M4x10     | PIN-ADJ-RM-SE-4 | 4           |

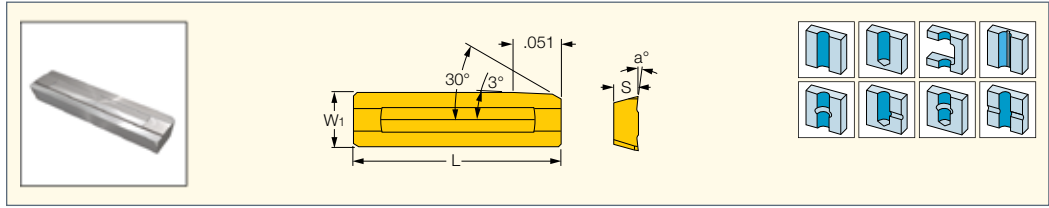


**Insert Designation Code Key**

|                     |                                  |                         |                               |                         |                               |
|---------------------|----------------------------------|-------------------------|-------------------------------|-------------------------|-------------------------------|
| <b>RM</b><br>Reamer | <b>SEI</b><br>Single Edge Insert | <b>4</b><br>Insert Size | <b>B</b><br>Lead Type A, B, C | <b>12</b><br>Rake Angle | <b>IC907</b><br>Carbide Grade |
|---------------------|----------------------------------|-------------------------|-------------------------------|-------------------------|-------------------------------|

**INDEXH-REAM**

**RM-SEI-B**  
Single-Edged Reaming Inserts  
for General Applications at  
High Cutting Speeds

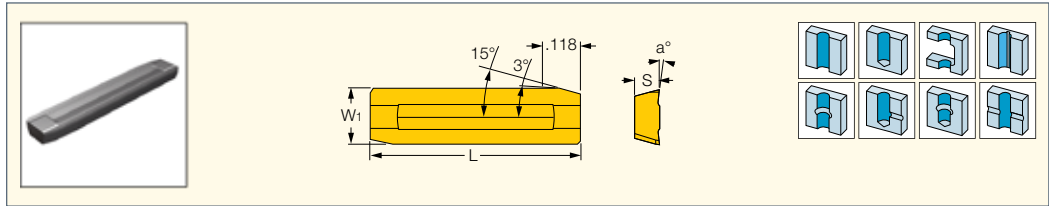


| Designation  | Dimensions         |    |      |      |      | Tough ↔ Hard |      |       |       |
|--------------|--------------------|----|------|------|------|--------------|------|-------|-------|
|              | SSC <sup>(1)</sup> | a° | L    | W1   | S    | IC30N        | IC07 | IC507 | IC907 |
| RM-SEI-1B-00 | 1.0                | 0  | .610 | .110 | .059 |              |      |       | •     |
| RM-SEI-1B-06 | 1.0                | 6  | .610 | .110 | .059 |              |      | •     | •     |
| RM-SEI-1B-12 | 1.0                | 12 | .610 | .110 | .059 |              | •    |       | •     |
| RM-SEI-2B-00 | 2.0                | 0  | .610 | .142 | .059 |              |      |       | •     |
| RM-SEI-2B-06 | 2.0                | 6  | .610 | .142 | .059 |              |      | •     | •     |
| RM-SEI-2B-12 | 2.0                | 12 | .610 | .142 | .059 |              | •    |       | •     |
| RM-SEI-3B-00 | 3.0                | 0  | .669 | .173 | .079 |              |      |       | •     |
| RM-SEI-3B-06 | 3.0                | 6  | .669 | .173 | .079 |              |      | •     | •     |
| RM-SEI-3B-12 | 3.0                | 12 | .669 | .173 | .079 |              | •    |       | •     |
| RM-SEI-4B-06 | 4.0                | 6  | .886 | .260 | .118 | •            |      | •     | •     |
| RM-SEI-4B-12 | 4.0                | 12 | .886 | .260 | .118 |              | •    |       | •     |

• Lead type of insert should be compatible with lead type of the tool  
<sup>(1)</sup> Insert size  
 For tools, see pages: RM-SET-B-B (399) • RM-SET-T-B (399)

**INDEXH-REAM**

**RM-SEI-A**  
Single-Edged Reaming Inserts  
for High Surface Quality at  
Low Cutting Conditions

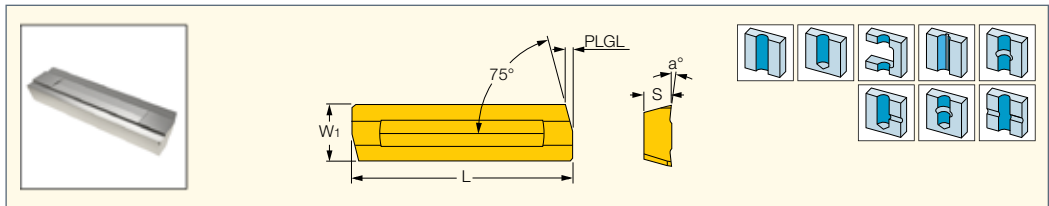


| Designation  | Dimensions         |    |      |      |      | Tough ↔ Hard |       |
|--------------|--------------------|----|------|------|------|--------------|-------|
|              | SSC <sup>(1)</sup> | a° | L    | W1   | S    | IC507        | IC907 |
| RM-SEI-1A-06 | 1.0                | 6  | .610 | .110 | .059 | •            |       |
| RM-SEI-2A-06 | 2.0                | 6  | .610 | .142 | .059 | •            |       |
| RM-SEI-3A-06 | 3.0                | 6  | .610 | .173 | .079 | •            |       |
| RM-SEI-3A-12 | 3.0                | 12 | .669 | .173 | .079 |              | •     |
| RM-SEI-4A-06 | 4.0                | 6  | .886 | .260 | .118 | •            |       |

• Lead type of insert should be compatible with lead type of the tool • Available on request  
<sup>(1)</sup> Insert size

**INDEXH-REAM**

**RM-SEI-C**  
Single-Edged Reaming Inserts  
for Aluminum and Brass



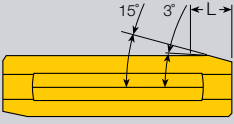
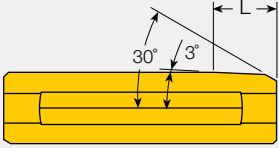
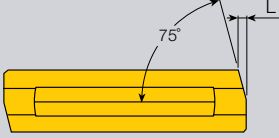
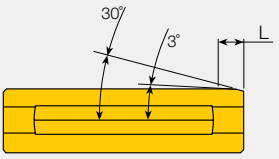
| Designation  | Dimensions         |    |      |      |      |       | IC07 |
|--------------|--------------------|----|------|------|------|-------|------|
|              | SSC <sup>(1)</sup> | a° | L    | W1   | S    | PLGL  |      |
| RM-SEI-1C-12 | 1.0                | 12 | .610 | .110 | .059 | .0216 | •    |
| RM-SEI-2C-12 | 2.0                | 12 | .610 | .142 | .059 | .0216 | •    |
| RM-SEI-3C-12 | 3.0                | 12 | .669 | .173 | .079 | .0216 | •    |
| RM-SEI-4C-12 | 4.0                | 12 | .886 | .260 | .118 | .0216 | •    |

• Lead type of insert should be compatible with lead type of the tool • Available on request  
<sup>(1)</sup> Insert size



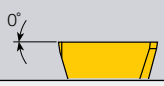

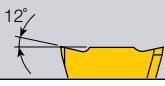
**Front Angles and Cutting Geometries**

4 standard lead angles are available:

| Lead             | L [inch] | Use   |
|------------------|----------|---|
| A                | .118     | Higher surface quality, lower cutting conditions (not recommended for nonferrous materials).<br> |
| B                | .051     | Universal use, high speed cutting conditions. Can be used on a wide range of materials.<br>      |
| C                | 0.22     | Suitable for aluminum and brass at high cutting speed.<br>                                      |
| D <sup>(1)</sup> | .024     | When needed for blind hole - lower feed.<br>   |

<sup>(1)</sup> On request

3 standard cutting angles are available:

| Angle [deg.]  | Use                               |
|---|-----------------------------------|
| 00<br> | For cast iron applications.       |
| 06<br> | General use.                      |
| 12<br> | For stainless steel and aluminum. |

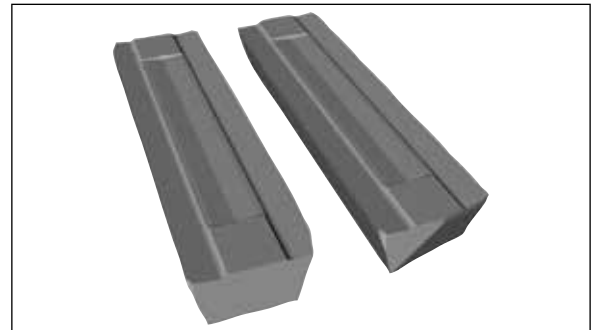
**Carbide Grades**

**IC07** grade is the basic substrate for reaming inserts. It is a very versatile submicron grade. **IC07** features very high fracture toughness and wear resistance, which is required for efficient high speed reaming. An uncoated **IC07** can be used for machining nonferrous (N type material group) applications. Two types of standard coatings are available:

- **IC907** – a TiAlN PVD coating for steel (P) and stainless steel (M) workpiece material groups
- **IC507** - a TiCN+TiN PVD coating for cast iron (K) workpiece material group.





The following grades can be provided on request:

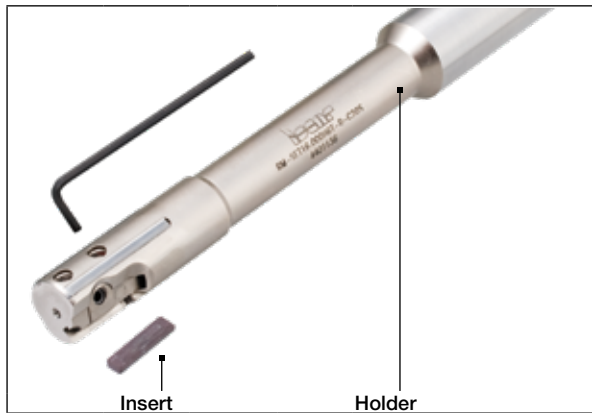
- **PCD** grade for machining aluminum
- **PCBN** grade for machining cast iron
- **IC30N** (cermet) for machining steel



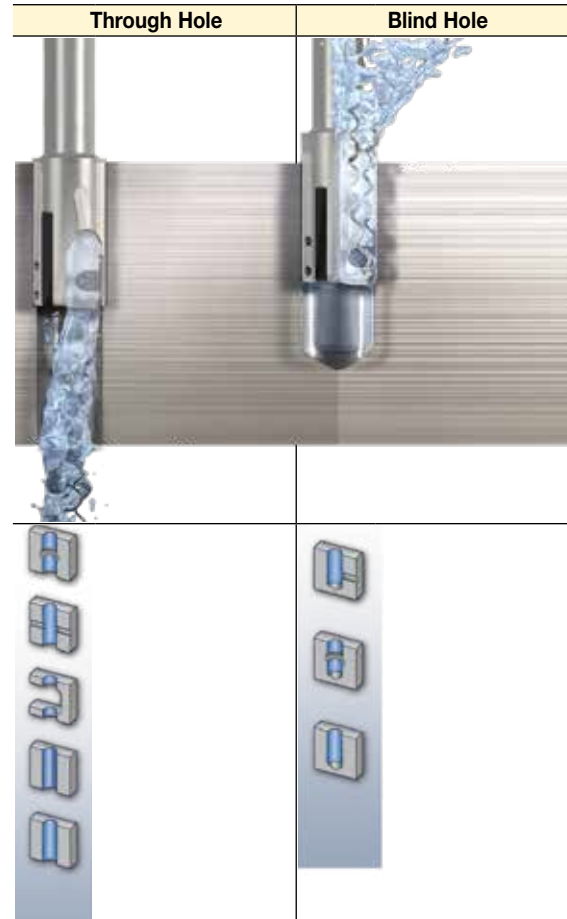
**Concept**

The **INDEX-H-REAM** Line is available in 4 sizes and features two different holder geometries (short flute and long flute). The holder selection depends on the hole type (through or blind).

| RM-SEI-1  | RM-SEI-2  | RM-SEI-3  | RM-SEI-4  |
|---|---|---|---|
|  |  |  |  |
| Ø.315-.393"<br>(Ø8.00-9.99 mm)  | Ø.393-.472"<br>(Ø10.00-11.99 mm)  | Ø.472-1.024"<br>(Ø12.00-25.99 mm)   | Ø1.024-1.260"<br>(Ø26.00-32.00 mm)  |

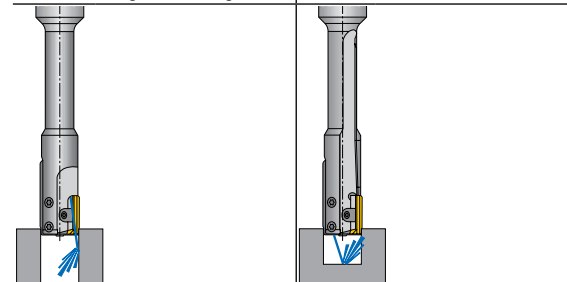


**Applications**



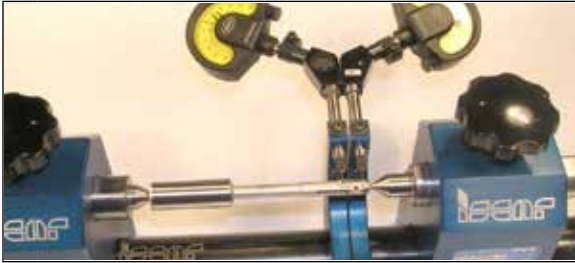
**Through Hole**  
Short Flute Holder. This holder has a lateral coolant outlet located right above the insert. The coolant is pointed directly to the cutting edge to lubricate it and divert the chips forward. Additional coolant outlets are located behind the guiding pads. Their purpose is to reduce high friction that is created between the pads and the reamed surface during machining.

**Blind Hole**  
Long Flute Holder. This holder has a front coolant outlet. The liquid reaches the bottom of the blind hole and evacuates the formed chips. These chips are conveyed backwards through the long chip gullet (flute) of the holder.



**Setting Procedure**

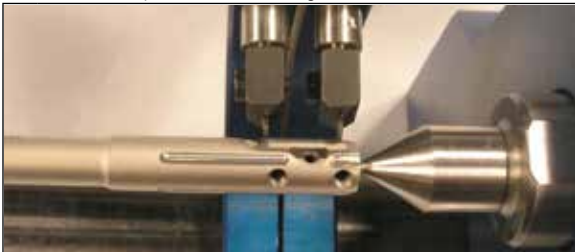
- 1 Place the reamer between the centering pins of the device.



- 2 Use the pad as a reference for setting the indicator to zero.



- 3 Rotate and place the inserts against indicators.



- 4 Tighten the adjustment screws in a clockwise direction.



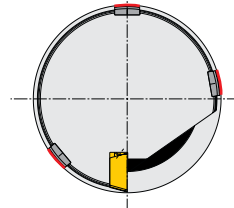
- 5 Adjust the frontal side of the insert to:  
+600 µm on D≤.3933,  
+800 µm on D≤.3937

- 6 Adjust the rear side of insert to:  
+200 µm on D≤.3933,  
+400 µm on D≤.3937

**Back Taper**

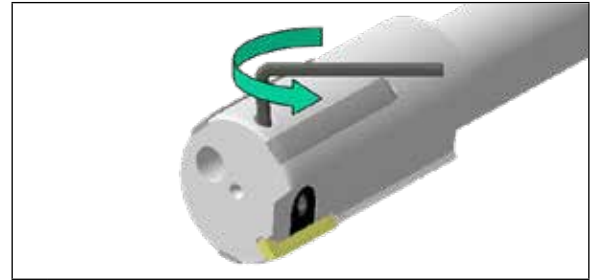
The back taper prevents the reamer from jamming, as well as lowering reaming forces and improving surface quality. Incorrect back taper may cause unstable reaming, accelerated wear and rough surface finish.

**High Friction Lubricated Zones**

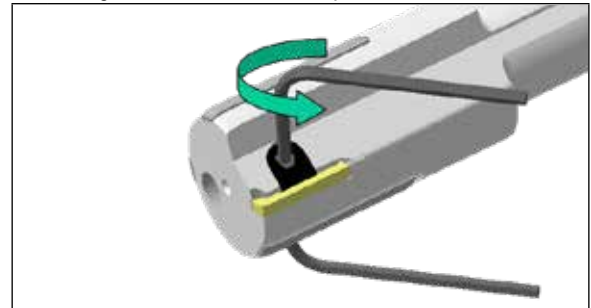


**Insert Indexing**

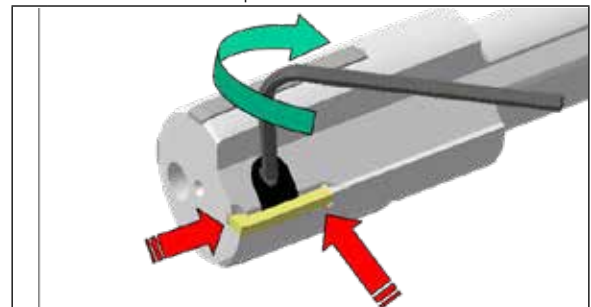
- 1 Rotate the adjustment screws one turn counterclockwise (CCW).



- 2 Rotate the clamping screw CCW from the top and/or clockwise (CW) from the bottom, turning both sides simultaneously.



- 3 Remove the insert. Clean the insert and the pocket. Place the sharp edge on the outer position. Press the insert against the back stopper and the two adjustment pins. Tighten the clamping wedge by rotating the clamping screw CW from the top or CCW from the bottom.



**Setting Methods**

There are two optional setting methods - comparison micrometer and setting device. Comparison micrometer with dial gauge, although a low cost solution and readily available for small workshops, is prone to damaging the cutting edge and therefore not recommended.

**Using a Comparison Micrometer**

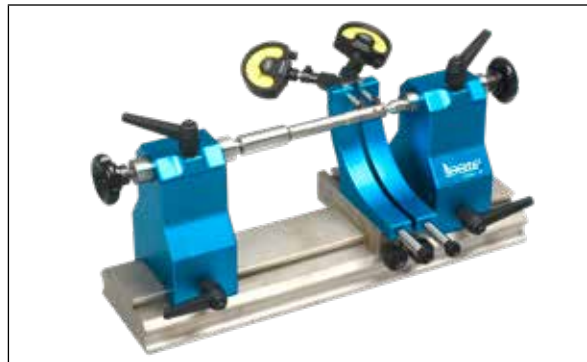
Set the micrometer to the correct diameter using the precision blocks. Adjust the frontal diameter and back taper by turning the adjustment screw clockwise. The frontal diameter should be larger than the rear diameter by approximately 600 µin.

**Using a Setting Device**

ISCAR's mechanical setting device enables easy, quick and accurate adjustment. Due to its modular construction, it can be used for standard, special and more complicated reamer adjustments.

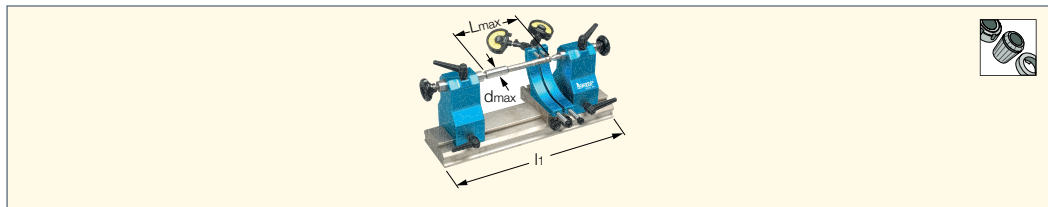
**Setting Device Located Between Centers**


- Shorter setting time
- Modular system
- Higher accuracy
- No risk of damaging the cutting edge



**Accessories**

**RM SETTING DEVICE**  
Reamer Setting Device



| Designation              | $L_{max}$ | $l_1$  | $d_{max}$ |  |
|--------------------------|-----------|--------|-----------|---|
| <b>RM SETTING DEVICE</b> | 10.433    | 17.717 | 6.693     | 55.13   |

**H-REAM Cutting Conditions**

The cutting conditions in the table below should be used to start a new application. Optimal conditions for a specific application should be evaluated by examining the results and changing the machining conditions accordingly.

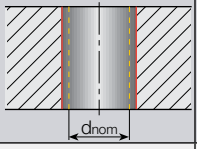
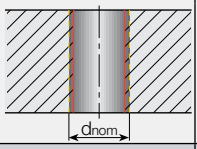
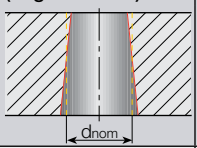
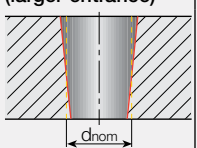
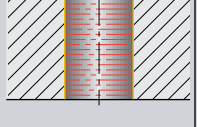
| Material No. | Material   | Lead A=15°/3° L.118 (reaming allowance = .004 - .012 ) |          |                                    |                |         |            |            |
|--------------|--|--|----------|------------------------------------|----------------|---------|------------|------------|
|              |  | Feed (IPR)   | Rake (°) | Cutting Speed V <sub>c</sub> (SFM) |                |         |            |            |
|              |  |  |          | Carbide                            | Coated Carbide | Cermet  | PCD        | CBN        |
| 1-5          | Non-alloy steel and cast steel free cutting steel                  | .004-.016  | 6        | 130-200                            | 200-260        | 360-520 |            |            |
| 6-9          | Low alloy steel and cast steel (less than 5% of alloying elements) | .004-.016  | 6        | 70-130                             | 130-200        | 360-520 |            |            |
| 10-11        | High alloyed steel, cast steel and tool steel                      | .004-.016  | 6        | 70-130                             | 70-200         | 70-200  |            |            |
| 12-13        | Stainless steel and cast steel                                     | .004-.012  | 12       | 70-130                             | 130-200        | 130-200 |            |            |
| 15-16        | Grey cast iron (GG)  | .004-.012  | 0 / 6    | 130-200                            | 200-330        |         |            | Please ask |
| 17-18        | Cast iron nodular (GGG)  | .004-.012  | 0 / 6    | 130-200                            | 200-330        |         |            |            |
| 19-20        | Malleable cast iron  | .004-.012  | 0 / 6    | 130-200                            | 200-330        |         |            |            |
| 21-22        | Aluminum wrought alloy   |  |          |                                    |                |         | Please ask |            |
| 23-25        | Aluminum - cast, alloyed   |  |          |                                    |                |         |            |            |
| 26-28        | Copper alloys  |  |          |                                    |                |         |            |            |
| 29-30        | Non-metallic   |  |          |                                    |                |         |            |            |

| Material No. | Material   | Lead B=30°/3° L.051 (reaming allowance = .004 - .012 ) |          |                                    |                |         |            |            |
|--------------|--|--|----------|------------------------------------|----------------|---------|------------|------------|
|              |  | Feed (IPR)   | Rake (°) | Cutting Speed V <sub>c</sub> (SFM) |                |         |            |            |
|              |  |  |          | Carbide                            | Coated Carbide | Cermet  | PCD        | CBN        |
| 1-5          | Non-alloy steel and cast steel free cutting steel                  | .004-.012  | 6        | 200-260                            | 260-390        | 360-530 |            |            |
| 6-9          | Low alloy steel and cast steel (less than 5% of alloying elements) | .004-.012  | 6        | 200-260                            | 260-390        | 360-530 |            |            |
| 10-11        | High alloyed steel, cast steel and tool steel                      | .004-.012  | 6        | 130-200                            | 130-260        | 130-260 |            |            |
| 12-13        | Stainless steel and cast steel                                     | .004-.008  | 12       | 130-200                            | 200-260        | 200-260 |            |            |
| 15-16        | Grey cast iron (GG)  | .004-.012  | 0 / 6    | 200-260                            | 260-390        |         |            | Please ask |
| 17-18        | Cast iron nodular (GGG)  | .004-.012  | 0 / 6    | 200-260                            | 260-390        |         |            |            |
| 19-20        | Malleable cast iron  | .004-.012  | 0 / 6    | 200-260                            | 260-390        |         |            |            |
| 21-22        | Aluminum wrought alloy   | .004-.012  | 12       | 530-660                            |                |         | Please ask |            |
| 23-25        | Aluminum - cast, alloyed   | .004-.012  | 12       | 530-660                            |                |         |            |            |
| 26-28        | Copper alloys  | .004-.008  | 0        | 260-330                            |                |         |            |            |
| 29-30        | Non-metallic   | .004-.012  | 0        | 35-230                             |                |         |            |            |

| Material No. | Material   | Lead D=30°/3° L.024 (reaming allowance = .004 - .008 ) |          |                                    |                |         |            |            |
|--------------|--|--|----------|------------------------------------|----------------|---------|------------|------------|
|              |  | Feed (IPR)   | Rake (°) | Cutting Speed V <sub>c</sub> (SFM) |                |         |            |            |
|              |  |  |          | Carbide                            | Coated Carbide | Cermet  | PCD        | CBN        |
| 1-5          | Non-alloy steel and cast steel free cutting steel                  | .002-.008  | 6        | 200-260                            | 260-390        | 360-530 |            |            |
| 6-9          | Low alloy steel and cast steel (less than 5% of alloying elements) | .002-.008  | 6        | 200-260                            | 260-390        | 360-530 |            |            |
| 10-11        | High alloyed steel, cast steel and tool steel                      | .002-.008  | 6        | 130-200                            | 130-260        | 130-260 |            |            |
| 12-13        | Stainless steel and cast steel                                     | .002-.008  | 12       | 130-200                            | 200-260        | 200-260 |            |            |
| 15-16        | Grey cast iron (GG)  | .002-.008  | 0 / 6    | 200-260                            | 260-390        |         |            | Please ask |
| 17-18        | Cast iron nodular (GGG)  | .002-.008  | 0 / 6    | 200-260                            | 260-390        |         |            |            |
| 19-20        | Malleable cast iron  | .002-.008  | 0 / 6    | 200-260                            | 260-390        |         |            |            |
| 21-22        | Aluminum wrought alloy   | .002-.008  | 12       | 360-660                            |                |         | Please ask |            |
| 23-25        | Aluminum - cast, alloyed   | .002-.008  | 12       | 590-660                            |                |         |            |            |
| 26-28        | Copper alloys  | .002-.008  | 0        | 260-330                            |                |         |            |            |
| 29-30        | Non-metallic   |  |          |                                    |                |         |            |            |

| Material No. | Material   | Lead C=75°/3° L.022 (reaming allowance = .008 - .016 ) |          |                                    |                |        |            |            |
|--------------|--|--|----------|------------------------------------|----------------|--------|------------|------------|
|              |  | Feed (IPR)   | Rake (°) | Cutting Speed V <sub>c</sub> (SFM) |                |        |            |            |
|              |  |  |          | Carbide                            | Coated Carbide | Cermet | PCD        | CBN        |
| 1-5          | Non-alloy steel and cast steel free cutting steel                  |  |          |                                    |                |        |            |            |
| 6-9          | Low alloy steel and cast steel (less than 5% of alloying elements) |  |          |                                    |                |        |            |            |
| 10-11        | High alloyed steel, cast steel and tool steel                      |  |          |                                    |                |        |            |            |
| 12-13        | Stainless steel and cast steel                                     |  |          |                                    |                |        |            |            |
| 15-16        | Grey cast iron (GG)  |  |          |                                    |                |        |            | Please ask |
| 17-18        | Cast iron nodular (GGG)  |  |          |                                    |                |        |            |            |
| 19-20        | Malleable cast iron  |  |          |                                    |                |        |            |            |
| 21-22        | Aluminum wrought alloy   | .006-.012  | 12       | 490-820                            |                |        | Please ask |            |
| 23-25        | Aluminum - cast, alloyed   | .006-.012  | 12       | 490-820                            |                |        |            |            |
| 26-28        | Copper alloys  |  |          |                                    |                |        |            |            |
| 29-30        | Non-metallic   |  |          |                                    |                |        |            |            |

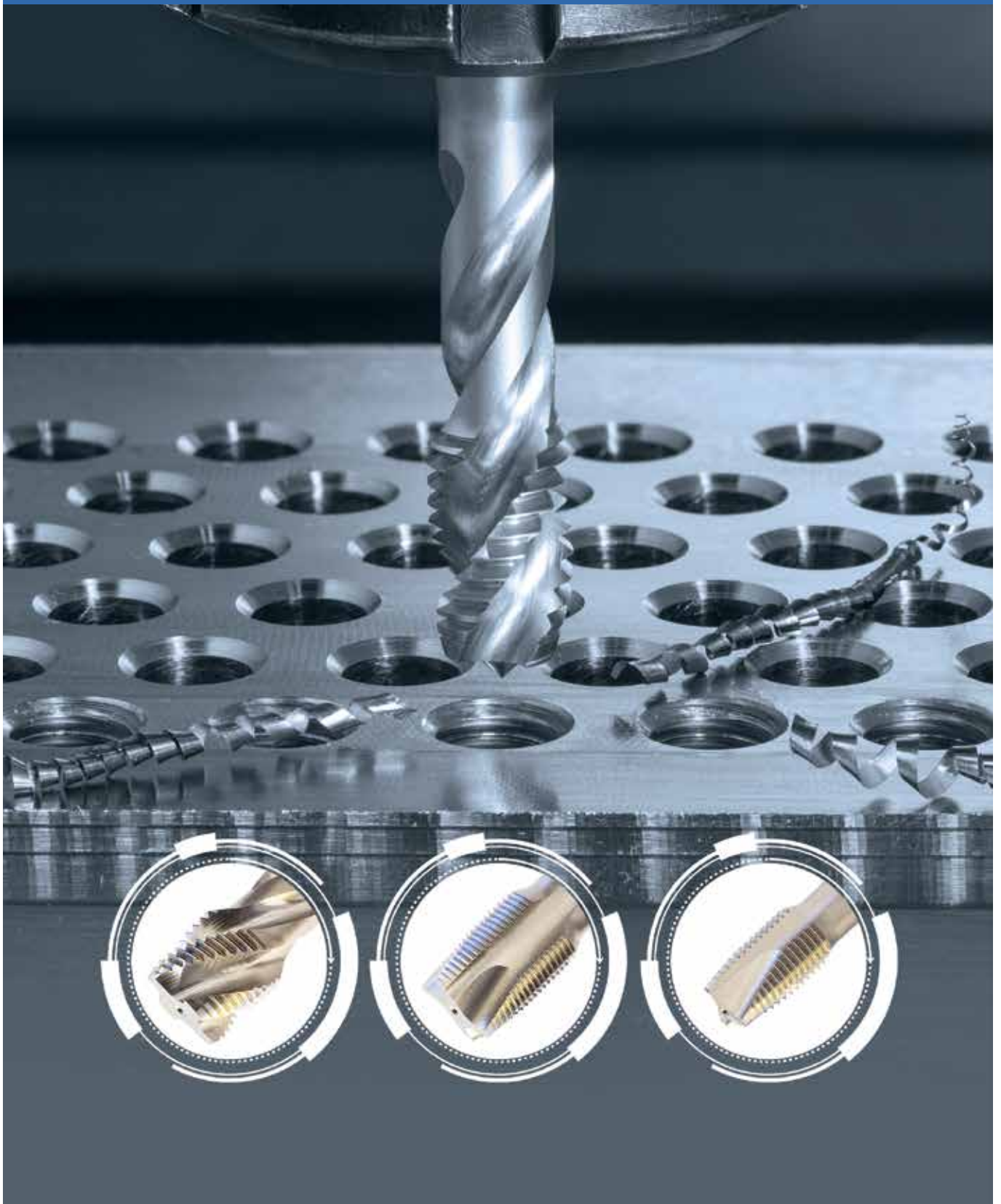
## Troubleshooting

| Problem   | Cause   | Solution   |
|---|---|--|
| <b>Hole too large</b><br>                  | <ul style="list-style-type: none"> <li>Reamer or pilot hole not centered</li> <li>Reamer too large</li> <li>Cooling / lubrication problems</li> </ul>   | <ul style="list-style-type: none"> <li>Use a floating reamer chuck or correct pilot hole</li> <li>Check size of reamer and correct if necessary</li> <li>Change lubricant and increase coolant pressure</li> </ul>                                 |
| <b>Hole too small</b><br>                  | <ul style="list-style-type: none"> <li>Worn reamer</li> <li>Reaming allowance too small</li> <li>Cooling / lubrication problems</li> </ul>  | <ul style="list-style-type: none"> <li>Replace the reamer</li> <li>Increase reaming allowance</li> <li>Change lubricant and increase coolant pressure</li> </ul>   |
| <b>Conical hole (larger bottom)</b><br>    | <ul style="list-style-type: none"> <li>Misalignment between pre-hole and reamer centers</li> </ul>  | <ul style="list-style-type: none"> <li>Re-align or use a floating reamer chuck</li> </ul>  |
| <b>Conical hole (larger entrance)</b><br> | <ul style="list-style-type: none"> <li>Misalignment between pre-hole and reamer centers</li> <li>Material jammed between reamer and hole in the upper hole section</li> </ul>   | <ul style="list-style-type: none"> <li>Re-align or use a floating reamer chuck</li> <li>Secure the tool axially</li> </ul>   |
| <b>Poor surface finish</b><br>           | <ul style="list-style-type: none"> <li>Worn reamer</li> <li>Misalignment between pre-hole and reamer centers</li> <li>Problems with chip evacuation</li> <li>Incorrect cutting parameters</li> <li>Built-up edge</li> </ul> | <ul style="list-style-type: none"> <li>Replace the tool</li> <li>Re-align or use a floating reamer chuck</li> <li>Increase coolant pressure</li> <li>Change cutting parameters</li> <li>Change cutting parameters or coolant conditions</li> </ul> |





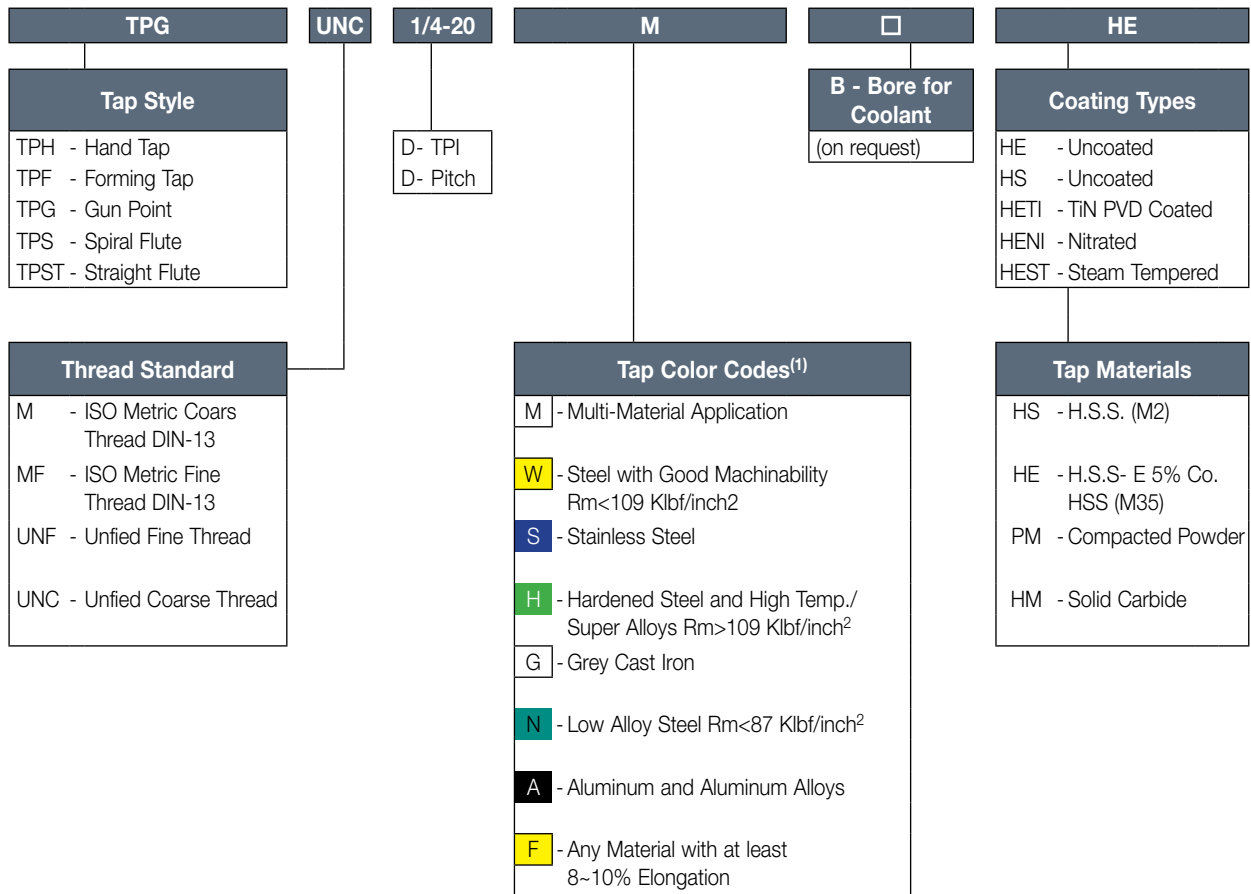
# TAPS



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### Tap Designation Code Key



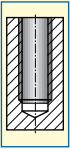
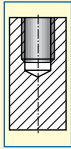
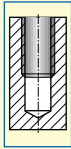
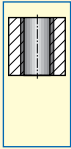

<sup>(1)</sup> The tools have a matching colored ring around the shank

#### Chamfer Lead According to DIN2197 (specified for each tool family)

- A** Form A (Chamfer Lead 5-6 Threads)
- B** Form B (with Gun-Nose and Chamfer Lead 4-5 Threads)
- C** Form C (Chamfer Lead 2-3 Threads)
- D** Form D (Chamfer Lead 4-5 Threads)
- E** Form E (Chamfer Lead 1.5-2 Threads)



## Tap Selection Guide and Cutting Speed Recommendations

| Material Group No. | Hole Type <sup>(4)</sup>  |   |   |   |  | Tap Color Code <sup>(1)</sup> |                              |   |
|--------------------|---|---|---|---|--|-------------------------------|------------------------------|---|
|                    |  |  |  |  |  | Tap Color Code <sup>(1)</sup> | Tool Material <sup>(1)</sup> |   |
|                    | 1   | 2   | 3   | 4   | 5  | Hole Type <sup>(4)</sup>      |                              |   |
|                    | Material  |   | Condition   | Tensile Strength [ksi]  | Hardness HB  | Chip                          | Coolant                      |   |
| 1                  |   |   | Annealed  | 61  | 125  | Ext. Long                     | T                            |   |
| 2                  |   |   | Annealed  | 94  | 190  | Medium                        | T                            |   |
| 3                  | Non-alloy steel and cast steel, free cutting steel                                | <0.25% C  | Quenched and tempered   | 123   | 250  | Long                          | T                            |   |
| 4                  |   | ≥0.25% C  | Annealed  | 109   | 220  | Long                          | T                            |   |
| 7                  |   |   | Quenched and tempered   | 145   | 275  | Long                          | X                            |   |
| 8                  |   |   |   | 87  | 300  | Long                          | X                            |   |
| 9                  |   | 135   |   | 350   | Long   | A                             |                              |   |
| 10                 | High alloyed steel, cast steel and tool steel                                     |   | Annealed  | 145   | 200  | Long                          | X                            |   |
| 11                 |   |   | Quenched and tempered   | 174   | 325  | Long                          | X                            |   |
| 12                 | Stainless steel and cast steel  |   | Ferritic/martensitic  | 99  | 200  | Medium                        | A                            |   |
| 13                 |   |   | Martensitic   | 160   | 240  | Long                          | A                            |   |
| 14                 | Stainless steel and cast steel  |   | Austenitic, duplex  | 87  | 180  | Long                          | A                            |   |
| 15                 | Gray cast iron (GG)   |   | Ferritic / pearlitic  |   | 180  | Ext. Short                    | X                            |   |
| 16                 |   |   | Pearlitic / martensitic   |   | 260  | Ext. Short                    | X                            |   |
| 17                 | Nodular cast iron (GGG)   |   | Ferritic  |   | 160  | Short                         | X                            |   |
| 18                 |   |   | Pearlitic   |   | 250  | Ext. Short                    | X                            |   |
| 19                 | Malleable cast iron   |   | Ferritic  |   | 130  | Short                         | X                            |   |
| 20                 |   |   | Pearlitic   |   | 230  | Short                         | X                            |   |
| 21                 | Aluminum-wrought alloys   |   | Not hardenable  |   | 60   | Medium                        | T                            |   |
| 22                 |   |   | Hardenable  |   | 100  | Medium                        | T                            |   |
| 23                 | Aluminum-cast alloys  |   | Not hardenable  |   | 75   | Short                         | T                            |   |
| 24                 |   |   | ≤12% Si   | Hardenable  |  | 90                            | Short                        | T |
| 25                 |   |   | >12% Si   | High temperature  |  | 130                           | Short                        | T |
| 26                 |   |   | Free cutting  |   | 110  | Med/Short                     | T                            |   |
| 27                 | Copper alloys   |   | Brass   |   | 90   | Long                          | T                            |   |
| 28                 |   |   | Electrolytic copper   |   | 100  | Long                          | T                            |   |
| 29                 | Non metallic  |   | Duroplastics, fiber plastics  |   |  | Short                         | Z                            |   |
| 31                 | High temperature alloys   |   | Fe based  | Annealed  |  | 200                           | Long                         | A |
| 32                 |   |   |   | Hardened  |  | 280                           | Long                         | A |
| 33                 |   |   |   | Annealed  |  | 250                           | Long                         | A |
| 34                 |   |   | Ni or Co based  | Hardened  |  | 350                           | Long                         | A |
| 35                 |   |   |   | Cast  |  | 250                           | Long                         | A |
| 36                 | Titanium alloys   |   | Pure  | 58  | 190  | Med/Short                     | A                            |   |
| 37                 |   |   | Alpha+Beta alloys, hardened   | 152   | 310  | Med/Short                     | A                            |   |

(1) See page 411

(2) See page 426

(3) See page 427

(4) See page 427

Coolant

A - Cutting oil

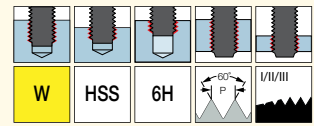
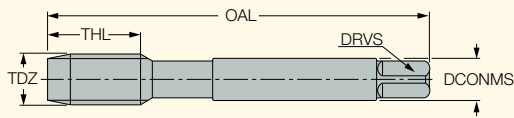
T - Oil emulsion

X - Oil or emulsion

Z - Dry or emulsion




**TPH M-W (HSS)**

 DIN 13 HSS Hand Tap Set for  
ISO Metric Coarse Threads


| Designation      | Dimensions |                      |       |       |        |                    |                     |          |          |    |
|------------------|------------|----------------------|-------|-------|--------|--------------------|---------------------|----------|----------|----|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HS |
| TPH M-2X0.4-W    | M2         | .400                 | 1.417 | .315  | .110   | 3                  | .083                | .06      | DIN 352  | ●  |
| TPH M-2.2X0.45-W | M2.2       | .450                 | 1.417 | .354  | .110   | 3                  | .083                | .07      | DIN 352  | ●  |
| TPH M-2.5X0.45-W | M2.5       | .450                 | 1.575 | .354  | .110   | 3                  | .083                | .08      | DIN 352  | ●  |
| TPH M-2.6X0.45-W | M2.6       | .450                 | 1.575 | .354  | .110   | 3                  | .083                | .08      | DIN 352  | ●  |
| TPH M-3X0.5-W    | M3         | .500                 | 1.575 | .433  | .138   | 3                  | .106                | .10      | DIN 352  | ●  |
| TPH M-3.5X0.6-W  | M3.5       | .600                 | 1.772 | .512  | .157   | 3                  | .118                | .11      | DIN 352  | ●  |
| TPH M-4X0.7-W    | M4         | .700                 | 1.772 | .512  | .177   | 3                  | .134                | .13      | DIN 352  | ●  |
| TPH M-4.5X0.75-W | M4.5       | .750                 | 1.968 | .630  | .236   | 3                  | .193                | .15      | DIN 352  | ●  |
| TPH M-5X0.8-W    | M5         | .800                 | 2.047 | .630  | .236   | 3                  | .193                | .17      | DIN 352  | ●  |
| TPH M-5.5X0.9-W  | M5.5       | .900                 | 2.205 | .709  | .236   | 3                  | .193                | .18      | DIN 352  | ●  |
| TPH M-6X1.0-W    | M6         | 1.000                | 2.205 | .709  | .236   | 3                  | .193                | .20      | DIN 352  | ●  |
| TPH M-7X1.0-W    | M7         | 1.000                | 2.205 | .709  | .236   | 3                  | .193                | .24      | DIN 352  | ●  |
| TPH M-8X1.25-W   | M8         | 1.250                | 2.480 | .787  | .236   | 3                  | .193                | .27      | DIN 352  | ●  |
| TPH M-9X1.25-W   | M9         | 1.250                | 2.480 | .787  | .276   | 4                  | .217                | .31      | DIN 352  | ●  |
| TPH M-10X1.5-W   | M10        | 1.500                | 2.756 | .866  | .276   | 4                  | .217                | .33      | DIN 352  | ●  |
| TPH M-11X1.5-W   | M11        | 1.500                | 2.756 | .866  | .315   | 4                  | .244                | .37      | DIN 352  | ●  |
| TPH M-12X1.75-W  | M12        | 1.750                | 3.150 | .945  | .354   | 4                  | .276                | .40      | DIN 352  | ●  |
| TPH M-14X2.0-W   | M14        | 2.000                | 3.150 | 1.024 | .433   | 4                  | .354                | .47      | DIN 352  | ●  |
| TPH M-16X2.0-W   | M16        | 2.000                | 3.150 | 1.063 | .472   | 4                  | .354                | .55      | DIN 352  | ●  |
| TPH M-18X2.5-W   | M18        | 2.500                | 3.740 | 1.181 | .551   | 4                  | .433                | .61      | DIN 352  | ●  |
| TPH M-20X2.5-W   | M20        | 2.500                | 3.740 | 1.260 | .630   | 4                  | .472                | .69      | DIN 352  | ●  |

• NOTE: Each set contains 2 or 3 taps • For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

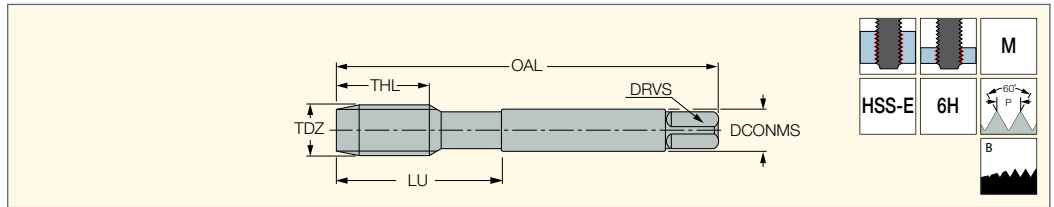
<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size



**TPG M (HSS)**

DIN 13 HSS Gun Point Machine Taps - ISO Metric Coarse Threads for a Wide Range of Materials



| Designation      | Dimensions |                      |       |       |      |        |                    |                     |          |          | Tough ↔ Hard |     |      |
|------------------|------------|----------------------|-------|-------|------|--------|--------------------|---------------------|----------|----------|--------------|-----|------|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HES | HETI |
| TPG M-2X0.4-M    | M2         | .400                 | 1.772 | .315  | .51  | .110   | 3                  | .083                | .06      | DIN 371  | ●            | ●   | ●    |
| TPG M-2.2X0.45-M | M2.2       | .450                 | 1.772 | .315  | .51  | .110   | 3                  | .083                | .07      | DIN 371  | ●            | ●   | ●    |
| TPG M-2.3X0.4-M  | M2.3       | .400                 | 1.772 | .315  | .51  | .110   | 3                  | .083                | .07      | DIN 371  | ●            | ●   | ●    |
| TPG M-2.5X0.45-M | M2.5       | .450                 | 1.968 | .354  | .59  | .110   | 3                  | .083                | .08      | DIN 371  | ●            | ●   | ●    |
| TPG M-2.6X0.45-M | M2.6       | .450                 | 1.968 | .354  | .59  | .110   | 3                  | .083                | .08      | DIN 371  | ●            | ●   | ●    |
| TPG M-3X0.5-M    | M3         | .500                 | 2.205 | .433  | .71  | .138   | 3                  | .106                | .10      | DIN 371  | ●            | ●   | ●    |
| TPG M-3.5X0.6-M  | M3.5       | .600                 | 2.205 | .472  | .79  | .157   | 3                  | .118                | .11      | DIN 371  | ●            | ●   | ●    |
| TPG M-4X0.7-M    | M4         | .700                 | 2.480 | .512  | .83  | .177   | 3                  | .134                | .13      | DIN 371  | ●            | ●   | ●    |
| TPG M-4.5X0.75-M | M4.5       | .750                 | 2.756 | .551  | .98  | .236   | 3                  | .193                | .15      | DIN 371  | ●            | ●   | ●    |
| TPG M-5X0.8-M    | M5         | .800                 | 2.756 | .591  | .98  | .236   | 3                  | .193                | .17      | DIN 371  | ●            | ●   | ●    |
| TPG M-6X1.0-M    | M6         | 1.000                | 3.150 | .669  | 1.18 | .236   | 3                  | .193                | .20      | DIN 371  | ●            | ●   | ●    |
| TPG M-7X1.0-M    | M7         | 1.000                | 3.150 | .669  | 1.18 | .276   | 3                  | .217                | .24      | DIN 371  | ●            | ●   | ●    |
| TPG M-8X1.25-M   | M8         | 1.250                | 3.543 | .787  | 1.38 | .315   | 3                  | .244                | .27      | DIN 371  | ●            | ●   | ●    |
| TPG M-9X1.25-M   | M9         | 1.250                | 3.543 | .787  | 1.38 | .354   | 3                  | .276                | .31      | DIN 371  | ●            | ●   | ●    |
| TPG M-10X1.5-M   | M10        | 1.500                | 3.937 | .866  | 1.54 | .394   | 3                  | .315                | .33      | DIN 371  | ●            | ●   | ●    |
| TPG M-11X1.5-M   | M11        | 1.500                | 3.937 | .866  | -    | .315   | 3                  | .244                | .37      | DIN 376  | ●            | ●   | ●    |
| TPG M-12X1.75-M  | M12        | 1.750                | 4.331 | .945  | -    | .354   | 3                  | .276                | .40      | DIN 376  | ●            | ●   | ●    |
| TPG M-14X2.0-M   | M14        | 2.000                | 4.331 | 1.024 | -    | .433   | 3                  | .354                | .47      | DIN 376  | ●            | ●   | ●    |
| TPG M-16X2.0-M   | M16        | 2.000                | 4.331 | 1.063 | -    | .472   | 3                  | .354                | .55      | DIN 376  | ●            | ●   | ●    |
| TPG M-18X2.5-M   | M18        | 2.500                | 4.921 | 1.181 | -    | .551   | 4                  | .433                | .61      | DIN 376  | ●            | ●   | ●    |
| TPG M-20X2.5-M   | M20        | 2.500                | 5.512 | 1.260 | -    | .630   | 4                  | .472                | .69      | DIN 376  | ●            | ●   | ●    |
| TPG M-22X2.5-M   | M22        | 2.500                | 5.512 | 1.260 | -    | .709   | 4                  | .571                | .77      | DIN 376  | ●            | ●   | ●    |
| TPG M-24X3.0-M   | M24        | 3.000                | 6.299 | 1.339 | -    | .709   | 4                  | .571                | .83      | DIN 376  | ●            | ●   | ●    |
| TPG M-27X3.0-M   | M27        | 3.000                | 6.299 | 1.417 | -    | .787   | 4                  | .630                | .94      | DIN 376  | ●            | ●   | ●    |
| TPG M-30X3.5-M   | M30        | 3.500                | 7.087 | 1.575 | -    | .866   | 4                  | .709                | 1.04     | DIN 376  | ●            | ●   | ●    |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

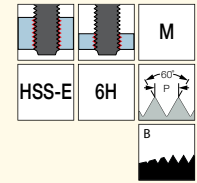
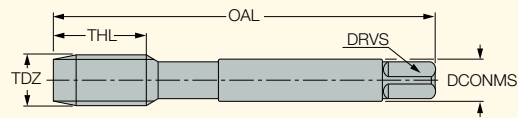
<sup>(3)</sup> Torque key size





**TPG MF (HSS)**

DIN 13 HSS Gun Point Machine  
Taps - ISO Metric Fine Threads  
for a Wide Range of Materials



| Designation      | Dimensions |                      |       |       |        |                    |                     |          |          | Tough ↔ Hard |      |      |
|------------------|------------|----------------------|-------|-------|--------|--------------------|---------------------|----------|----------|--------------|------|------|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HEST | HETI |
| TPG MF-4X0.5-M   | M4         | .500                 | 2.480 | .394  | .110   | 3                  | .083                | .14      | DIN 374  | ●            | ●    | ●    |
| TPG MF-5X0.5-M   | M5         | .500                 | 2.756 | .433  | .138   | 3                  | .106                | .18      | DIN 374  | ●            | ●    | ●    |
| TPG MF-6X0.75-M  | M6         | .750                 | 3.150 | .512  | .177   | 3                  | .134                | .20      | DIN 374  | ●            | ●    | ●    |
| TPG MF-6X0.5-M   | M6         | .500                 | 3.150 | .512  | .177   | 3                  | .134                | .22      | DIN 374  | ●            | ●    | ●    |
| TPG MF-7X0.75-M  | M7         | .750                 | 3.150 | .551  | .217   | 3                  | .169                | .24      | DIN 374  | ●            | ●    | ●    |
| TPG MF-8X1.0-M   | M8         | 1.000                | 3.543 | .669  | .236   | 3                  | .193                | .28      | DIN 374  | ●            | ●    | ●    |
| TPG MF-8X0.75-M  | M8         | .750                 | 3.150 | .551  | .236   | 3                  | .193                | .28      | DIN 374  | ●            | ●    | ●    |
| TPG MF-10X1.25-M | M10        | 1.250                | 3.937 | .866  | .276   | 3                  | .217                | .35      | DIN 374  | ●            | ●    | ●    |
| TPG MF-10X1.0-M  | M10        | 1.000                | 3.543 | .709  | .276   | 3                  | .217                | .35      | DIN 374  | ●            | ●    | ●    |
| TPG MF-10X0.75-M | M10        | .750                 | 3.543 | .709  | .276   | 3                  | .217                | .36      | DIN 374  | ●            | ●    | ●    |
| TPG MF-12X1.5-M  | M12        | 1.500                | 3.937 | .866  | .354   | 3                  | .276                | .41      | DIN 374  | ●            | ●    | ●    |
| TPG MF-12X1.25-M | M12        | 1.250                | 3.937 | .866  | .354   | 3                  | .276                | .43      | DIN 374  | ●            | ●    | ●    |
| TPG MF-12X1.0-M  | M12        | 1.000                | 3.937 | .709  | .354   | 3                  | .276                | .43      | DIN 374  | ●            | ●    | ●    |
| TPG MF-14X1.5-M  | M14        | 1.500                | 3.937 | .866  | .433   | 3                  | .354                | .49      | DIN 374  | ●            | ●    | ●    |
| TPG MF-14X1.25-M | M14        | 1.250                | 3.937 | .866  | .433   | 3                  | .354                | .50      | DIN 374  | ●            | ●    | ●    |
| TPG MF-14X1.0-M  | M14        | 1.000                | 3.937 | .709  | .433   | 3                  | .354                | .51      | DIN 374  | ●            | ●    | ●    |
| TPG MF-16X1.5-M  | M16        | 1.500                | 3.937 | .866  | .472   | 3                  | .354                | .57      | DIN 374  | ●            | ●    | ●    |
| TPG MF-16X1.0-M  | M16        | 1.000                | 3.937 | .709  | .472   | 3                  | .354                | .59      | DIN 374  | ●            | ●    | ●    |
| TPG MF-18X1.5-M  | M18        | 1.500                | 4.331 | .984  | .551   | 4                  | .433                | .65      | DIN 374  | ●            | ●    | ●    |
| TPG MF-18X1.0-M  | M18        | 1.000                | 4.331 | .787  | .551   | 4                  | .433                | .67      | DIN 374  | ●            | ●    | ●    |
| TPG MF-20X1.5-M  | M20        | 1.500                | 4.921 | .984  | .630   | 4                  | .472                | .73      | DIN 374  | ●            | ●    | ●    |
| TPG MF-20X1.0-M  | M20        | 1.000                | 4.921 | .787  | .630   | 4                  | .472                | .75      | DIN 374  | ●            | ●    | ●    |
| TPG MF-22X1.5-M  | M22        | 1.500                | 4.921 | .984  | .709   | 4                  | .571                | .81      | DIN 374  | ●            | ●    | ●    |
| TPG MF-22X1.0-M  | M22        | 1.000                | 4.921 | .787  | .709   | 4                  | .571                | .83      | DIN 374  | ●            | ●    | ●    |
| TPG MF-24X2.0-M  | M24        | 2.000                | 5.512 | 1.063 | .709   | 4                  | .571                | .87      | DIN 374  | ●            | ●    | ●    |
| TPG MF-24X1.5-M  | M24        | 1.500                | 5.512 | 1.063 | .709   | 4                  | .571                | .89      | DIN 374  | ●            | ●    | ●    |
| TPG MF-26X1.5-M  | M26        | 1.500                | 5.512 | 1.102 | .709   | 4                  | .571                | .96      | DIN 374  | ●            | ●    | ●    |
| TPG MF-27X2.0-M  | M27        | 2.000                | 5.512 | 1.102 | .787   | 4                  | .630                | .98      | DIN 374  | ●            | ●    | ●    |
| TPG MF-27X1.5-M  | M27        | 1.500                | 5.512 | 1.102 | .787   | 4                  | .630                | 1.00     | DIN 374  | ●            | ●    | ●    |
| TPG MF-28X1.5-M  | M28        | 1.500                | 5.512 | 1.102 | .787   | 4                  | .630                | 1.04     | DIN 374  | ●            | ●    | ●    |
| TPG MF-30X2.0-M  | M30        | 2.000                | 5.906 | 1.181 | .866   | 4                  | .709                | 1.10     | DIN 374  | ●            | ●    | ●    |
| TPG MF-30X1.5-M  | M30        | 1.500                | 5.906 | 1.181 | .866   | 4                  | .709                | 1.12     | DIN 374  | ●            | ●    | ●    |

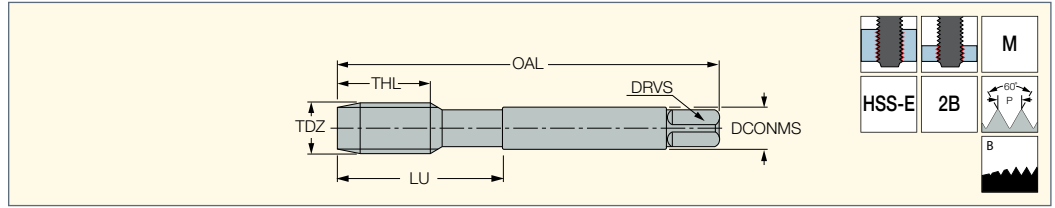
• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size

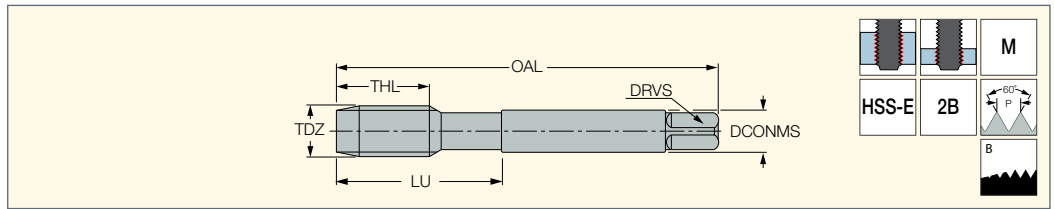
**TPG UNC (HSS)**  
HSS Gun Point Machine Taps  
- Unified Coarse Threads for  
a Wide Range of Materials



| Designation       | Dimensions |                    |       |       |      |        |                    |                     |          |          | Tough ← Hard |     |     |
|-------------------|------------|--------------------|-------|-------|------|--------|--------------------|---------------------|----------|----------|--------------|-----|-----|
|                   | TDZ        | TPI <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HES | HET |
| TPG UNC-#4-40-M   | #4         | 40.0               | 2.205 | .433  | .71  | .138   | 3                  | .106                | .09      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-#5-40-M   | #5         | 40.0               | 2.205 | .433  | .71  | .138   | 3                  | .106                | .10      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-#6-32-M   | #6         | 32.0               | 2.205 | .472  | .79  | .157   | 3                  | .118                | .11      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-#8-32-M   | #8         | 32.0               | 2.480 | .512  | .83  | .177   | 3                  | .134                | .14      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-#10-24-M  | #10        | 24.0               | 2.756 | .591  | .98  | .236   | 3                  | .193                | .15      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-#12-24-M  | #12        | 24.0               | 3.150 | .630  | 1.18 | .236   | 3                  | .193                | .18      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-1/4-20-M  | 1/4"       | 20.0               | 3.150 | .669  | 1.18 | .276   | 3                  | .217                | .20      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-5/16-18-M | 5/16"      | 18.0               | 3.543 | .787  | 1.38 | .315   | 3                  | .244                | .26      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-3/8-16-M  | 3/8"       | 16.0               | 3.937 | .866  | 1.54 | .354   | 3                  | .276                | .31      | DIN 371  | ●            | ●   | ●   |
| TPG UNC-7/16-14-M | 7/16"      | 14.0               | 3.937 | .866  | -    | .315   | 3                  | .244                | .37      | DIN 376  | ●            | ●   | ●   |
| TPG UNC-1/2-13-M  | 1/2"       | 13.0               | 4.331 | .984  | -    | .354   | 3                  | .276                | .42      | DIN 376  | ●            | ●   | ●   |
| TPG UNC-9/16-12-M | 9/16"      | 12.0               | 4.331 | 1.024 | -    | .433   | 3                  | .354                | .48      | DIN 376  | ●            | ●   | ●   |
| TPG UNC-5/8-11-M  | 5/8"       | 11.0               | 4.331 | 1.063 | -    | .472   | 3                  | .354                | .53      | DIN 376  | ●            | ●   | ●   |
| TPG UNC-3/4-10-M  | 3/4"       | 10.0               | 4.921 | 1.181 | -    | .551   | 4                  | .433                | .65      | DIN 376  | ●            | ●   | ●   |
| TPG UNC-7/8-9-M   | 7/8"       | 9.0                | 5.512 | 1.260 | -    | .709   | 4                  | .571                | .77      | DIN 376  | ●            | ●   | ●   |
| TPG UNC-1-8-M     | 1"         | 8.0                | 6.299 | 1.417 | -    | .787   | 4                  | .630                | .88      | DIN 376  | ●            | ●   | ●   |

- For user guide and cutting conditions, see pages 411-413, 425-446
- <sup>(1)</sup> Threads per inch
- <sup>(2)</sup> Number of flutes
- <sup>(3)</sup> Torque key size

**TPG UNF (HSS)**  
HSS Gun Point Machine Taps  
- Unified Fine Threads for a  
Wide Range of Materials

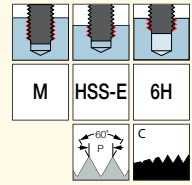
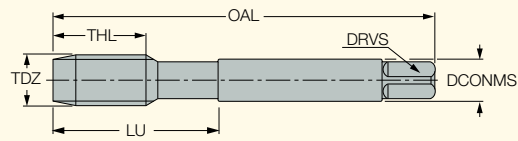


| Designation       | Dimensions |                    |       |       |      |        |                    |                     |          |          | Tough ← Hard |     |     |
|-------------------|------------|--------------------|-------|-------|------|--------|--------------------|---------------------|----------|----------|--------------|-----|-----|
|                   | TDZ        | TPI <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HES | HET |
| TPG UNF-#4-48-M   | #4         | 48.0               | 2.205 | .433  | .71  | .138   | 3                  | .106                | .09      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-#5-44-M   | #5         | 44.0               | 2.205 | .433  | .71  | .138   | 3                  | .106                | .11      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-#6-40-M   | #6         | 40.0               | 2.205 | .472  | .79  | .157   | 3                  | .118                | .12      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-#8-36-M   | #8         | 36.0               | 2.480 | .512  | .83  | .177   | 3                  | .134                | .14      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-#10-32-M  | #10        | 32.0               | 2.756 | .591  | .98  | .236   | 3                  | .193                | .16      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-#12-28-M  | #12        | 28.0               | 3.150 | .630  | 1.18 | .236   | 3                  | .193                | .19      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-1/4-28-M  | 1/4"       | 28.0               | 3.150 | .669  | 1.18 | .276   | 3                  | .217                | .22      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-5/16-24-M | 5/16"      | 24.0               | 3.543 | .669  | 1.38 | .315   | 3                  | .244                | .27      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-3/8-24-M  | 3/8"       | 24.0               | 3.937 | .709  | 1.54 | .354   | 3                  | .276                | .33      | DIN 371  | ●            | ●   | ●   |
| TPG UNF-7/16-20-M | 7/16"      | 20.0               | 3.937 | .866  | -    | .315   | 3                  | .244                | .39      | DIN 374  | ●            | ●   | ●   |
| TPG UNF-1/2-20-M  | 1/2"       | 20.0               | 3.937 | .866  | -    | .354   | 3                  | .276                | .45      | DIN 374  | ●            | ●   | ●   |
| TPG UNF-9/16-18-M | 9/16"      | 18.0               | 3.937 | .866  | -    | .433   | 3                  | .354                | .51      | DIN 374  | ●            | ●   | ●   |
| TPG UNF-5/8-18-M  | 5/8"       | 18.0               | 3.937 | .866  | -    | .472   | 3                  | .354                | .57      | DIN 374  | ●            | ●   | ●   |
| TPG UNF-3/4-16-M  | 3/4"       | 16.0               | 4.331 | .984  | -    | .551   | 4                  | .433                | .69      | DIN 374  | ●            | ●   | ●   |
| TPG UNF-7/8-14-M  | 7/8"       | 14.0               | 4.921 | 1.024 | -    | .709   | 4                  | .571                | .81      | DIN 374  | ●            | ●   | ●   |
| TPG UNF-1-12-M    | 1"         | 12.0               | 5.512 | 1.102 | -    | .787   | 4                  | .630                | .92      | DIN 374  | ●            | ●   | ●   |

- For user guide and cutting conditions, see pages 411-413, 425-446
- <sup>(1)</sup> Threads per inch
- <sup>(2)</sup> Number of flutes
- <sup>(3)</sup> Torque key size

**ONETAP****TPS M (HSS)**

DIN 13 HSS Spiral Flute Machine  
Taps - Metric Coarse Threads  
for a Wide Range of Materials



| Designation      | Dimensions |                         |       |       |      |        |                    |                     |          |          |                    | Tough ↔ Hard |     |     |
|------------------|------------|-------------------------|-------|-------|------|--------|--------------------|---------------------|----------|----------|--------------------|--------------|-----|-----|
|                  | TDZ        | TP<br>mm <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | CSP <sup>(4)</sup> | HE           | HES | HET |
| TPS M-2X0.4-M    | M2         | .400                    | 1.772 | .315  | .51  | .110   | 3                  | .083                | .06      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-2.2X0.45-M | M2.2       | .450                    | 1.772 | .315  | .51  | .110   | 3                  | .083                | .07      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-2.3X0.4-M  | M2.3       | .400                    | 1.772 | .315  | .51  | .110   | 3                  | .083                | .07      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-2.5X0.45-M | M2.5       | .450                    | 1.968 | .354  | .59  | .110   | 3                  | .083                | .08      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-2.6X0.45-M | M2.6       | .450                    | 1.968 | .354  | .59  | .110   | 3                  | .083                | .08      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-3X0.5-M    | M3         | .500                    | 2.205 | .236  | .71  | .138   | 3                  | .106                | .10      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-3.5X0.6-M  | M3.5       | .600                    | 2.205 | .276  | .79  | .157   | 3                  | .118                | .11      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-4X0.7-M    | M4         | .700                    | 2.480 | .276  | .83  | .177   | 3                  | .134                | .13      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-4.5X0.75-M | M4.5       | .750                    | 2.756 | .315  | .98  | .236   | 3                  | .193                | .15      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-5X0.8-M    | M5         | .800                    | 2.756 | .315  | .98  | .236   | 3                  | .193                | .17      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-6X1.0-M    | M6         | 1.000                   | 3.150 | .394  | 1.18 | .236   | 3                  | .193                | .20      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-7X1.0-M    | M7         | 1.000                   | 3.150 | .394  | 1.18 | .276   | 3                  | .217                | .24      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-8X1.25-M   | M8         | 1.250                   | 3.543 | .512  | 1.38 | .315   | 3                  | .244                | .27      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-9X1.25-M   | M9         | 1.250                   | 3.543 | .512  | 1.38 | .354   | 3                  | .276                | .31      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-10X1.5-M   | M10        | 1.500                   | 3.937 | .591  | 1.54 | .394   | 3                  | .315                | .33      | DIN 371  | 0                  | ●            | ●   | ●   |
| TPS M-11X1.5-M   | M11        | 1.500                   | 3.937 | .669  | -    | .315   | 3                  | .244                | .37      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-12X1.75-M  | M12        | 1.750                   | 4.331 | .709  | -    | .354   | 3                  | .276                | .40      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-14X2.0-M   | M14        | 2.000                   | 4.331 | .787  | -    | .433   | 3                  | .354                | .47      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-16X2.0-M   | M16        | 2.000                   | 4.331 | .787  | -    | .472   | 3                  | .354                | .55      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-16X2.0-M-B | M16        | 2.000                   | 4.331 | .787  | -    | .472   | 3                  | .354                | .55      | DIN 376  | 1                  | ●            | ●   | ●   |
| TPS M-18X2.5-M   | M18        | 2.500                   | 4.921 | .984  | -    | .551   | 4                  | .433                | .61      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-18X2.5-M-B | M18        | 2.500                   | 4.921 | .984  | -    | .551   | 4                  | .433                | .61      | DIN 376  | 1                  | ●            | ●   | ●   |
| TPS M-20X2.5-M   | M20        | 2.500                   | 5.512 | .984  | -    | .630   | 4                  | .472                | .69      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-20X2.5-M-B | M20        | 2.500                   | 5.512 | .984  | -    | .630   | 4                  | .472                | .69      | DIN 376  | 1                  | ●            | ●   | ●   |
| TPS M-22X2.5-M   | M22        | 2.500                   | 5.512 | .984  | -    | .709   | 4                  | .571                | .77      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-22X2.5-M-B | M22        | 2.500                   | 5.512 | .984  | -    | .709   | 4                  | .571                | .77      | DIN 376  | 1                  | ●            | ●   | ●   |
| TPS M-24X3.0-M   | M24        | 3.000                   | 6.299 | 1.181 | -    | .709   | 4                  | .571                | .83      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-24X3.0-M-B | M24        | 3.000                   | 6.299 | 1.181 | -    | .709   | 4                  | .571                | .83      | DIN 376  | 1                  | ●            | ●   | ●   |
| TPS M-27X3.0-M   | M27        | 3.000                   | 6.299 | 1.181 | -    | .787   | 4                  | .630                | .94      | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-30X3.5-M   | M30        | 3.500                   | 7.087 | 1.378 | -    | .866   | 4                  | .709                | 1.04     | DIN 376  | 0                  | ●            | ●   | ●   |
| TPS M-30X3.5-M-B | M30        | 3.500                   | 7.087 | 1.378 | -    | .866   | 4                  | .709                | 1.04     | DIN 376  | 1                  | ●            | ●   | ●   |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

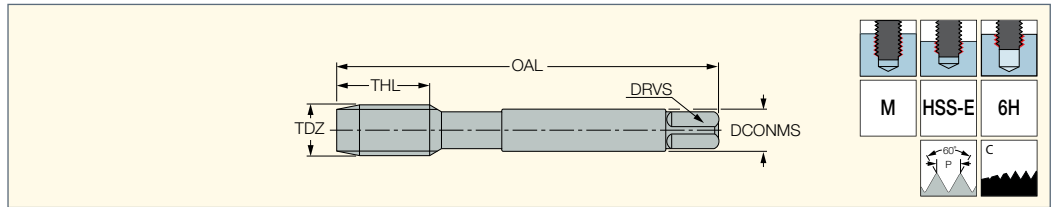
<sup>(3)</sup> Torque key size

<sup>(4)</sup> 0 - Without coolant supply, 1 - With coolant supply



**TPS MF (HSS)**

DIN 13 HSS Spiral Flute Machine Taps - Metric Fine Threads for a Wide Range of Materials



| Designation      | Dimensions |                      |       |      |        |                    |                     |          |          | Tough ↔ Hard |     |     |
|------------------|------------|----------------------|-------|------|--------|--------------------|---------------------|----------|----------|--------------|-----|-----|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL  | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HES | HET |
| TPS MF-4X0.5-M   | M4         | .500                 | 2.480 | .197 | .110   | 3                  | .083                | .14      | DIN 374  | ●            | ●   | ●   |
| TPS MF-5X0.5-M   | M5         | .500                 | 2.756 | .197 | .138   | 3                  | .106                | .18      | DIN 374  | ●            | ●   | ●   |
| TPS MF-6X0.75-M  | M6         | .750                 | 3.150 | .315 | .177   | 3                  | .134                | .20      | DIN 374  | ●            | ●   | ●   |
| TPS MF-6X0.5-M   | M6         | .500                 | 3.150 | .197 | .177   | 3                  | .134                | .22      | DIN 374  | ●            | ●   | ●   |
| TPS MF-7X0.75-M  | M7         | .750                 | 3.150 | .394 | .217   | 3                  | .169                | .24      | DIN 374  | ●            | ●   | ●   |
| TPS MF-8X1.0-M   | M8         | 1.000                | 3.543 | .394 | .236   | 3                  | .193                | .28      | DIN 374  | ●            | ●   | ●   |
| TPS MF-8X0.75-M  | M8         | .750                 | 3.150 | .315 | .236   | 3                  | .193                | .28      | DIN 374  | ●            | ●   | ●   |
| TPS MF-10X1.25-M | M10        | 1.250                | 3.937 | .630 | .276   | 3                  | .217                | .35      | DIN 374  | ●            | ●   | ●   |
| TPS MF-10X1.0-M  | M10        | 1.000                | 3.543 | .394 | .276   | 3                  | .217                | .35      | DIN 374  | ●            | ●   | ●   |
| TPS MF-10X0.75-M | M10        | .750                 | 3.543 | .394 | .276   | 3                  | .217                | .36      | DIN 374  | ●            | ●   | ●   |
| TPS MF-12X1.5-M  | M12        | 1.500                | 3.937 | .591 | .354   | 3                  | .276                | .41      | DIN 374  | ●            | ●   | ●   |
| TPS MF-12X1.25-M | M12        | 1.250                | 3.937 | .591 | .354   | 3                  | .276                | .43      | DIN 374  | ●            | ●   | ●   |
| TPS MF-12X1.0-M  | M12        | 1.000                | 3.937 | .433 | .354   | 3                  | .276                | .43      | DIN 374  | ●            | ●   | ●   |
| TPS MF-14X1.5-M  | M14        | 1.500                | 3.937 | .591 | .433   | 3                  | .354                | .49      | DIN 374  | ●            | ●   | ●   |
| TPS MF-14X1.25-M | M14        | 1.250                | 3.937 | .591 | .433   | 3                  | .354                | .50      | DIN 374  | ●            | ●   | ●   |
| TPS MF-14X1.0-M  | M14        | 1.000                | 3.937 | .433 | .433   | 3                  | .354                | .51      | DIN 374  | ●            | ●   | ●   |
| TPS MF-16X1.5-M  | M16        | 1.500                | 3.937 | .591 | .472   | 3                  | .354                | .57      | DIN 374  | ●            | ●   | ●   |
| TPS MF-16X1.0-M  | M16        | 1.000                | 3.937 | .472 | .472   | 3                  | .354                | .59      | DIN 374  | ●            | ●   | ●   |
| TPS MF-18X1.5-M  | M18        | 1.500                | 4.331 | .669 | .551   | 4                  | .433                | .65      | DIN 374  | ●            | ●   | ●   |
| TPS MF-18X1.0-M  | M18        | 1.000                | 4.331 | .512 | .551   | 4                  | .433                | .67      | DIN 374  | ●            | ●   | ●   |
| TPS MF-20X1.5-M  | M20        | 1.500                | 4.921 | .669 | .630   | 4                  | .472                | .73      | DIN 374  | ●            | ●   | ●   |
| TPS MF-20X1.0-M  | M20        | 1.000                | 4.921 | .551 | .630   | 4                  | .472                | .75      | DIN 374  | ●            | ●   | ●   |
| TPS MF-22X1.5-M  | M22        | 1.500                | 4.921 | .669 | .709   | 4                  | .571                | .81      | DIN 374  | ●            | ●   | ●   |
| TPS MF-22X1.0-M  | M22        | 1.000                | 4.921 | .551 | .709   | 4                  | .571                | .83      | DIN 374  | ●            | ●   | ●   |
| TPS MF-24X2.0-M  | M24        | 2.000                | 5.512 | .787 | .709   | 4                  | .571                | .87      | DIN 374  | ●            | ●   | ●   |
| TPS MF-24X1.5-M  | M24        | 1.500                | 5.512 | .787 | .709   | 4                  | .571                | .89      | DIN 374  | ●            | ●   | ●   |
| TPS MF-26X1.5-M  | M26        | 1.500                | 5.512 | .787 | .709   | 4                  | .571                | .96      | DIN 374  | ●            | ●   | ●   |
| TPS MF-27X2.0-M  | M27        | 2.000                | 5.512 | .787 | .787   | 4                  | .630                | .98      | DIN 374  | ●            | ●   | ●   |
| TPS MF-27X1.5-M  | M27        | 1.500                | 5.512 | .787 | .787   | 4                  | .630                | 1.00     | DIN 374  | ●            | ●   | ●   |
| TPS MF-28X1.5-M  | M28        | 1.500                | 5.512 | .787 | .787   | 4                  | .630                | 1.04     | DIN 374  | ●            | ●   | ●   |
| TPS MF-30X2.0-M  | M30        | 2.000                | 5.906 | .866 | .866   | 4                  | .709                | 1.10     | DIN 374  | ●            | ●   | ●   |
| TPS MF-30X1.5-M  | M30        | 1.500                | 5.906 | .866 | .866   | 4                  | .709                | 1.12     | DIN 374  | ●            | ●   | ●   |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

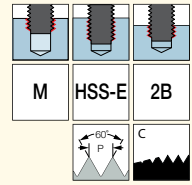
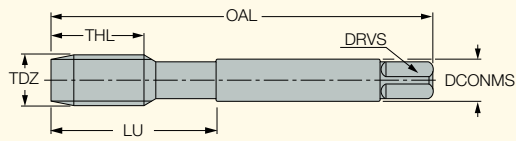
<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size



**ONETAP**

**TPS UNC (HSS)**  
HSS Spiral Flute Machine Taps  
- Unified Coarse Threads for  
a Wide Range of Materials

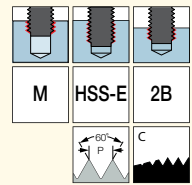
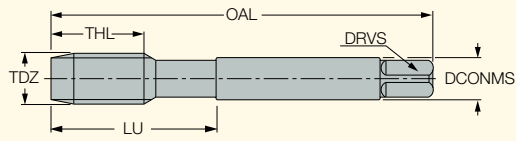


| Designation       | Dimensions |                    |       |       |      |        |                    |                     |          |          | Tough ↔ Hard |     |     |
|-------------------|------------|--------------------|-------|-------|------|--------|--------------------|---------------------|----------|----------|--------------|-----|-----|
|                   | TDZ        | TPI <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HES | HET |
| TPS UNC-#4-40-M   | #4         | 40.0               | 2.205 | .236  | .71  | .138   | 3                  | .106                | .09      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-#5-40-M   | #5         | 40.0               | 2.205 | .276  | .71  | .138   | 3                  | .106                | .10      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-#6-32-M   | #6         | 32.0               | 2.205 | .276  | .79  | .157   | 3                  | .118                | .11      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-#8-32-M   | #8         | 32.0               | 2.480 | .315  | .83  | .177   | 3                  | .134                | .14      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-#10-24-M  | #10        | 24.0               | 2.756 | .394  | .98  | .236   | 3                  | .193                | .15      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-#12-24-M  | #12        | 24.0               | 3.150 | .394  | 1.18 | .236   | 3                  | .193                | .18      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-1/4-20-M  | 1/4"       | 20.0               | 3.150 | .512  | 1.18 | .276   | 3                  | .217                | .20      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-5/16-18-M | 5/16"      | 18.0               | 3.543 | .551  | 1.38 | .315   | 3                  | .244                | .26      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-3/8-16-M  | 3/8"       | 16.0               | 3.937 | .630  | 1.54 | .354   | 3                  | .276                | .31      | DIN 371  | ●            | ●   | ●   |
| TPS UNC-7/16-14-M | 7/16"      | 14.0               | 3.937 | .669  | -    | .315   | 3                  | .244                | .37      | DIN 376  | ●            | ●   | ●   |
| TPS UNC-1/2-13-M  | 1/2"       | 13.0               | 4.331 | .787  | -    | .354   | 3                  | .276                | .42      | DIN 376  | ●            | ●   | ●   |
| TPS UNC-9/16-12-M | 9/16"      | 12.0               | 4.331 | .787  | -    | .433   | 3                  | .354                | .48      | DIN 376  | ●            | ●   | ●   |
| TPS UNC-5/8-11-M  | 5/8"       | 11.0               | 4.331 | .866  | -    | .472   | 3                  | .354                | .53      | DIN 376  | ●            | ●   | ●   |
| TPS UNC-3/4-10-M  | 3/4"       | 10.0               | 4.921 | .984  | -    | .551   | 4                  | .433                | .65      | DIN 376  | ●            | ●   | ●   |
| TPS UNC-7/8-9-M   | 7/8"       | 9.0                | 5.512 | 1.063 | -    | .709   | 4                  | .571                | .77      | DIN 376  | ●            | ●   | ●   |
| TPS UNC-1-8-M     | 1"         | 8.0                | 6.299 | 1.181 | -    | .787   | 4                  | .630                | .88      | DIN 376  | ●            | ●   | ●   |

- For user guide and cutting conditions, see pages 411-413, 425-446
- <sup>(1)</sup> Threads per inch
- <sup>(2)</sup> Number of flutes
- <sup>(3)</sup> Torque key size

**ONETAP**

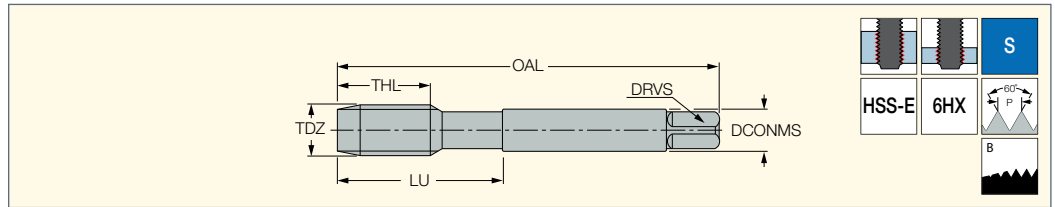
**TPS UNF (HSS)**  
HSS Spiral Flute Machine  
Taps - Unified Fine Threads for  
a Wide Range of Materials



| Designation       | Dimensions |                    |       |      |      |        |                    |                     |          |          | Tough ↔ Hard |     |     |
|-------------------|------------|--------------------|-------|------|------|--------|--------------------|---------------------|----------|----------|--------------|-----|-----|
|                   | TDZ        | TPI <sup>(1)</sup> | OAL   | THL  | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard | HE           | HES | HET |
| TPS UNF-#4-48-M   | #4         | 48.0               | 2.205 | .236 | .71  | .138   | 3                  | .106                | .09      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-#5-44-M   | #5         | 44.0               | 2.205 | .276 | .71  | .138   | 3                  | .106                | .11      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-#6-40-M   | #6         | 40.0               | 2.205 | .276 | .79  | .157   | 3                  | .118                | .12      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-#8-36-M   | #8         | 36.0               | 2.480 | .315 | .83  | .177   | 3                  | .134                | .14      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-#10-32-M  | #10        | 32.0               | 2.756 | .394 | .98  | .236   | 3                  | .193                | .16      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-#12-28-M  | #12        | 28.0               | 3.150 | .394 | 1.18 | .236   | 3                  | .193                | .19      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-1/4-28-M  | 1/4"       | 28.0               | 3.150 | .394 | 1.18 | .276   | 3                  | .217                | .22      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-5/16-24-M | 5/16"      | 24.0               | 3.543 | .394 | 1.38 | .315   | 3                  | .244                | .27      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-3/8-24-M  | 3/8"       | 24.0               | 3.937 | .394 | 1.54 | .354   | 3                  | .276                | .33      | DIN 371  | ●            | ●   | ●   |
| TPS UNF-7/16-20-M | 7/16"      | 20.0               | 3.937 | .512 | -    | .315   | 3                  | .244                | .39      | DIN 374  | ●            | ●   | ●   |
| TPS UNF-1/2-20-M  | 1/2"       | 20.0               | 3.937 | .512 | -    | .354   | 3                  | .276                | .45      | DIN 374  | ●            | ●   | ●   |
| TPS UNF-9/16-18-M | 9/16"      | 18.0               | 3.937 | .591 | -    | .433   | 3                  | .354                | .51      | DIN 374  | ●            | ●   | ●   |
| TPS UNF-5/8-18-M  | 5/8"       | 18.0               | 3.937 | .591 | -    | .472   | 3                  | .354                | .57      | DIN 374  | ●            | ●   | ●   |
| TPS UNF-3/4-16-M  | 3/4"       | 16.0               | 4.331 | .669 | -    | .551   | 4                  | .433                | .69      | DIN 374  | ●            | ●   | ●   |
| TPS UNF-7/8-14-M  | 7/8"       | 14.0               | 4.921 | .669 | -    | .709   | 4                  | .571                | .81      | DIN 374  | ●            | ●   | ●   |
| TPS UNF-1-12-M    | 1"         | 12.0               | 5.512 | .787 | -    | .787   | 4                  | .630                | .92      | DIN 374  | ●            | ●   | ●   |

- For user guide and cutting conditions, see pages 411-413, 425-446
- <sup>(1)</sup> Threads per inch
- <sup>(2)</sup> Number of flutes
- <sup>(3)</sup> Torque key size

**TPG M-S (HSS)**  
HSS Gun Point Machine Taps  
According to DIN 13 - ISO  
Metric Coarse Threads on  
Steel with Good Machinability



| Designation      | Dimensions |                      |       |       |      |        |                    |                     |          | HEST |
|------------------|------------|----------------------|-------|-------|------|--------|--------------------|---------------------|----------|------|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole |      |
| TPG M-2.2X0.45-S | M2.2       | .450                 | 1.772 | .315  | -    | .110   | 3                  | .083                | .07      | ●    |
| TPG M-2.3X0.4-S  | M2.3       | .400                 | 1.772 | .315  | -    | .110   | 3                  | .083                | .07      | ●    |
| TPG M-2.5X0.45-S | M2.5       | .450                 | 1.968 | .354  | -    | .110   | 3                  | .083                | .08      | ●    |
| TPG M-2.6X0.45-S | M2.6       | .450                 | 1.968 | .354  | -    | .110   | 3                  | .083                | .08      | ●    |
| TPG M-3X0.5-S    | M3         | .500                 | 2.205 | .433  | .71  | .138   | 3                  | .106                | .10      | ●    |
| TPG M-3.5X0.6-S  | M3.5       | .600                 | 2.205 | .472  | .79  | .157   | 3                  | .118                | .11      | ●    |
| TPG M-4X0.7-S    | M4         | .700                 | 2.480 | .512  | .83  | .177   | 3                  | .134                | .13      | ●    |
| TPG M-4.5X0.75-S | M4.5       | .750                 | 2.756 | .551  | .98  | .236   | 3                  | .193                | .15      | ●    |
| TPG M-5X0.8-S    | M5         | .800                 | 2.756 | .591  | .98  | .236   | 3                  | .193                | .17      | ●    |
| TPG M-6X1.0-S    | M6         | 1.000                | 3.150 | .669  | 1.18 | .236   | 3                  | .193                | .20      | ●    |
| TPG M-8X1.25-S   | M8         | 1.250                | 3.543 | .787  | 1.38 | .315   | 3                  | .244                | .27      | ●    |
| TPG M-10X1.5-S   | M10        | 1.500                | 3.937 | .866  | 1.54 | .394   | 3                  | .315                | .33      | ●    |
| TPG M-11X1.5-S   | M11        | 1.500                | 3.937 | .866  | -    | .315   | 3                  | .244                | .37      | ●    |
| TPG M-12X1.75-S  | M12        | 1.750                | 4.331 | .945  | -    | .354   | 4                  | .276                | .40      | ●    |
| TPG M-16X2.0-S   | M16        | 2.000                | 4.331 | 1.063 | -    | .472   | 4                  | .354                | .55      | ●    |
| TPG M-18X2.5-S   | M18        | 2.500                | 4.921 | 1.181 | -    | .551   | 4                  | .433                | .61      | ●    |
| TPG M-20X2.5-S   | M20        | 2.500                | 5.512 | 1.260 | -    | .630   | 4                  | .472                | .69      | ●    |

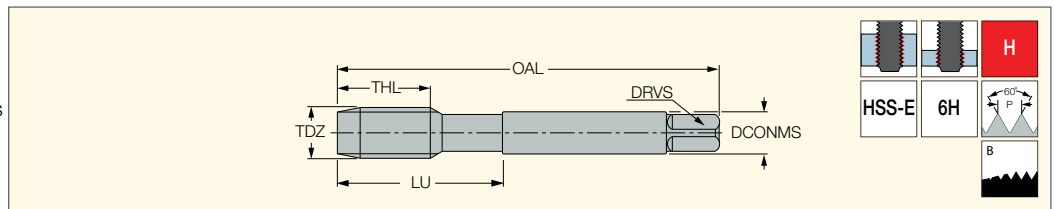
• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size

**TPG M-H (HSS)**  
DIN 13 HSS Gun Point Machine  
Taps - ISO Metric Coarse Threads  
for Hardened Steel and H.T.A.



| Designation      | Dimensions |                      |       |       |      |        |                    |                     |          | HE |
|------------------|------------|----------------------|-------|-------|------|--------|--------------------|---------------------|----------|----|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole |    |
| TPG M-2X0.4-H    | M2         | .400                 | 1.772 | .315  | -    | .110   | 3                  | .083                | .06      | ●  |
| TPG M-2.3X0.4-H  | M2.3       | .400                 | 1.772 | .315  | -    | .110   | 3                  | .083                | .07      | ●  |
| TPG M-2.5X0.45-H | M2.5       | .450                 | 1.968 | .354  | -    | .110   | 3                  | .083                | .08      | ●  |
| TPG M-2.6X0.45-H | M2.6       | .450                 | 1.968 | .354  | -    | .110   | 3                  | .083                | .08      | ●  |
| TPG M-3X0.5-H    | M3         | .500                 | 2.205 | .433  | .71  | .138   | 3                  | .106                | .10      | ●  |
| TPG M-3.5X0.6-H  | M3.5       | .600                 | 2.205 | .472  | .79  | .157   | 3                  | .118                | .11      | ●  |
| TPG M-4X0.7-H    | M4         | .700                 | 2.480 | .512  | .83  | .177   | 3                  | .134                | .13      | ●  |
| TPG M-4.5X0.75-H | M4.5       | .750                 | 2.756 | .551  | .98  | .236   | 3                  | .193                | .15      | ●  |
| TPG M-5X0.8-H    | M5         | .800                 | 2.756 | .591  | .98  | .236   | 3                  | .193                | .17      | ●  |
| TPG M-6X1.0-H    | M6         | 1.000                | 3.150 | .669  | 1.18 | .236   | 3                  | .193                | .20      | ●  |
| TPG M-7X1.0-H    | M7         | 1.000                | 3.150 | .669  | 1.18 | .276   | 3                  | .217                | .24      | ●  |
| TPG M-8X1.25-H   | M8         | 1.250                | 3.543 | .787  | 1.38 | .315   | 3                  | .244                | .27      | ●  |
| TPG M-10X1.5-H   | M10        | 1.500                | 3.937 | .866  | 1.54 | .394   | 3                  | .315                | .33      | ●  |
| TPG M-11X1.5-H   | M11        | 1.500                | 3.937 | .866  | -    | .315   | 3                  | .244                | .37      | ●  |
| TPG M-12X1.75-H  | M12        | 1.750                | 4.331 | .945  | -    | .354   | 3                  | .276                | .40      | ●  |
| TPG M-14X2.0-H   | M14        | 2.000                | 4.331 | 1.024 | -    | .433   | 3                  | .354                | .47      | ●  |
| TPG M-16X2.0-H   | M16        | 2.000                | 4.331 | 1.063 | -    | .472   | 3                  | .354                | .55      | ●  |
| TPG M-18X2.5-H   | M18        | 2.500                | 4.921 | 1.181 | -    | .551   | 4                  | .433                | .61      | ●  |
| TPG M-20X2.5-H   | M20        | 2.500                | 5.512 | 1.260 | -    | .630   | 4                  | .472                | .69      | ●  |

• For user guide and cutting conditions, see pages 411-413, 425-446

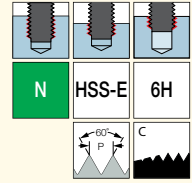
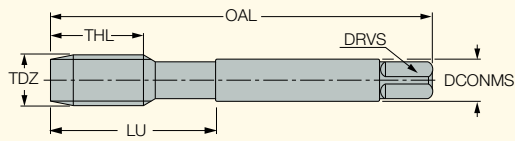
<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size

**TPS M-N (HSS)**

DIN 13 HSS R.H. 40° Spiral  
Flute Machine Taps - ISO  
Metric Coarse Threads  
for Low Alloyed Steel



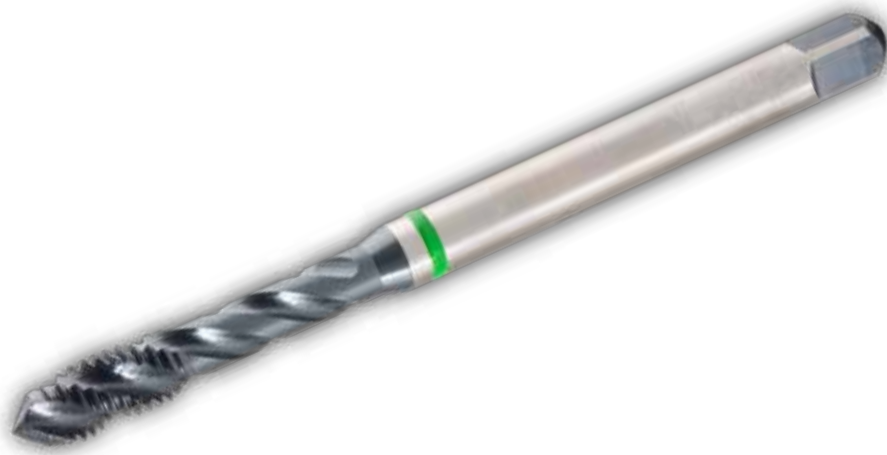
| Designation      | Dimensions |                      |       |      |      |        |                    |                     |          |      |          | HEST |
|------------------|------------|----------------------|-------|------|------|--------|--------------------|---------------------|----------|------|----------|------|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL  | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | FHA  | Standard |      |
| TPS M-2X0.4-N    | M2         | .400                 | 1.772 | .315 | -    | .110   | 3                  | .083                | .06      | 40.0 | DIN 371  | ●    |
| TPS M-2.2X0.45-N | M2.2       | .450                 | 1.772 | .315 | -    | .110   | 3                  | .083                | .07      | 40.0 | DIN 371  | ●    |
| TPS M-2.3X0.4-N  | M2.3       | .400                 | 1.772 | .315 | -    | .110   | 3                  | .083                | .07      | 40.0 | DIN 371  | ●    |
| TPS M-2.5X0.45-N | M2.5       | .450                 | 1.968 | .354 | -    | .110   | 3                  | .083                | .08      | 40.0 | DIN 371  | ●    |
| TPS M-3X0.5-N    | M3         | .500                 | 2.205 | .236 | .71  | .138   | 3                  | .106                | .10      | 40.0 | DIN 371  | ●    |
| TPS M-3.5X0.6-N  | M3.5       | .600                 | 2.205 | .276 | .79  | .157   | 3                  | .118                | .11      | 40.0 | DIN 371  | ●    |
| TPS M-4X0.7-N    | M4         | .700                 | 2.480 | .276 | .83  | .177   | 3                  | .134                | .13      | 40.0 | DIN 371  | ●    |
| TPS M-4.5X0.75-N | M4.5       | .750                 | 2.756 | .315 | .98  | .236   | 3                  | .193                | .15      | 40.0 | DIN 371  | ●    |
| TPS M-5X0.8-N    | M5         | .800                 | 2.756 | .315 | .98  | .236   | 3                  | .193                | .17      | 40.0 | DIN 371  | ●    |
| TPS M-6X1.0-N    | M6         | 1.000                | 3.150 | .394 | 1.18 | .236   | 3                  | .193                | .20      | 40.0 | DIN 371  | ●    |
| TPS M-7X1.0-N    | M7         | 1.000                | 3.150 | .394 | 1.18 | .276   | 3                  | .217                | .24      | 40.0 | DIN 371  | ●    |
| TPS M-8X1.25-N   | M8         | 1.250                | 3.543 | .512 | 1.38 | .315   | 3                  | .244                | .27      | 40.0 | DIN 371  | ●    |
| TPS M-9X1.25-N   | M9         | 1.250                | 3.543 | .512 | 1.38 | .354   | 3                  | .276                | .31      | 40.0 | DIN 371  | ●    |
| TPS M-10X1.5-N   | M10        | 1.500                | 3.937 | .591 | 1.54 | .394   | 3                  | .315                | .33      | 40.0 | DIN 371  | ●    |
| TPS M-11X1.5-N   | M11        | 1.500                | 3.937 | .669 | -    | .315   | 3                  | .244                | .37      | 40.0 | DIN 376  | ●    |
| TPS M-12X1.75-N  | M12        | 1.750                | 4.331 | .709 | -    | .354   | 3                  | .276                | .40      | 40.0 | DIN 376  | ●    |
| TPS M-14X2.0-N   | M14        | 2.000                | 4.331 | .787 | -    | .433   | 3                  | .354                | .47      | 40.0 | DIN 376  | ●    |
| TPS M-16X2.0-N   | M16        | 2.000                | 4.331 | .787 | -    | .472   | 3                  | .354                | .55      | 40.0 | DIN 376  | ●    |
| TPS M-18X2.5-N   | M18        | 2.500                | 4.921 | .984 | -    | .551   | 4                  | .433                | .61      | 40.0 | DIN 376  | ●    |
| TPS M-20X2.5-N   | M20        | 2.500                | 5.512 | .984 | -    | .630   | 4                  | .472                | .69      | 40.0 | DIN 376  | ●    |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

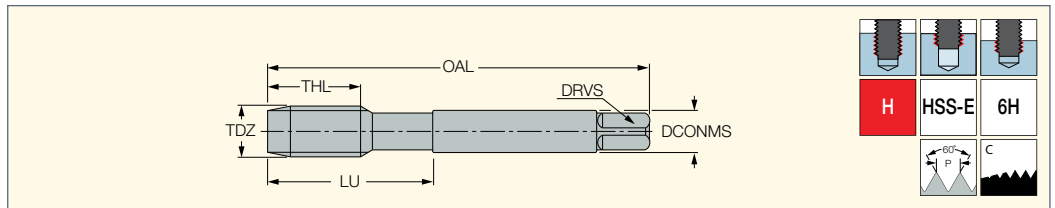
<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size





**TPS M-H (HSS)**  
 DIN 13 HSS Right-Hand 40°  
 Spiral Flute Machine Taps - ISO  
 Metric Coarse Threads for H.T.A.



| Designation      | Dimensions |                      |       |      |      |        |                    |                     |          |      | HEST |
|------------------|------------|----------------------|-------|------|------|--------|--------------------|---------------------|----------|------|------|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL  | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | FHA  |      |
| TPS M-2X0.4-H    | M2         | .400                 | 1.772 | .315 | -    | .110   | 3                  | .083                | .06      | 40.0 | ●    |
| TPS M-2.2X0.45-H | M2.2       | .450                 | 1.772 | .315 | -    | .110   | 3                  | .083                | .07      | 40.0 | ●    |
| TPS M-2.5X0.45-H | M2.5       | .450                 | 1.968 | .354 | -    | .110   | 3                  | .083                | .08      | 40.0 | ●    |
| TPS M-2.6X0.45-H | M2.6       | .450                 | 1.968 | .354 | -    | .110   | 3                  | .083                | .08      | 40.0 | ●    |
| TPS M-3X0.5-H    | M3         | .500                 | 2.205 | .236 | .71  | .138   | 3                  | .106                | .10      | 40.0 | ●    |
| TPS M-3.5X0.6-H  | M3.5       | .600                 | 2.205 | .276 | .79  | .157   | 3                  | .118                | .11      | 40.0 | ●    |
| TPS M-4X0.7-H    | M4         | .700                 | 2.480 | .276 | .83  | .177   | 3                  | .134                | .13      | 40.0 | ●    |
| TPS M-4.5X0.75-H | M4.5       | .750                 | 2.756 | .315 | .98  | .236   | 3                  | .193                | .15      | 40.0 | ●    |
| TPS M-5X0.8-H    | M5         | .800                 | 2.756 | .315 | .98  | .236   | 3                  | .193                | .17      | 40.0 | ●    |
| TPS M-6X1.0-H    | M6         | 1.000                | 3.150 | .394 | 1.18 | .236   | 3                  | .193                | .20      | 40.0 | ●    |
| TPS M-7X1.0-H    | M7         | 1.000                | 3.150 | .394 | 1.18 | .276   | 3                  | .217                | .24      | 40.0 | ●    |
| TPS M-8X1.25-H   | M8         | 1.250                | 3.543 | .512 | 1.38 | .315   | 3                  | .244                | .27      | 40.0 | ●    |
| TPS M-9X1.25-H   | M9         | 1.250                | 3.543 | .512 | 1.38 | .354   | 3                  | .276                | .31      | 40.0 | ●    |
| TPS M-10X1.5-H   | M10        | 1.500                | 3.937 | .591 | 1.54 | .394   | 3                  | .315                | .33      | 40.0 | ●    |
| TPS M-11X1.5-H   | M11        | 1.500                | 3.937 | .669 | -    | .315   | 3                  | .244                | .37      | 40.0 | ●    |
| TPS M-12X1.75-H  | M12        | 1.750                | 4.331 | .709 | -    | .354   | 3                  | .276                | .40      | 40.0 | ●    |
| TPS M-14X2.0-H   | M14        | 2.000                | 4.331 | .787 | -    | .433   | 3                  | .354                | .47      | 40.0 | ●    |
| TPS M-16X2.0-H   | M16        | 2.000                | 4.331 | .787 | -    | .472   | 3                  | .354                | .55      | 40.0 | ●    |
| TPS M-18X2.5-H   | M18        | 2.500                | 4.921 | .984 | -    | .551   | 4                  | .433                | .61      | 40.0 | ●    |
| TPS M-20X2.5-H   | M20        | 2.500                | 5.512 | .984 | -    | .630   | 4                  | .472                | .69      | 40.0 | ●    |

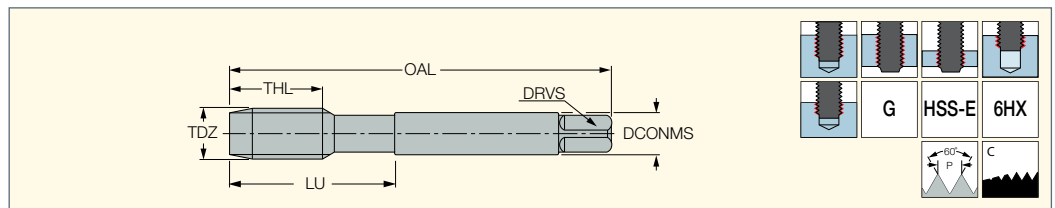
• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size

**TPST M-G (HSS)**  
 DIN 13 HSS Straight  
 Flute Machine Taps - ISO  
 Metric Coarse Threads  
 for Grey Cast Iron



| Designation       | Dimensions |                      |       |       |      |        |                    |                     |          |      | HENI |
|-------------------|------------|----------------------|-------|-------|------|--------|--------------------|---------------------|----------|------|------|
|                   | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | FHA  |      |
| TPST M-2.2X0.45-G | M2.2       | .450                 | 1.772 | .315  | -    | .110   | 3                  | .083                | .07      | 40.0 | ●    |
| TPST M-2.3X0.4-G  | M2.3       | .400                 | 1.772 | .315  | -    | .110   | 3                  | .083                | .07      | 40.0 | ●    |
| TPST M-2.5X0.45-G | M2.5       | .450                 | 1.968 | .354  | -    | .110   | 3                  | .083                | .08      | 40.0 | ●    |
| TPST M-2.6X0.45-G | M2.6       | .450                 | 1.968 | .354  | -    | .110   | 3                  | .083                | .08      | 40.0 | ●    |
| TPST M-3.5X0.6-G  | M3.5       | .600                 | 2.205 | .472  | .79  | .157   | 3                  | .118                | .11      | 40.0 | ●    |
| TPST M-4X0.7-G    | M4         | .700                 | 2.480 | .512  | .83  | .177   | 3                  | .134                | .13      | 40.0 | ●    |
| TPST M-4.5X0.75-G | M4.5       | .750                 | 2.756 | .551  | .98  | .236   | 3                  | .193                | .15      | 40.0 | ●    |
| TPST M-5X0.8-G    | M5         | .800                 | 2.756 | .591  | .98  | .236   | 4                  | .193                | .17      | 40.0 | ●    |
| TPST M-6X1.0-G    | M6         | 1.000                | 3.150 | .669  | 1.18 | .236   | 4                  | .193                | .20      | 40.0 | ●    |
| TPST M-8X1.25-G   | M8         | 1.250                | 3.543 | .787  | 1.38 | .315   | 4                  | .244                | .27      | 40.0 | ●    |
| TPST M-9X1.25-G   | M9         | 1.250                | 3.543 | .787  | 1.38 | .354   | 4                  | .276                | .31      | 40.0 | ●    |
| TPST M-10X1.5-G   | M10        | 1.500                | 3.937 | .866  | 1.54 | .394   | 4                  | .315                | .33      | 40.0 | ●    |
| TPST M-11X1.5-G   | M11        | 1.500                | 3.937 | .866  | -    | .315   | 4                  | .244                | .37      | 40.0 | ●    |
| TPST M-12X1.75-G  | M12        | 1.750                | 4.331 | .945  | -    | .354   | 4                  | .276                | .40      | 40.0 | ●    |
| TPST M-14X2.0-G   | M14        | 2.000                | 4.331 | 1.024 | -    | .433   | 4                  | .354                | .47      | 40.0 | ●    |
| TPST M-16X2.0-G   | M16        | 2.000                | 4.331 | 1.063 | -    | .472   | 4                  | .354                | .55      | 40.0 | ●    |
| TPST M-18X2.5-G   | M18        | 2.500                | 4.921 | 1.181 | -    | .551   | 4                  | .433                | .61      | 40.0 | ●    |
| TPST M-20X2.5-G   | M20        | 2.500                | 5.512 | 1.260 | -    | .630   | 4                  | .472                | .69      | 40.0 | ●    |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

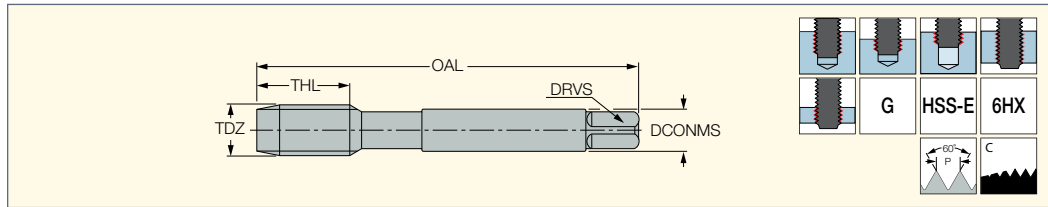
<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size



### TPST MF-G (HSS)

DIN 13 HSS Straight Flute  
Machine Taps - ISO Metric Fine  
Threads for Grey Cast Iron



| Designation       | Dimensions |                      |       |      |        |                    |                     |          | HEIT |
|-------------------|------------|----------------------|-------|------|--------|--------------------|---------------------|----------|------|
|                   | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL  | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole |      |
| TPST MF-10X1.0-G  | M10        | 1.000                | 3.543 | .709 | .276   | 3                  | .217                | .35      | ●    |
| TPST MF-10X1.25-G | M10        | 1.250                | 3.937 | .866 | .276   | 3                  | .217                | .35      | ●    |
| TPST MF-12X1.25-G | M12        | 1.250                | 3.937 | .866 | .354   | 3                  | .276                | .43      | ●    |
| TPST MF-14X1.5-G  | M14        | 1.500                | 3.937 | .866 | .433   | 3                  | .354                | .49      | ●    |
| TPST MF-16X1.5-G  | M16        | 1.500                | 3.937 | .866 | .472   | 4                  | .354                | .57      | ●    |
| TPST MF-22X1.5-G  | M22        | 1.500                | 4.921 | .984 | .709   | 4                  | .571                | .81      | ●    |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

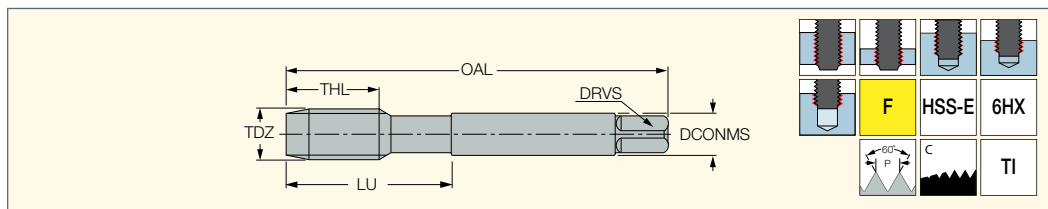
<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size



### TPF M-F (HSS)

DIN 13 HSS Cold Forming  
Machine Taps - ISO Metric  
Coarse Threads



| Designation      | Dimensions |                      |       |       |      |        |                    |                     |          |          | HEIT |
|------------------|------------|----------------------|-------|-------|------|--------|--------------------|---------------------|----------|----------|------|
|                  | TDZ        | TP mm <sup>(1)</sup> | OAL   | THL   | LU   | DCONMS | NOF <sup>(2)</sup> | DRVS <sup>(3)</sup> | Pre-hole | Standard |      |
| TPF M-2X0.4-F    | M2         | .400                 | 1.772 | .315  | -    | .110   | 5                  | .083                | .07      | DIN 371  | ●    |
| TPF M-2.2X0.45-F | M2.2       | .450                 | 1.772 | .315  | -    | .110   | 5                  | .083                | .08      | DIN 371  | ●    |
| TPF M-2.3X0.4-F  | M2.3       | .400                 | 1.772 | .315  | -    | .110   | 5                  | .083                | .08      | DIN 371  | ●    |
| TPF M-2.5X0.45-F | M2.5       | .450                 | 1.968 | .354  | -    | .110   | 5                  | .083                | .09      | DIN 371  | ●    |
| TPF M-3X0.5-F    | M3         | .500                 | 2.205 | .433  | .71  | .138   | 5                  | .106                | .11      | DIN 371  | ●    |
| TPF M-3.5X0.6-F  | M3.5       | .600                 | 2.205 | .472  | .79  | .157   | 5                  | .118                | .13      | DIN 371  | ●    |
| TPF M-4X0.7-F    | M4         | .700                 | 2.480 | .512  | .83  | .177   | 5                  | .134                | .15      | DIN 371  | ●    |
| TPF M-4.5X0.75-F | M4.5       | .750                 | 2.756 | .551  | .98  | .236   | 5                  | .193                | .16      | DIN 371  | ●    |
| TPF M-5X0.8-F    | M5         | .800                 | 2.756 | .591  | .98  | .236   | 5                  | .193                | .18      | DIN 371  | ●    |
| TPF M-6X1.0-F    | M6         | 1.000                | 3.150 | .669  | 1.18 | .236   | 5                  | .193                | .22      | DIN 371  | ●    |
| TPF M-7X1.0-F    | M7         | 1.000                | 3.150 | .669  | 1.18 | .276   | 5                  | .217                | .26      | DIN 371  | ●    |
| TPF M-8X1.25-F   | M8         | 1.250                | 3.543 | .787  | 1.38 | .315   | 5                  | .244                | .29      | DIN 371  | ●    |
| TPF M-9X1.25-F   | M9         | 1.250                | 3.543 | .787  | 1.38 | .354   | 5                  | .276                | .33      | DIN 371  | ●    |
| TPF M-10X1.5-F   | M10        | 1.500                | 3.937 | .866  | 1.54 | .394   | 5                  | .315                | .37      | DIN 371  | ●    |
| TPF M-11X1.5-F   | M11        | 1.500                | 3.937 | .866  | -    | .315   | 5                  | .244                | .41      | DIN 376  | ●    |
| TPF M-12X1.75-F  | M12        | 1.750                | 4.331 | .945  | -    | .354   | 5                  | .276                | .44      | DIN 376  | ●    |
| TPF M-14X2.0-F   | M14        | 2.000                | 4.331 | 1.024 | -    | .433   | 5                  | .354                | .51      | DIN 376  | ●    |
| TPF M-16X2.0-F   | M16        | 2.000                | 4.331 | 1.063 | -    | .472   | 6                  | .354                | .59      | DIN 376  | ●    |
| TPF M-18X2.5-F   | M18        | 2.500                | 4.921 | 1.181 | -    | .551   | 6                  | .433                | .66      | DIN 376  | ●    |
| TPF M-20X2.5-F   | M20        | 2.500                | 5.512 | 1.260 | -    | .630   | 6                  | .472                | .74      | DIN 376  | ●    |

• For user guide and cutting conditions, see pages 411-413, 425-446

<sup>(1)</sup> Pitch in mm

<sup>(2)</sup> Number of flutes

<sup>(3)</sup> Torque key size

# USER GUIDE CONTENTS

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## Tap Surface Treatments and Coating Types

The high speed steels we use grant high wear resistance and toughness. For machining certain materials, various surface treatments are an advantage.

### Steam Tempered (ST)

The steam tempered is a Fe<sub>3</sub>O<sub>4</sub> oxide coating which reduces the friction between the tool and workpiece and prevents cold welding.

### Nitriding (NI)

Recommended surface treatment for machining hard wear/abrasive materials such as grey cast iron, aluminum alloys with high silicon percentage (more than 10%).

### TiN Coating (TI)

The TiN coating has a hardness of approximately 2,300 HV and is temperature resistant up to approximately 1100°F. This is an excellent golden colored coating for general applications.

### TiCN-COATING – TiCN

TiCN takes place of TiN when the conditions require the coating to have a different hardness and toughness. The TiCN brings an advantage to machining very difficult steels or cutting interrupted bores. The TiCN-coating has a hardness of approx. 3,000 HV, but is temperature resistant up to approx. 750°F only. That means TiCN needs excellent cooling for long service life. Color: Blue-grey coefficient of friction against steel : 0.4

### TiAlN-COATING – TiAlN

This is a special coating for machining abrasive materials such as: grey cast iron, alu-alloys with silicon, fiber reinforced plastics, etc., or machining under high temperatures, which means with insufficient cooling, or high speeds  $\geq$  1970 SFM. TiAlN has a hardness of approx. 3,000 HV and is temperature resistant up to approx. 1470°F. Color: Violet-grey coefficient of friction against steel : 0.4

### Hardslick-COATING – Hardslick

Hardslick combines in a novel way the advantages of an extremely hard, thermally stable TiAlN-coating with the sliding and lubricating properties of an outer WC/C (Tungsten carbide/carbon) coating. The Hardslick coating has a hardness of approx. 3,000 HV and is temperature-resistant up to approx. 1470°F. Color: Violet-grey coefficient of friction against steel : 0.2

### Tolerances According to DIN EN 22857

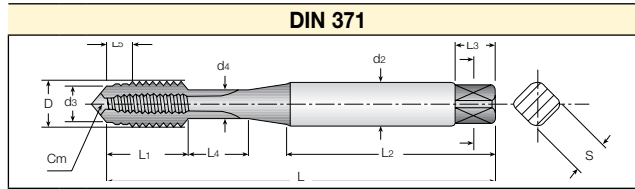
For taps with ISO metric threads.

The following chart gives a comparison between the new standard DIN EN 22857 and the withdrawn standard DIN 802 part 1. An important change is the re-classification from tap tolerance to tap application class.

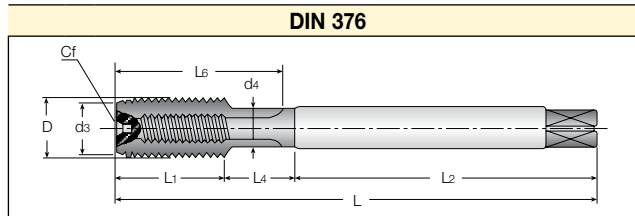
| Application class for taps to DIN EN 22857 | Tolerance class to withdrawn standard DIN 802 part 1 | Allotment of the tolerance zones of the nut thread to be cut |
|--|--|--|
| Class 1 ISO 1                              | 4H   | 4H 5H - - -  |
| Class 2 ISO 2                              | 6H   | 5G 5G 6H - -   |
| Class 3 ISO 3                              | 6G   | - - 6G 7H 8H   |
| - -  | 7G   | - - - 7G 8G  |

A suitable transition period is to be expected. Codes for tolerance classes 7G/8G and <X> tolerance zones have yet to be standardized within DIN EN 22857, and the values from DIN 802 part will remain valid.

### Tap Nomenclature and Standards



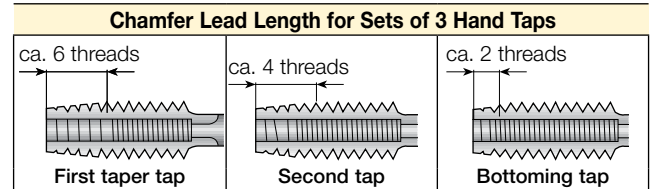
- D - Major diameter
- d2 - Shank diameter
- d3 - Chamfer diameter
- d4 - Neck diameter



- L - Total length
- L1 - Thread length
- L2 - Shank length
- L3 - Square length
- L4 - Neck length
- L5 - Chamfer length
- L6 - Flute length
- S - Square size
- Cm - Center male
- Cf - Center female

#### Chamfer Lead Forms According to DIN 2197

|          |               |  |
|----------|---------------|--|
| <b>A</b> | 6-8 threads   | <b>Form A</b><br>Long, 6-8 threads for short through holes.  |
| <b>B</b> | 3.5-5 threads | <b>Form B</b><br>Medium, 3.5-5 threads, with spiral point for all through holes and deep tapping holes.          |
| <b>C</b> | 2-3 threads   | <b>Form C</b><br>Long, 2-3 threads for blind holes and generally for aluminum grey cast iron and brass.          |
| <b>D</b> | 3.5-5 threads | <b>Form D</b><br>Medium, 3.5-5 threads for through and blind holes with sufficient runoff.                       |
| <b>E</b> | 1.5-2 threads | <b>Form E</b><br>Extremely short, 1.5-2 threads for blind holes with little runoff depth. Avoid use if possible. |
| <b>F</b> | 1-1.5 threads | <b>Form F</b><br>Extremely short, 1-1.5 threads for blind holes with little runoff depth. Avoid use if possible. |



#### Tap Styles for Hole Types

|             |   |   |
|-------------|---|---|
| Throughhole | 1 | Straight fluted tap with spiral point       |
|             | 2 | Left-hand spiral fluted tap                 |
|             | 3 | Straight fluted tap with long chamfer lead  |
| Blind hole  | 1 | Right-hand spiral fluted tap                |
|             | 2 | Straight fluted tap with short chamfer lead |

#### Front and End Configurations According to DIN2197

| Front End |                         |  | Shank End |                 |  |
|-----------|-------------------------|--|-----------|-----------------|--|
| <b>1</b>  | External Center         |  | <b>4</b>  | External Center |  |
| <b>2</b>  | Stepped External Center |  | <b>5</b>  | Chamfer         |  |
| <b>3</b>  | Internal Center         |  | <b>6</b>  | Internal Center |  |

| Thread Dia. Range (inch) | Front End | Shank End | Tap Standard |
|--------------------------|-----------|-----------|--------------|
| ≤.236                    | 1         | 4 5       | DIN352       |
| .276                     | 1 2       | 4 5 6     | DIN371       |
| ≥.315                    | 1 2 3     | 5 6       | DIN376       |

## Pre-Tapping Hole Sizes

| ISO Metric Threads Coarse Pitch |          |                 |               |
|---------------------------------|----------|-----------------|---------------|
| M                               | Pitch mm | Max Core Dia.mm | Drill Size mm |
| 1                               | 0.25     | 0.785           | 0.75          |
| 1.1                             | 0.25     | 0.885           | 0.85          |
| 1.2                             | 0.25     | 0.985           | 0.95          |
| 1.4                             | 0.30     | 1.160           | 1.10          |
| 1.6                             | 0.35     | 1.321           | 1.25          |
| 1.7                             | 0.35     | 1.346           | 1.30          |
| 1.8                             | 0.35     | 1.521           | 1.45          |
| 2                               | 0.40     | 1.679           | 1.60          |
| 2.2                             | 0.45     | 1.838           | 1.75          |
| 2.3                             | 0.40     | 1.920           | 1.90          |
| 2.5                             | 0.45     | 2.138           | 2.05          |
| 2.6                             | 0.45     | 2.176           | 2.10          |
| 3                               | 0.50     | 2.599           | 2.50          |
| 3.5                             | 0.60     | 3.010           | 2.90          |
| 4                               | 0.70     | 3.422           | 3.30          |
| 4.5                             | 0.75     | 3.878           | 3.70          |
| 5                               | 0.80     | 4.334           | 4.20          |
| 6                               | 1.00     | 5.153           | 5.00          |
| 7                               | 1.00     | 6.153           | 6.00          |
| 8                               | 1.25     | 6.912           | 6.80          |
| 9                               | 1.25     | 7.912           | 7.80          |
| 10                              | 1.50     | 8.676           | 8.50          |
| 11                              | 1.50     | 9.676           | 9.50          |
| 12                              | 1.75     | 10.441          | 10.20         |
| 14                              | 2.00     | 12.210          | 12.00         |
| 16                              | 2.00     | 14.210          | 14.00         |
| 18                              | 2.50     | 15.744          | 15.50         |
| 20                              | 2.50     | 17.744          | 17.50         |
| 22                              | 2.50     | 19.744          | 19.50         |
| 24                              | 3.00     | 21.252          | 21.00         |
| 27                              | 3.00     | 24.252          | 24.00         |
| 30                              | 3.50     | 26.771          | 26.50         |
| 33                              | 3.50     | 29.771          | 29.50         |
| 36                              | 4.00     | 32.270          | 32.00         |
| 39                              | 4.00     | 35.270          | 35.00         |
| 42                              | 4.50     | 37.799          | 37.50         |
| 45                              | 4.50     | 40.799          | 40.50         |
| 48                              | 5.00     | 43.297          | 43.00         |
| 52                              | 5.00     | 47.297          | 47.00         |
| 56                              | 5.50     | 50.796          | 50.50         |
| 60                              | 5.50     | 54.796          | 54.50         |
| 64                              | 6.00     | 58.305          | 58.00         |
| 68                              | 6.00     | 62.305          | 62.00         |

| ISO Metric Threads Fine Pitch |          |                 |               |
|-------------------------------|----------|-----------------|---------------|
| MF                            | Pitch mm | Max Core Dia.mm | Drill Size mm |
| 2.5                           | 0.35     | 2.221           | 2.15          |
| 3                             | 0.35     | 2.271           | 2.65          |
| 3.5                           | 0.35     | 3.221           | 3.15          |
| 4                             | 0.50     | 3.599           | 3.50          |
| 4.5                           | 0.50     | 4.099           | 4.00          |
| 5                             | 0.50     | 4.599           | 4.50          |
| 5.5                           | 0.50     | 5.099           | 5.00          |
| 6                             | 0.75     | 5.378           | 5.20          |
| 7                             | 0.75     | 6.378           | 6.20          |
| 8                             | 0.75     | 7.378           | 7.20          |
| 8                             | 1.00     | 7.153           | 7.00          |
| 9                             | 0.75     | 8.378           | 8.20          |
| 9                             | 1.00     | 8.153           | 8.00          |
| 10                            | 0.75     | 9.378           | 9.20          |
| 10                            | 1.00     | 9.153           | 9.00          |
| 10                            | 1.25     | 8.912           | 8.80          |
| 11                            | 0.75     | 10.378          | 10.20         |
| 11                            | 1.00     | 10.153          | 10.00         |
| 12                            | 1.00     | 11.153          | 11.00         |
| 12                            | 1.25     | 10.912          | 10.80         |
| 12                            | 1.50     | 10.676          | 10.50         |
| 14                            | 1.00     | 13.153          | 13.00         |
| 14                            | 1.25     | 12.912          | 12.80         |
| 14                            | 1.50     | 12.676          | 12.50         |
| 15                            | 1.00     | 14.153          | 14.00         |
| 15                            | 1.50     | 13.676          | 13.50         |
| 16                            | 1.00     | 15.153          | 15.00         |
| 16                            | 1.50     | 14.676          | 14.50         |
| 17                            | 1.00     | 16.153          | 16.00         |
| 17                            | 1.50     | 15.676          | 15.50         |
| 18                            | 1.00     | 17.153          | 17.00         |
| 18                            | 1.50     | 16.676          | 16.50         |
| 18                            | 2.00     | 16.210          | 16.00         |
| 20                            | 1.00     | 19.153          | 19.00         |
| 20                            | 1.50     | 18.676          | 18.50         |
| 20                            | 2.00     | 18.210          | 18.00         |
| 22                            | 1.00     | 21.153          | 21.00         |
| 22                            | 1.50     | 20.676          | 20.50         |
| 22                            | 2.00     | 20.210          | 20.00         |
| 24                            | 1.00     | 23.153          | 23.00         |
| 24                            | 1.50     | 22.676          | 22.50         |
| 24                            | 2.00     | 22.210          | 22.00         |
| 25                            | 1.00     | 24.153          | 24.00         |
| 25                            | 1.50     | 23.676          | 23.50         |

| ISO Metric Threads Fine Pitch |          |                 |               |
|-------------------------------|----------|-----------------|---------------|
| MF                            | Pitch mm | Max Core Dia.mm | Drill Size mm |
| 25                            | 2.00     | 23.210          | 23.00         |
| 26                            | 1.50     | 24.676          | 24.50         |
| 27                            | 1.00     | 26.153          | 26.00         |
| 27                            | 1.50     | 25.676          | 25.50         |
| 27                            | 2.00     | 25.210          | 25.00         |
| 28                            | 1.00     | 27.153          | 27.00         |
| 28                            | 1.50     | 26.676          | 26.50         |
| 28                            | 2.00     | 26.210          | 26.00         |
| 30                            | 1.00     | 29.153          | 29.00         |
| 30                            | 1.50     | 28.676          | 28.50         |
| 30                            | 2.00     | 28.210          | 28.00         |
| 30                            | 3.00     | 27.252          | 27.00         |
| 32                            | 1.50     | 30.675          | 30.50         |
| 32                            | 2.00     | 30.210          | 30.00         |
| 33                            | 1.50     | 31.676          | 31.50         |
| 33                            | 2.00     | 31.210          | 31.00         |
| 33                            | 3.00     | 30.252          | 30.00         |
| 35                            | 1.50     | 33.676          | 33.50         |
| 36                            | 1.50     | 34.676          | 34.50         |
| 36                            | 2.00     | 34.210          | 34.00         |
| 36                            | 3.00     | 33.252          | 33.00         |
| 38                            | 1.50     | 36.676          | 36.50         |
| 39                            | 1.50     | 37.676          | 37.50         |
| 39                            | 2.00     | 37.210          | 37.00         |
| 39                            | 3.00     | 36.252          | 36.00         |
| 40                            | 1.50     | 38.676          | 38.50         |
| 40                            | 2.00     | 38.210          | 38.00         |
| 40                            | 3.00     | 37.252          | 37.00         |
| 42                            | 1.50     | 40.676          | 40.50         |
| 42                            | 2.00     | 40.210          | 40.00         |
| 42                            | 3.00     | 39.252          | 39.00         |
| 45                            | 1.50     | 43.676          | 43.50         |
| 45                            | 2.00     | 43.210          | 43.00         |
| 45                            | 3.00     | 42.252          | 42.00         |
| 48                            | 1.50     | 46.676          | 46.50         |
| 48                            | 2.00     | 46.210          | 46.00         |
| 48                            | 3.00     | 45.252          | 45.00         |
| 50                            | 1.50     | 48.676          | 48.50         |
| 50                            | 2.00     | 48.210          | 48.00         |
| 50                            | 3.00     | 47.252          | 47.00         |
| 52                            | 1.50     | 50.676          | 50.50         |
| 52                            | 2.00     | 50.210          | 50.00         |
| 52                            | 3.00     | 49.252          | 49.00         |

Pre-Tapping Hole Sizes - Forming Taps

Pre-Tapping Hole Sizes - General Taps

| Recommended Tap Drill Size |          |               |
|----------------------------|----------|---------------|
| M                          | Pitch mm | Drill Size mm |
| 1                          | 0.25     | 0.9           |
| 1.1                        | 0.25     | 1             |
| 1.2                        | 0.25     | 1.1           |
| 1.4                        | 0.3      | 1.28          |
| 1.6                        | 0.35     | 1.47          |
| 1.7                        | 0.35     | 1.57          |
| 1.8                        | 0.35     | 1.67          |
| 2                          | 0.4      | 1.85          |
| 2.2                        | 0.45     | 2.03          |
| 2.3                        | 0.4      | 2.15          |
| 2.5                        | 0.45     | 2.33          |
| 2.6                        | 0.45     | 2.43          |
| 3                          | 0.5      | 2.8           |
| 3.5                        | 0.6      | 3.25          |
| 4                          | 0.7      | 3.7           |
| 4.5                        | 0.75     | 4.2           |
| 5                          | 0.8      | 4.65          |
| 6                          | 1        | 5.55          |
| 7                          | 1        | 6.55          |
| 8                          | 1.25     | 6.6           |
| 9                          | 1.25     | 7.45          |
| 10                         | 1.5      | 8.45          |
| 11                         | 1.5      | 9.35          |
| 12                         | 1.75     | 11.25         |
| 14                         | 2        | 13.1          |
| 16                         | 2        | 15.1          |
| 18                         | 2.5      | 16.85         |
| 20                         | 2.5      | 18.85         |
| 22                         | 2.5      | 20.85         |
| 24                         | 3        | 22.65         |
| 27                         | 3        | 25.65         |
| 30                         | 3.5      | 28.4          |
| 33                         | 3.5      | 31.4          |
| 36                         | 4        | 34.15         |
| 39                         | 4        | 37.15         |
| 42                         | 4.5      | 39.9          |
| 45                         | 4.5      | 42.9          |
| 48                         | 5        | 45.65         |

| Recommended Tap Drill Size |          |               |
|----------------------------|----------|---------------|
| MF                         | Pitch mm | Drill Size mm |
| 2.5                        | 0.35     | 2.37          |
| 2.6                        | 0.35     | 2.47          |
| 3                          | 0.35     | 2.88          |
| 3.5                        | 0.35     | 3.38          |
| 4                          | 0.5      | 3.8           |
| 5                          | 0.5      | 4.8           |
| 6                          | 0.5      | 5.8           |
| 6                          | 0.75     | 5.7           |
| 7                          | 0.75     | 6.7           |
| 8                          | 0.75     | 7.7           |
| 8                          | 1        | 7.6           |
| 9                          | 0.75     | 8.7           |
| 9                          | 1        | 8.6           |
| 10                         | 0.75     | 9.7           |
| 10                         | 1        | 9.6           |
| 10                         | 1.25     | 9.45          |
| 11                         | 1        | 10.6          |
| 12                         | 1        | 11.6          |
| 12                         | 1.25     | 11.45         |
| 12                         | 1.5      | 11.35         |
| 14                         | 1        | 13.6          |
| 14                         | 1.25     | 13.45         |
| 14                         | 1.5      | 13.35         |
| 15                         | 1        | 14.6          |
| 15                         | 1.5      | 14.35         |
| 16                         | 1        | 15.6          |
| 16                         | 1.5      | 15.35         |
| 18                         | 4        | 17.6          |
| 18                         | 1.5      | 17.35         |
| 18                         | 2        | 17.1          |
| 20                         | 1        | 19.6          |
| 20                         | 1.5      | 19.35         |
| 20                         | 2        | 19.1          |
| 24                         | 2        | 23.1          |
| 30                         | 2        | 29.1          |
| 36                         | 3        | 34.65         |
| 42                         | 4        | 40.15         |
| 48                         | 3        | 46.65         |

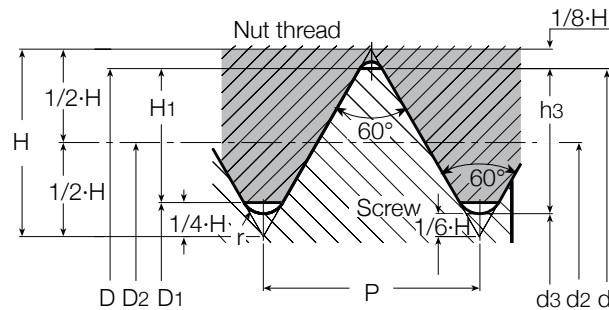
| American Unified Coarse Threads |       |                     |               |
|---------------------------------|-------|---------------------|---------------|
| UNC                             | T.P.I | Max. Core Dia. inch | Drill Size mm |
| #1                              | 64    | 1.585               | 1.5           |
| #2                              | 56    | 1.872               | 1.8           |
| #3                              | 48    | 2.146               | 2.1           |
| #4                              | 40    | 2.385               | 2.3           |
| #5                              | 40    | 2.697               | 2.6           |
| #6                              | 32    | 2.896               | 2.85          |
| #8                              | 32    | 3.528               | 3.5           |
| #10                             | 24    | 3.95                | 3.9           |
| #12                             | 24    | 4.59                | 4.5           |
| 1/4"                            | 20    | 5.25                | 5.2           |
| 5/16"                           | 18    | 6.68                | 6.6           |
| 3/8"                            | 16    | 8.082               | 8             |
| 7/16"                           | 14    | 9.441               | 9.4           |
| 1/2"                            | 13    | 10.881              | 10.75         |
| 9/16"                           | 12    | 12.301              | 12.25         |
| 5/8"                            | 11    | 13.693              | 13.5          |
| 3/4"                            | 10    | 16.624              | 16.5          |
| 7/8"                            | 9     | 19.52               | 19.5          |
| 1"                              | 8     | 22.344              | 22.25         |
| 1*1/8"                          | 7     | 25.082              | 25            |
| 1*1/4"                          | 7     | 28.258              | 28.25         |
| 1*3/8"                          | 6     | 30.851              | 30.75         |
| 1*1/2"                          | 6     | 34.026              | 34            |
| 1*3/4"                          | 5     | 39.56               | 39.5          |
| 2"                              | 4.5   | 45.367              | 45.25         |

| American Unified Fine Threads |       |                     |               |
|-------------------------------|-------|---------------------|---------------|
| UNF                           | T.P.I | Max. Core Dia. inch | Drill Size mm |
| #0                            | 80    | 1.306               | 1.3           |
| #1                            | 72    | 1.613               | 1.6           |
| #2                            | 64    | 1.913               | 1.9           |
| #3                            | 56    | 2.197               | 2.1           |
| #4                            | 48    | 2.459               | 2.4           |
| #5                            | 44    | 2.741               | 2.7           |
| #6                            | 40    | 3.012               | 3             |
| #8                            | 36    | 3.597               | 3.5           |
| #10                           | 32    | 4.168               | 4.1           |
| #12                           | 28    | 4.717               | 4.7           |
| 1/4"                          | 28    | 5.563               | 5.5           |
| 5/16"                         | 24    | 6.995               | 6.9           |
| 3/8"                          | 24    | 8.565               | 8.5           |
| 7/16"                         | 20    | 9.947               | 9.9           |
| 1/2"                          | 20    | 11.524              | 11.5          |
| 9/16"                         | 18    | 12.969              | 12.9          |
| 5/8"                          | 18    | 14.554              | 14.5          |
| 3/4"                          | 16    | 17.546              | 17.5          |
| 7/8"                          | 14    | 20.493              | 20.5          |
| 1"                            | 12    | 23.363              | 23.25         |
| 1*1/8"                        | 12    | 26.538              | 26.5          |
| 1*1/4"                        | 12    | 29.713              | 29.5          |
| 1*3/8"                        | 12    | 32.888              | 32.7          |
| 1*1/2"                        | 12    | 36.063              | 36            |



## ISO Metric Thread Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

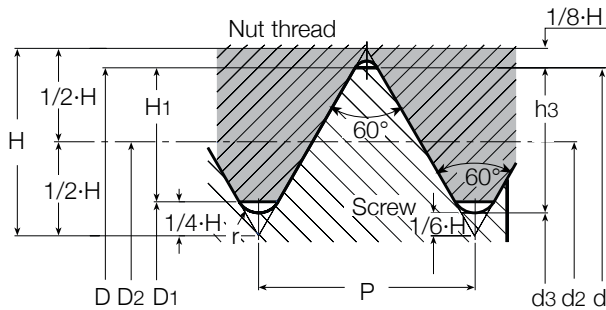
$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

| Nominal Dia. d=D                       | Pitch P | Flank Dia. d2=D2 | Minor Diameter |        | Thread Depth |        | Radius r | Flank Dia. Tap Tolerance 6H d2 |        | Flank Dia. Tap Tolerance 6H |        |
|--|---------|------------------|----------------|--------|--------------|--------|----------|--------------------------------|--------|-----------------------------|--------|
|  |         |                  | Screw d3       | Nut D1 | Screw h3     | Nut H1 |          | Min.                           | Max.   | Min.                        | Max.   |
| M1.6                                   | 0.35    | 1.373            | 1.171          | 1.221  | 0.215        | 0.189  | 0.051    | 1.393                          | 1.407  | 1.373                       | 1.458  |
| M1.8                                   | 0.35    | 1.573            | 1.371          | 1.421  | 0.215        | 0.189  | 0.051    | 1.593                          | 1.607  | 1.573                       | 1.658  |
| M2                                     | 0.4     | 1.740            | 1.509          | 1.567  | 0.245        | 0.217  | 0.058    | 1.761                          | 1.776  | 1.740                       | 1.830  |
| M2.2                                   | 0.45    | 1.908            | 1.648          | 1.713  | 0.276        | 0.244  | 0.065    | 1.931                          | 1.946  | 1.908                       | 2.003  |
| M2.5                                   | 0.45    | 2.208            | 1.948          | 2.013  | 0.276        | 0.244  | 0.065    | 2.231                          | 2.246  | 2.208                       | 2.303  |
| M3                                     | 0.5     | 2.675            | 2.387          | 2.459  | 0.307        | 0.271  | 0.072    | 2.699                          | 2.715  | 2.675                       | 2.775  |
| M3.5                                   | 0.6     | 3.110            | 2.764          | 2.850  | 0.368        | 0.325  | 0.087    | 3.137                          | 3.155  | 3.110                       | 3.222  |
| M4                                     | 0.7     | 3.545            | 3.141          | 3.242  | 0.429        | 0.379  | 0.101    | 3.574                          | 3.593  | 3.545                       | 3.663  |
| M4.5                                   | 0.75    | 4.013            | 3.580          | 3.688  | 0.460        | 0.406  | 0.108    | 4.042                          | 4.061  | 4.013                       | 4.131  |
| M5                                     | 0.8     | 4.480            | 4.019          | 4.134  | 0.491        | 0.433  | 0.115    | 4.510                          | 4.530  | 4.480                       | 4.605  |
| M6                                     | 1       | 5.350            | 4.773          | 4.917  | 0.613        | 0.541  | 0.144    | 5.385                          | 5.409  | 5.350                       | 5.500  |
| M7                                     | 1       | 6.350            | 5.773          | 5.917  | 0.613        | 0.541  | 0.144    | 6.385                          | 6.409  | 6.350                       | 6.500  |
| M8                                     | 1.25    | 7.188            | 6.466          | 6.647  | 0.767        | 0.677  | 0.180    | 7.226                          | 7.251  | 7.188                       | 7.348  |
| M9                                     | 1.25    | 8.188            | 7.466          | 7.647  | 0.767        | 0.677  | 0.180    | 8.226                          | 8.251  | 8.188                       | 8.348  |
| M10                                    | 1.5     | 9.026            | 8.160          | 8.376  | 0.920        | 0.812  | 0.217    | 9.068                          | 9.096  | 9.026                       | 9.206  |
| M11                                    | 1.5     | 10.026           | 9.160          | 9.376  | 0.920        | 0.812  | 0.217    | 10.068                         | 10.096 | 10.026                      | 10.206 |
| M12                                    | 1.75    | 10.863           | 9.853          | 10.106 | 1.074        | 0.947  | 0.253    | 10.911                         | 10.943 | 10.863                      | 11.063 |
| M14                                    | 2       | 12.701           | 11.546         | 11.835 | 1.227        | 1.083  | 0.289    | 12.752                         | 12.786 | 12.701                      | 12.913 |
| M16                                    | 2       | 14.701           | 13.546         | 13.835 | 1.227        | 1.083  | 0.289    | 14.752                         | 14.786 | 14.701                      | 14.913 |
| M18                                    | 2.5     | 16.376           | 14.933         | 15.294 | 1.534        | 1.353  | 0.361    | 16.430                         | 16.466 | 16.376                      | 16.600 |
| M20                                    | 2.5     | 18.376           | 16.933         | 17.294 | 1.534        | 1.353  | 0.361    | 18.430                         | 18.466 | 18.376                      | 18.600 |
| M22                                    | 2.5     | 20.376           | 18.933         | 19.294 | 1.534        | 1.353  | 0.361    | 20.430                         | 20.466 | 20.376                      | 20.600 |
| M24                                    | 3       | 22.051           | 20.319         | 20.752 | 1.840        | 1.624  | 0.433    | 22.115                         | 22.157 | 22.051                      | 22.316 |
| M27                                    | 3       | 25.051           | 23.319         | 23.752 | 1.840        | 1.624  | 0.433    | 25.115                         | 25.157 | 25.051                      | 25.316 |
| M30                                    | 3.5     | 27.727           | 25.706         | 26.211 | 2.147        | 1.894  | 0.505    | 27.794                         | 27.839 | 27.727                      | 28.007 |
| M33                                    | 3.5     | 30.727           | 28.706         | 29.211 | 2.147        | 1.894  | 0.505    | 30.794                         | 30.839 | 30.727                      | 31.007 |
| M36                                    | 4       | 33.402           | 31.093         | 31.670 | 2.454        | 2.165  | 0.577    | 33.473                         | 33.520 | 33.402                      | 33.702 |
| M39                                    | 4       | 36.402           | 34.093         | 34.670 | 2.454        | 2.165  | 0.577    | 36.473                         | 36.520 | 36.402                      | 36.702 |
| M42                                    | 4.5     | 39.077           | 36.479         | 37.129 | 2.760        | 2.436  | 0.650    | 39.152                         | 39.202 | 39.077                      | 39.392 |
| M45                                    | 4.5     | 42.077           | 39.479         | 40.129 | 2.760        | 2.436  | 0.650    | 42.152                         | 42.202 | 42.077                      | 42.392 |
| M48                                    | 5       | 44.752           | 41.866         | 42.587 | 3.067        | 2.706  | 0.722    | 44.832                         | 44.885 | 44.752                      | 45.087 |
| M52                                    | 5       | 48.752           | 45.866         | 46.587 | 3.067        | 2.706  | 0.722    | 48.832                         | 48.885 | 48.752                      | 49.087 |
| M56                                    | 5.5     | 52.428           | 49.252         | 50.046 | 3.374        | 2.977  | 0.794    | 52.512                         | 52.568 | 52.428                      | 52.783 |
| M60                                    | 5.5     | 56.428           | 53.252         | 54.046 | 3.374        | 2.977  | 0.794    | 56.512                         | 56.568 | 56.428                      | 56.783 |
| M64                                    | 6       | 60.103           | 56.639         | 57.505 | 3.681        | 3.248  | 0.866    | 60.193                         | 60.253 | 60.103                      | 60.478 |
| M68                                    | 6       | 64.103           | 60.639         | 61.505 | 3.681        | 3.248  | 0.866    | 64.193                         | 64.253 | 64.103                      | 64.478 |
| Metric Thread MA (old UNI 159 profile) |         |                  |                |        |              |        |          | Nut Tolerance SH8              |        |                             |        |
| M1.7                                   | 0.35    | 1.473            | 1.246          | 1.246  | 0.227        | 0.227  | 0.040    | 1.493                          | 1.507  | 1.473                       | 1.529  |
| M2.3                                   | 0.4     | 2.040            | 1.780          | 1.780  | 0.260        | 0.260  | 0.040    | 2.061                          | 2.076  | 2.040                       | 2.120  |
| M2.6                                   | 0.45    | 2.308            | 2.016          | 2.016  | 0.292        | 0.292  | 0.050    | 2.331                          | 2.346  | 2.308                       | 2.388  |

**ISO Metric Fine Thread  
Nominal Dimensions According to UNI 4535-64**

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

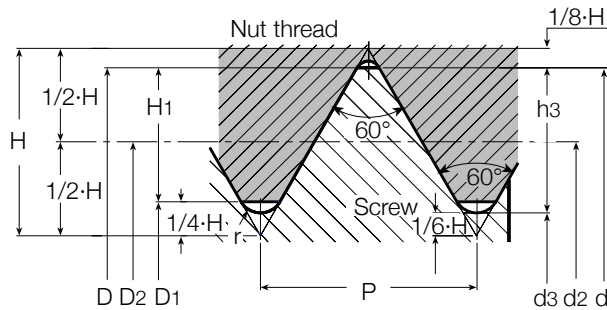
$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

| Nominal Dia. d=D | Pitch P | Flank Dia. d2=D2 | Minor Diameter |        | Thread Depth |        | Radius r | Flank Dia. Tap Tolerance 6H d2 |        | Flank Dia. Tap Tolerance 6H |        |
|------------------|---------|------------------|----------------|--------|--------------|--------|----------|--------------------------------|--------|-----------------------------|--------|
|                  |         |                  | Screw d3       | Nut D1 | Screw h3     | Nut H1 |          | Min.                           | Max.   | Min.                        | Max.   |
| M 2              | 0.25    | 1.838            | 1.693          | 1.729  | 0.153        | 0.135  | 0.036    | 1.844                          | 1.856  | 1.838                       | 1.886  |
| M 2.5            | 0.35    | 2.273            | 2.701          | 2.121  | 0.215        | 0.189  | 0.051    | 2.293                          | 2.307  | 2.273                       | 2.358  |
| M 3              | 0.35    | 2.773            | 2.571          | 2.621  | 0.215        | 0.189  | 0.051    | 2.794                          | 2.809  | 2.773                       | 2.863  |
| M 3.5            | 0.35    | 3.273            | 3.071          | 3.121  | 0.215        | 0.189  | 0.051    | 3.294                          | 3.309  | 3.273                       | 3.363  |
| M 4              | 0.5     | 3.675            | 3.387          | 3.459  | 0.307        | 0.271  | 0.072    | 3.699                          | 3.715  | 3.675                       | 3.775  |
| M 4.5            | 0.5     | 4.175            | 3.887          | 3.959  | 0.307        | 0.271  | 0.072    | 4.199                          | 4.215  | 4.175                       | 4.275  |
| M 5              | 0.5     | 4.675            | 4.387          | 4.459  | 0.307        | 0.271  | 0.072    | 4.699                          | 4.715  | 4.675                       | 4.775  |
| M 5.5            | 0.5     | 5.175            | 4.887          | 4.959  | 0.307        | 0.271  | 0.072    | 5.199                          | 5.215  | 5.175                       | 5.275  |
| M 6              | 0.5     | 5.675            | 5.387          | 5.459  | 0.307        | 0.271  | 0.072    | 5.702                          | 5.72   | 5.675                       | 5.787  |
| M 6              | 0.75    | 5.513            | 5.08           | 5.188  | 0.46         | 0.406  | 0.108    | 5.545                          | 5.566  | 5.513                       | 5.645  |
| M 7              | 0.75    | 6.513            | 6.08           | 6.188  | 0.46         | 0.406  | 0.108    | 6.545                          | 6.566  | 6.513                       | 6.645  |
| M 8              | 0.5     | 7.675            | 7.387          | 7.459  | 0.307        | 0.271  | 0.072    | 7.702                          | 7.72   | 7.675                       | 7.787  |
| M 8              | 0.75    | 7.513            | 7.08           | 7.188  | 0.46         | 0.406  | 0.108    | 7.545                          | 7.566  | 7.513                       | 7.645  |
| M 8              | 1       | 7.35             | 6.773          | 6.917  | 0.613        | 0.541  | 0.144    | 7.835                          | 7.409  | 7.35                        | 7.5    |
| M 9              | 0.75    | 8.513            | 8.08           | 8.188  | 0.46         | 0.406  | 0.108    | 8.545                          | 8.566  | 8.513                       | 8.645  |
| M 9              | 1       | 8.35             | 7.773          | 7.917  | 0.613        | 0.541  | 0.144    | 8.385                          | 8.409  | 8.35                        | 8.5    |
| M 10             | 0.5     | 9.675            | 9.387          | 9.459  | 0.307        | 0.271  | 0.072    | 9.702                          | 9.72   | 9.675                       | 9.787  |
| M 10             | 0.75    | 9.513            | 9.08           | 9.188  | 0.46         | 0.406  | 0.108    | 9.545                          | 9.566  | 9.513                       | 9.645  |
| M 10             | 1       | 9.35             | 8.773          | 8.917  | 0.613        | 0.541  | 0.144    | 9.385                          | 9.409  | 9.35                        | 9.5    |
| M 10             | 1.25    | 9.188            | 8.466          | 8.647  | 0.767        | 0.677  | 0.18     | 9.226                          | 9.251  | 9.188                       | 9.348  |
| M 11             | 0.75    | 10.513           | 10.08          | 10.188 | 0.46         | 0.406  | 0.108    | 10.545                         | 10.566 | 10.513                      | 10.645 |
| M 11             | 1       | 10.35            | 9.773          | 9.917  | 0.613        | 0.541  | 0.144    | 10.385                         | 10.409 | 10.35                       | 10.5   |
| M 12             | 0.75    | 11.513           | 11.08          | 11.188 | 0.46         | 0.406  | 0.108    | 11.547                         | 11.569 | 11.513                      | 11.653 |
| M 12             | 1       | 11.35            | 10.773         | 10.917 | 0.613        | 0.541  | 0.144    | 11.388                         | 11.413 | 11.35                       | 11.51  |
| M 12             | 1.25    | 11.188           | 10.466         | 10.647 | 0.767        | 0.677  | 0.18     | 11.23                          | 11.258 | 11.188                      | 11.368 |
| M 12             | 1.5     | 11.026           | 10.16          | 10.376 | 0.92         | 0.812  | 0.217    | 11.071                         | 11.101 | 11.026                      | 11.216 |
| M 13             | 1       | 12.35            | 11.773         | 11.917 | 0.613        | 0.541  | 0.144    | 12.388                         | 12.413 | 12.35                       | 12.51  |
| M 14             | 1       | 13.35            | 12.773         | 12.917 | 0.613        | 0.541  | 0.144    | 13.388                         | 13.413 | 13.35                       | 13.51  |
| M 14             | 1.25    | 13.188           | 12.466         | 12.647 | 0.767        | 0.677  | 0.18     | 13.23                          | 13.258 | 13.188                      | 13.368 |
| M 14             | 1.5     | 13.026           | 12.16          | 12.376 | 0.92         | 0.812  | 0.217    | 13.071                         | 13.101 | 13.026                      | 13.216 |
| M 15             | 1       | 14.35            | 13.773         | 13.917 | 0.613        | 0.541  | 0.144    | 14.388                         | 14.413 | 14.35                       | 14.51  |
| M 15             | 1.5     | 14.026           | 13.16          | 13.376 | 0.92         | 0.812  | 0.217    | 14.071                         | 14.101 | 14.026                      | 14.216 |
| M 16             | 1       | 15.35            | 14.773         | 14.917 | 0.613        | 0.541  | 0.144    | 15.388                         | 15.413 | 15.35                       | 15.51  |
| M 16             | 1.25    | 15.188           | 14.466         | 14.647 | 0.767        | 0.677  | 0.18     | 15.23                          | 15.258 | 15.188                      | 15.368 |
| M 16             | 1.5     | 15.026           | 14.16          | 14.376 | 0.92         | 0.812  | 0.217    | 15.071                         | 15.101 | 15.026                      | 15.216 |
| M 17             | 1       | 16.35            | 15.773         | 15.917 | 0.613        | 0.541  | 0.144    | 16.388                         | 16.413 | 16.35                       | 16.51  |
| M 17             | 1.5     | 16.026           | 15.16          | 15.376 | 0.92         | 0.812  | 0.217    | 16.071                         | 16.101 | 16.026                      | 16.216 |
| M 18             | 1       | 17.350           | 16.773         | 16.917 | 0.613        | 0.541  | 0.144    | 17.388                         | 17.413 | 17.35                       | 17.51  |
| M 18             | 1.5     | 17.026           | 16.16          | 16.376 | 0.92         | 0.812  | 0.217    | 17.071                         | 17.101 | 17.026                      | 17.216 |
| M 18             | 2       | 16.701           | 15.546         | 15.835 | 1.227        | 1.083  | 0.289    | 16.752                         | 16.786 | 16.701                      | 16.913 |

**ISO Metric Fine Thread**  
**Nominal Dimensions According to UNI 4535-64**

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

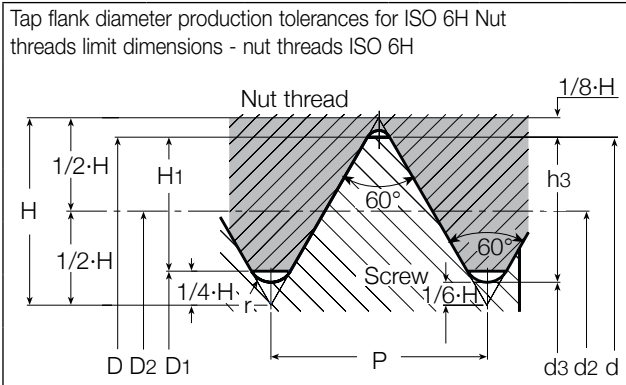
$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

| Nominal Dia. d=D | Pitch P | Flank Dia. d2=D2 | Minor Diameter |        | Thread Depth |        | Radius r | Flank Dia. Tap Tolerance 6H d2 |        | Flank Dia. Tap Tolerance 6H |        |
|------------------|---------|------------------|----------------|--------|--------------|--------|----------|--------------------------------|--------|-----------------------------|--------|
|                  |         |                  | Screw d3       | Nut D1 | Screw h3     | Nut H1 |          | Min.                           | Max.   | Min.                        | Max.   |
| M 20             | 1       | 19.35            | 18.773         | 18.917 | 0.613        | 0.541  | 0.144    | 19.388                         | 19.413 | 19.35                       | 19.51  |
| M 20             | 1.5     | 19.026           | 18.16          | 18.376 | 0.92         | 0.812  | 0.217    | 19.071                         | 19.101 | 19.026                      | 19.216 |
| M 20             | 2       | 18.701           | 17.546         | 17.835 | 1.227        | 1.083  | 0.289    | 18.752                         | 18.786 | 18.701                      | 18.913 |
| M 22             | 1       | 21.35            | 20.773         | 20.917 | 0.613        | 0.541  | 0.144    | 21.388                         | 21.413 | 21.35                       | 21.51  |
| M 22             | 1.5     | 21.026           | 20.16          | 20.376 | 0.92         | 0.812  | 0.217    | 21.071                         | 21.101 | 21.026                      | 21.216 |
| M 22             | 2       | 20.701           | 19.546         | 19.835 | 1.227        | 1.083  | 0.289    | 20.752                         | 20.786 | 20.701                      | 20.913 |
| M 24             | 1       | 23.350           | 22.773         | 22.917 | 0.613        | 0.541  | 0.144    | 23.390                         | 23.416 | 23.350                      | 23.520 |
| M 24             | 1.5     | 23.026           | 22.160         | 22.376 | 0.920        | 0.812  | 0.217    | 23.074                         | 23.106 | 23.026                      | 23.226 |
| M 24             | 2       | 22.701           | 21.546         | 21.835 | 1.227        | 1.083  | 0.289    | 22.754                         | 22.791 | 22.701                      | 22.925 |
| M 25             | 1       | 24.350           | 23.773         | 23.917 | 0.613        | 0.541  | 0.144    | 24.390                         | 24.416 | 24.350                      | 24.520 |
| M 25             | 1.5     | 24.026           | 23.160         | 23.376 | 0.920        | 0.812  | 0.217    | 24.074                         | 24.106 | 24.026                      | 24.226 |
| M 25             | 2       | 23.701           | 22.546         | 22.835 | 1.227        | 1.083  | 0.289    | 23.754                         | 23.791 | 23.701                      | 23.925 |
| M 26             | 1       | 25.350           | 24.773         | 24.917 | 0.613        | 0.541  | 0.144    | 25.390                         | 25.416 | 25.350                      | 25.520 |
| M 26             | 1.5     | 25.026           | 24.160         | 24.376 | 0.920        | 0.812  | 0.217    | 25.074                         | 25.106 | 25.026                      | 25.226 |
| M 26             | 2       | 24.701           | 23.546         | 23.835 | 1.227        | 1.083  | 0.289    | 24.754                         | 24.791 | 24.701                      | 24.925 |
| M 27             | 1       | 26.350           | 25.773         | 25.917 | 0.613        | 0.541  | 0.144    | 26.390                         | 26.416 | 26.350                      | 26.520 |
| M 27             | 1.5     | 26.026           | 25.160         | 25.376 | 0.920        | 0.812  | 0.217    | 26.074                         | 26.106 | 26.026                      | 26.226 |
| M 27             | 2       | 25.701           | 24.546         | 24.835 | 1.227        | 1.083  | 0.289    | 25.754                         | 25.791 | 25.701                      | 25.925 |
| M 28             | 1       | 27.350           | 26.773         | 26.917 | 0.613        | 0.541  | 0.144    | 27.390                         | 27.416 | 27.350                      | 27.520 |
| M 28             | 1.5     | 27.026           | 26.160         | 26.376 | 0.920        | 0.812  | 0.217    | 27.074                         | 27.106 | 27.026                      | 27.226 |
| M 28             | 2       | 26.701           | 25.546         | 25.835 | 1.227        | 1.083  | 0.289    | 26.754                         | 26.791 | 26.701                      | 26.925 |
| M 30             | 1       | 29.350           | 28.773         | 28.917 | 0.613        | 0.541  | 0.144    | 29.390                         | 29.416 | 29.350                      | 29.520 |
| M 30             | 1.5     | 29.026           | 28.160         | 28.376 | 0.920        | 0.812  | 0.217    | 29.074                         | 29.106 | 29.026                      | 29.226 |
| M 30             | 2       | 28.701           | 27.546         | 27.835 | 1.227        | 1.083  | 0.289    | 28.754                         | 28.791 | 28.701                      | 28.925 |
| M 30             | 3       | 28.051           | 26.319         | 26.752 | 1.840        | 1.624  | 0.433    | 28.115                         | 28.157 | 28.051                      | 28.316 |
| M 32             | 1.5     | 31.026           | 30.160         | 30.376 | 0.920        | 0.812  | 0.217    | 31.074                         | 31.106 | 31.026                      | 31.226 |
| M 32             | 2       | 30.701           | 29.546         | 29.835 | 1.227        | 1.083  | 0.289    | 30.754                         | 30.791 | 30.701                      | 30.925 |
| M 33             | 1.5     | 32.026           | 31.160         | 31.376 | 0.920        | 0.812  | 0.217    | 32.074                         | 32.106 | 32.026                      | 32.226 |
| M 33             | 2       | 31.701           | 30.546         | 30.835 | 1.227        | 1.083  | 0.289    | 31.754                         | 31.791 | 31.701                      | 31.925 |
| M 33             | 3       | 31.051           | 29.319         | 29.752 | 1.840        | 1.624  | 0.433    | 31.115                         | 31.157 | 31.051                      | 31.316 |
| M 35             | 1.5     | 34.026           | 33.160         | 33.376 | 0.920        | 0.812  | 0.217    | 34.074                         | 34.106 | 34.026                      | 34.226 |
| M 35             | 2       | 33.701           | 32.546         | 32.835 | 1.227        | 1.083  | 0.289    | 33.754                         | 33.791 | 33.701                      | 33.925 |
| M 36             | 1.5     | 35.026           | 34.160         | 34.376 | 0.920        | 0.812  | 0.217    | 35.074                         | 35.106 | 35.026                      | 35.226 |
| M 36             | 2       | 34.701           | 33.546         | 33.835 | 1.227        | 1.083  | 0.289    | 34.754                         | 34.791 | 34.701                      | 34.925 |
| M 36             | 3       | 34.051           | 32.319         | 32.752 | 1.840        | 1.624  | 0.433    | 34.115                         | 34.157 | 34.051                      | 34.316 |
| M 38             | 1.5     | 37.026           | 36.160         | 36.376 | 0.920        | 0.812  | 0.217    | 37.074                         | 37.106 | 37.026                      | 37.226 |

**ISO Metric Fine Thread  
Nominal Dimensions According to UNI 4535-64**



Coarse Pitch Threads Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

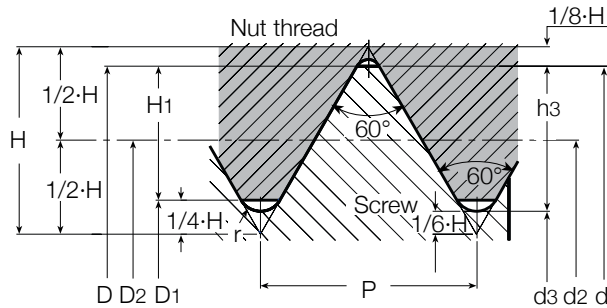
$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

| Nominal Dia. d=D                              | Pitch P | Flank Dia. d2=D2 | Minor Diameter |        | Thread Depth |        | Radius r | Flank Dia. Tap Tolerance 6H d2 |        | Flank Dia. Tap Tolerance 6H |        |
|---|---------|------------------|----------------|--------|--------------|--------|----------|--------------------------------|--------|-----------------------------|--------|
|   |         |                  | Screw d3       | Nut D1 | Screw h3     | Nut H1 |          | Min.                           | Max.   | Min.                        | Max.   |
| M 39  | 1.5     | 38.026           | 37.160         | 37.376 | 0.920        | 0.812  | 0.217    | 38.074                         | 38.106 | 38.026                      | 38.226 |
| M 39  | 2       | 37.701           | 36.546         | 36.835 | 1.227        | 1.083  | 0.289    | 37.754                         | 37.791 | 37.701                      | 37.925 |
| M 39  | 3       | 37.051           | 35.319         | 35.752 | 1.840        | 1.624  | 0.433    | 37.115                         | 37.157 | 37.051                      | 37.316 |
| M 40  | 1.5     | 39.026           | 38.160         | 38.376 | 0.920        | 0.812  | 0.217    | 39.074                         | 39.106 | 39.026                      | 39.226 |
| M 40  | 2       | 38.701           | 37.546         | 37.835 | 1.227        | 1.083  | 0.289    | 38.754                         | 38.791 | 38.701                      | 38.925 |
| M 40  | 3       | 38.051           | 36.319         | 36.752 | 1.840        | 1.624  | 0.433    | 38.115                         | 38.157 | 38.051                      | 38.316 |
| M 42  | 1.5     | 41.026           | 40.160         | 40.376 | 0.920        | 0.812  | 0.217    | 41.074                         | 41.106 | 41.026                      | 41.226 |
| M 42  | 2       | 40.701           | 39.546         | 39.835 | 1.227        | 1.083  | 0.289    | 40.754                         | 40.791 | 40.701                      | 40.925 |
| M 42  | 3       | 40.051           | 38.319         | 38.752 | 1.840        | 1.624  | 0.433    | 40.115                         | 40.157 | 40.051                      | 40.316 |
| M 45  | 1.5     | 44.026           | 43.160         | 43.376 | 0.920        | 0.812  | 0.217    | 44.074                         | 44.106 | 44.026                      | 44.226 |
| M 45  | 2       | 43.701           | 42.546         | 42.835 | 1.227        | 1.083  | 0.289    | 43.754                         | 43.791 | 43.701                      | 43.925 |
| M 45  | 3       | 43.051           | 41.319         | 41.752 | 1.840        | 1.624  | 0.433    | 43.115                         | 43.157 | 43.051                      | 43.316 |
| M 48  | 1.5     | 47.026           | 46.160         | 46.376 | 0.920        | 0.812  | 0.217    | 47.077                         | 47.111 | 47.026                      | 47.238 |
| M 48  | 2       | 46.701           | 45.546         | 45.835 | 1.227        | 1.083  | 0.289    | 46.758                         | 46.796 | 46.701                      | 46.937 |
| M 48  | 3       | 46.051           | 44.319         | 44.752 | 1.840        | 1.624  | 0.433    | 46.118                         | 46.163 | 46.051                      | 46.331 |
| M 50  | 1.5     | 49.026           | 48.160         | 48.376 | 0.920        | 0.812  | 0.217    | 49.077                         | 49.111 | 49.026                      | 49.238 |
| M 50  | 2       | 48.701           | 47.546         | 47.835 | 1.227        | 1.083  | 0.289    | 48.758                         | 48.796 | 48.701                      | 48.937 |
| M 50  | 3       | 48.051           | 46.319         | 46.752 | 1.840        | 1.624  | 0.433    | 48.118                         | 48.163 | 48.051                      | 48.331 |
| M 52  | 1.5     | 51.026           | 50.160         | 50.376 | 0.920        | 0.812  | 0.217    | 51.077                         | 51.111 | 51.026                      | 51.238 |
| M 52  | 2       | 50.701           | 49.546         | 49.835 | 1.227        | 1.083  | 0.289    | 50.758                         | 50.796 | 50.701                      | 50.937 |
| M 52  | 3       | 50.051           | 48.319         | 48.752 | 1.840        | 1.624  | 0.433    | 50.118                         | 50.163 | 50.051                      | 50.331 |
| M 55  | 1.5     | 54.026           | 53.160         | 53.376 | 0.920        | 0.812  | 0.217    | 54.077                         | 54.111 | 54.026                      | 54.238 |
| M 55  | 2       | 53.701           | 52.546         | 52.835 | 1.227        | 1.083  | 0.289    | 53.758                         | 53.796 | 53.701                      | 53.937 |
| M 55  | 3       | 53.051           | 51.319         | 51.752 | 1.840        | 1.624  | 0.433    | 53.118                         | 53.163 | 53.051                      | 53.331 |
| M 56  | 1.5     | 55.026           | 54.160         | 54.376 | 0.920        | 0.812  | 0.217    | 55.077                         | 55.111 | 55.026                      | 55.238 |
| M 56  | 2       | 54.701           | 53.546         | 53.835 | 1.227        | 1.083  | 0.289    | 54.758                         | 54.796 | 54.701                      | 54.937 |
| M 56  | 3       | 54.051           | 52.319         | 52.752 | 1.840        | 1.624  | 0.433    | 54.118                         | 54.163 | 54.051                      | 54.331 |
| M 58  | 1.5     | 57.026           | 56.160         | 56.376 | 0.920        | 0.812  | 0.217    | 57.077                         | 57.111 | 57.026                      | 57.238 |
| M 58  | 2       | 56.701           | 55.546         | 55.835 | 1.227        | 1.083  | 0.289    | 56.758                         | 56.796 | 56.701                      | 56.937 |
| M 58  | 3       | 56.051           | 54.319         | 54.752 | 1.840        | 1.624  | 0.433    | 56.118                         | 56.163 | 56.051                      | 56.331 |
| M 60  | 1.5     | 59.026           | 58.160         | 58.376 | 0.920        | 0.812  | 0.217    | 59.077                         | 59.111 | 59.026                      | 59.238 |
| M 60  | 2       | 58.701           | 57.546         | 57.835 | 1.227        | 1.083  | 0.289    | 58.758                         | 58.796 | 58.701                      | 58.937 |
| M 60  | 3       | 58.051           | 56.319         | 56.752 | 1.840        | 1.624  | 0.433    | 58.118                         | 58.163 | 58.051                      | 58.331 |
| <b>Metric thread MA (old UNI 160 Profile)</b> |         |                  |                |        |              |        |          | <b>Nut Tolerance SH8</b>       |        |                             |        |
| M 2,3   | 0.25    | 2.138            | 1.976          | 1.976  | 0.162        | 0.162  | 0.03     | 2.144                          | 2.156  | 2.138                       | 2.194  |
| M 2,6   | 0.35    | 2.373            | 2.146          | 2.146  | 0.227        | 0.227  | 0.04     | 2.393                          | 2.407  | 2.373                       | 2.429  |

**UNIFIED Coarse Thread**  
**Nominal Dimensions According to ANSI B1.1**

Tap flank diameter production tolerances for ISO 2B  
 Nut threads limit dimensions - nut threads ANSI B1.1, 2B-3B



Coarse Pitch Threads Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

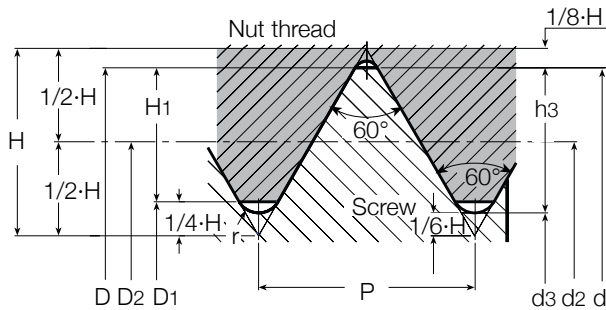
$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

| Nominal T.P.I Dia. |       | Pitch P | External Dia. d=D | Flank Dia. d2=D2 | Minor diameter |          | Pitch diameter Tap tolerance 2B |        | Pitch diameter Nut tolerance |         |         |
|--------------------|-------|---------|-------------------|------------------|----------------|----------|---------------------------------|--------|------------------------------|---------|---------|
|                    |       |         |                   |                  | Nut D1         | Screw h3 | Min.                            | Max.   | max. 2B/3B                   | max. 2B | max. 3B |
| UNC#1              | 64    | 0.397   | 1.854             | 1.598            | 1.425          | 1.367    | 1.610                           | 1.623  | 1.598                        | 1.664   | 1.646   |
| UNC# 2             | 64    | 0.454   | 2.184             | 1.890            | 1.694          | 1.628    | 1.902                           | 1.915  | 1.890                        | 1.961   | 1.943   |
| UNC#3              | 48    | 0.529   | 2.515             | 2.172            | 1.941          | 1.864    | 2.184                           | 2.197  | 2.172                        | 2.248   | 2.228   |
| UNC# 4             | 40    | 0.635   | 2.845             | 2.433            | 2.156          | 2.065    | 2.446                           | 2.459  | 2.433                        | 2.517   | 2.494   |
| UNC# 5             | 40    | 0.635   | 3.175             | 2.764            | 2.487          | 2.395    | 2.776                           | 2.789  | 2.764                        | 2.847   | 2.827   |
| UNC# 6             | 32    | 0.794   | 3.505             | 2.990            | 2.647          | 2.532    | 3.105                           | 3.028  | 2.990                        | 3.084   | 3.058   |
| UNC# 8             | 32    | 0.794   | 4.166             | 3.650            | 3.307          | 3.193    | 3.675                           | 3.688  | 3.650                        | 3.746   | 3.721   |
| UNC# 10            | 24    | 1.058   | 4.826             | 4.138            | 3.680          | 3.528    | 4.163                           | 4.176  | 4.138                        | 4.247   | 4.219   |
| UNC# 12            | 24    | 1.058   | 5.486             | 4.798            | 4.341          | 4.188    | 4.823                           | 4.836  | 4.798                        | 4.910   | 4.882   |
| UNC 1/4"           | 20    | 1.270   | 6.350             | 5.524            | 4.976          | 4.793    | 5.575                           | 5.588  | 5.524                        | 5.646   | 5.616   |
| UNC 5/16"          | 18    | 1.411   | 7.938             | 7.021            | 6.411          | 6.205    | 7.071                           | 7.084  | 7.021                        | 7.155   | 7.120   |
| UNC 3/8"           | 16    | 1.588   | 9.525             | 8.494            | 7.805          | 7.577    | 8.545                           | 8.557  | 8.494                        | 8.639   | 8.603   |
| UNC 7/16"          | 14    | 1.814   | 11.112            | 9.934            | 9.149          | 8.887    | 9.985                           | 9.997  | 9.934                        | 10.089  | 10.051  |
| UNC 1/2"           | 13    | 1.954   | 12.700            | 11.430           | 10.584         | 10.302   | 11.481                          | 11.494 | 11.430                       | 11.595  | 11.552  |
| UNC 9/16"          | 12    | 2.117   | 14.288            | 12.913           | 11.996         | 11.692   | 12.964                          | 12.977 | 12.913                       | 13.086  | 13.043  |
| UNC 5/8"           | 11    | 2.309   | 15.875            | 14.376           | 13.376         | 13.043   | 14.427                          | 14.440 | 14.376                       | 14.559  | 14.514  |
| UNC 3/4"           | 10    | 2.540   | 19.050            | 17.399           | 16.229         | 15.933   | 17.450                          | 17.463 | 17.399                       | 17.595  | 17.544  |
| UNC 7/8"           | 9     | 2.822   | 22.225            | 20.391           | 19.169         | 18.763   | 20.455                          | 20.467 | 20.391                       | 20.599  | 20.546  |
| UNC 1"             | 8     | 3.175   | 25.400            | 23.338           | 21.963         | 21.504   | 23.401                          | 23.414 | 23.338                       | 23.561  | 23.505  |
| UNC 1 1/8"         | 7     | 3.629   | 28.575            | 26.218           | 24.648         | 24.122   | 26.294                          | 26.319 | 26.218                       | 26.457  | 26.398  |
| UNC 1 1/4"         | 7     | 3.629   | 31.750            | 29.393           | 27.823         | 27.297   | 29.469                          | 29.494 | 29.393                       | 29.637  | 29.576  |
| UNC 1 3/8"         | 6     | 4.233   | 34.925            | 32.174           | 30.343         | 29.731   | 32.250                          | 32.276 | 32.174                       | 32.438  | 32.372  |
| UNC 1 1/2"         | 6     | 4.233   | 38.100            | 35.349           | 33.518         | 32.906   | 35.425                          | 35.451 | 35.349                       | 35.616  | 35.550  |
| UNC 1 3/4"         | 5     | 5.080   | 44.450            | 41.151           | 38.951         | 38.217   | 41.241                          | 41.266 | 41.151                       | 41.445  | 41.372  |
| UNC 2"             | 4 1/2 | 5.644   | 50.800            | 47.135           | 44.689         | 43.876   | 47.235                          | 47.260 | 47.135                       | 47.450  | 47.371  |
| UNC 2 1/4"         | 4 1/2 | 5.644   | 57.150            | 53.485           | 51.039         | 50.226   |                                 |        | 53.485                       | 53.805  | 53.726  |
| UNC 2 1/2"         | 4     | 6.350   | 63.500            | 59.375           | 56.627         | 55.710   |                                 |        | 59.375                       | 59.718  | 59.632  |
| UNC 2 3/4"         | 4     | 6.350   | 69.850            | 65.725           | 62.977         | 62.060   |                                 |        | 65.725                       | 66.073  | 65.987  |
| UNC 3"             | 4     | 6.350   | 76.200            | 72.075           | 69.327         | 68.410   |                                 |        | 72.075                       | 72.428  | 72.339  |
| UNC 3 1/4"         | 4     | 6.350   | 82.550            | 78.425           | 75.677         | 74.760   |                                 |        | 78.425                       | 78.783  | 78.694  |
| UNC 3 1/2"         | 4     | 6.350   | 88.900            | 84.775           | 82.027         | 81.110   |                                 |        | 84.775                       | 85.183  | 85.049  |
| UNC 3 3/4"         | 4     | 6.350   | 95.250            | 91.125           | 88.377         | 87.460   |                                 |        | 91.125                       | 91.493  | 91.402  |
| UNC 4"             | 4     | 6.350   | 101.600           | 97.475           | 94.727         | 93.810   |                                 |        | 97.475                       | 97.848  | 97.757  |

**UNIFIED Fine Thread  
Nominal Dimensions According to ANSI B1.1**

Tap flank diameter production tolerances for ISO 2B  
Nut threads limit dimensions - nut threads ANSI B1.1, 2B-3B



Coarse Pitch Threads Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

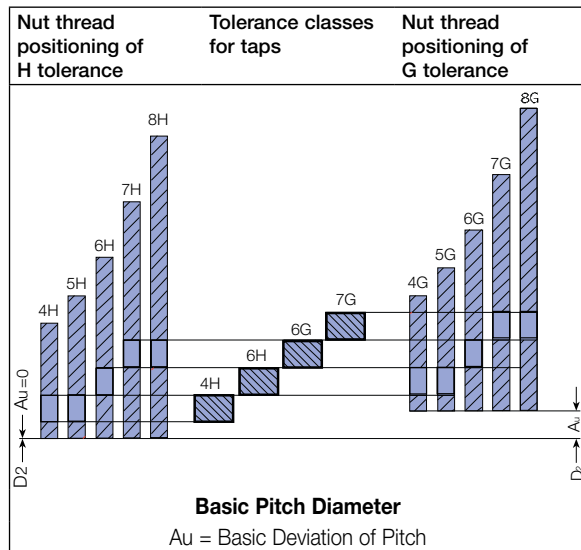
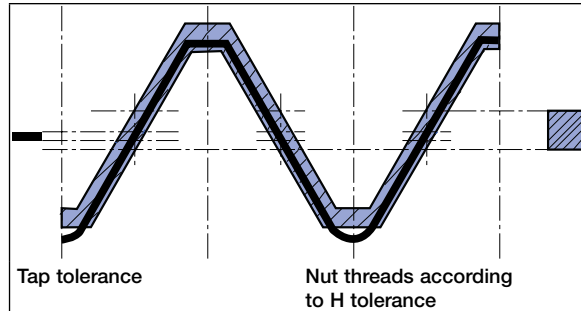
$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

| Nominal T.P.I Dia. | Pitch P | External Dia. d=D | Flank Dia. d2=D2 | Minor diameter |          | Pitch diameter Tap tolerance 2B |        | Pitch diameter Nut tolerance |         |         |        |
|--------------------|---------|-------------------|------------------|----------------|----------|---------------------------------|--------|------------------------------|---------|---------|--------|
|                    |         |                   |                  | Nut D1         | Screw h3 | Min.                            | Max.   | max. 2B/3B                   | max. 2B | max. 3B |        |
| UNF#0              | 80      | 0.318             | 1.524            | 1.318          | 1.181    | 1.135                           | 1.331  | 1.344                        | 1.318   | 1.377   | 1.361  |
| UNF#1              | 72      | 0.353             | 1.854            | 1.626          | 1.473    | 1.422                           | 1.638  | 1.651                        | 1.626   | 1.689   | 1.674  |
| UNF#2              | 64      | 0.397             | 2.184            | 1.928          | 1.755    | 1.697                           | 1.941  | 1.953                        | 1.928   | 1.996   | 1.979  |
| UNF#3              | 56      | 0.454             | 2.515            | 2.220          | 2.024    | 1.958                           | 2.233  | 2.245                        | 2.220   | 2.291   | 2.273  |
| UNF#4              | 48      | 0.529             | 2.845            | 2.502          | 2.271    | 2.195                           | 2.515  | 2.527                        | 2.502   | 2.581   | 2.560  |
| UNF#5              | 44      | 0.577             | 3.175            | 2.799          | 2.550    | 2.466                           | 2.812  | 2.824                        | 2.799   | 2.880   | 2.860  |
| UNF#6              | 40      | 0.635             | 3.505            | 3.094          | 2.817    | 2.725                           | 3.108  | 3.119                        | 3.094   | 3.180   | 3.157  |
| UNF#8              | 36      | 0.706             | 4.166            | 3.708          | 3.401    | 3.299                           | 3.721  | 3.734                        | 3.708   | 3.800   | 3.777  |
| UNF#10             | 32      | 0.794             | 4.826            | 4.310          | 3.967    | 3.853                           | 4.336  | 4.348                        | 4.310   | 4.409   | 4.384  |
| UNF#12             | 28      | 0.907             | 5.486            | 4.897          | 4.503    | 4.374                           | 4.923  | 4.935                        | 4.897   | 5.004   | 4.976  |
| UNF 1/4"           | 28      | 0.907             | 6.350            | 5.761          | 5.367    | 5.237                           | 5.799  | 5.812                        | 5.761   | 5.870   | 5.842  |
| UNF 5/16"          | 24      | 1.058             | 7.938            | 7.249          | 6.792    | 6.640                           | 7.287  | 7.300                        | 7.249   | 7.371   | 7.341  |
| UNF 3/8"           | 24      | 1.058             | 9.525            | 8.837          | 8.379    | 8.227                           | 8.875  | 8.887                        | 8.837   | 8.961   | 8.931  |
| UNF 7/16"          | 20      | 1.270             | 11.112           | 10.287         | 9.738    | 9.555                           | 10.338 | 10.351                       | 10.287  | 10.424  | 10.391 |
| UNF 1/2"           | 20      | 1.270             | 12.700           | 11.874         | 11.326   | 11.143                          | 11.925 | 11.938                       | 11.874  | 12.017  | 11.981 |
| UNF 9/16"          | 18      | 1.411             | 14.288           | 13.371         | 12.761   | 12.555                          | 13.421 | 13.434                       | 13.371  | 13.520  | 13.482 |
| UNF 5/8"           | 18      | 1.411             | 15.875           | 14.958         | 14.348   | 14.143                          | 15.009 | 15.022                       | 14.958  | 15.110  | 15.072 |
| UNF 3/4"           | 16      | 1.588             | 19.050           | 18.019         | 17.330   | 17.102                          | 18.070 | 18.082                       | 18.019  | 18.184  | 18.143 |
| UNF 7/8"           | 14      | 1.814             | 22.225           | 21.046         | 20.262   | 20.000                          | 21.110 | 21.123                       | 21.046  | 21.224  | 21.181 |
| UNF 1"             | 12      | 2.117             | 25.400           | 24.026         | 23.109   | 22.804                          | 24.089 | 24.102                       | 24.026  | 24.219  | 24.171 |
| UNF 1*1/8"         | 12      | 2.117             | 28.575           | 27.201         | 26.284   | 25.979                          | 27.252 | 27.277                       | 27.201  | 27.339  | 27.351 |
| UNF 1*1/4"         | 12      | 2.117             | 31.750           | 30.376         | 29.459   | 29.154                          | 30.427 | 30.452                       | 30.376  | 30.579  | 30.528 |
| UNF 1*3/8"         | 12      | 2.117             | 34.925           | 33.551         | 32.634   | 32.329                          | 33.602 | 33.627                       | 33.551  | 33.759  | 33.706 |
| UNF 1*1/2"         | 12      | 2.117             | 38.100           | 36.726         | 35.809   | 35.504                          | 36.777 | 36.802                       | 36.726  | 36.937  | 36.886 |

### Tap Tolerances

Tolerance classes of taps and tolerance positions for screw threads as per ISO metric standard.



### For Optimum Tapping Conditions, Reduced Machining Times and Increased Tap Life

#### Selection of the Most Suitable Tap

As a general rule, materials with deformation capability of at least 10% can be cold-formed. To decide on the most suitable tap, please refer to the tap recommendation table on page 412.

#### Pre-Tapping Holes

Check that the holes are within the prescribed size range depending on the application (see table on page 428) The holes should be clean and swarf-free.

#### Lubrication

Frequently the lubricant content of the coolant used for general machining is too low for tapping.

- If it is not possible to increase the lubricant content, following are some possible solutions:
- A separate lubricating unit can be connected to the machine control to deliver the required quantity of concentrated emulsion into the core hole or onto the tap. Tapping in separate operations allows the use of the ideal tapping lubricant.

#### Tapping Speeds

The tapping speed has a great influence on chip flow and the life of the tap. It is worthwhile to establish the ideal speed by tapping trials. For recommended initial values, see table on page 412. In addition, the following should be taken into consideration: characteristics of the material, machine and clamping method.

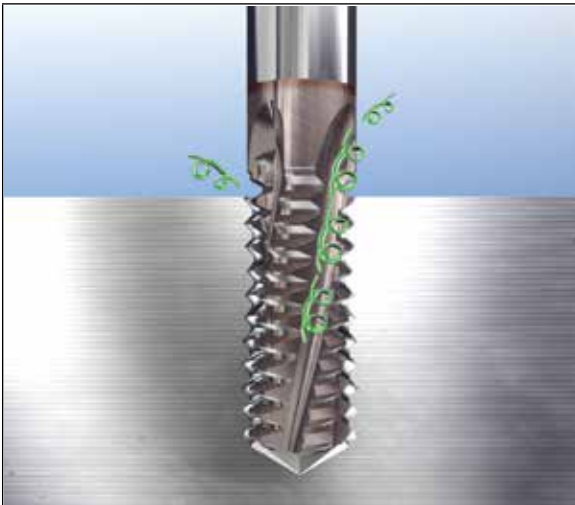
#### Effects of Unsuitable Tapping Speed

- forced tapping
- tap lead chipping caused by overloaded cutting tooth
- torn threads
- unsatisfactory tap life
- rejected threads



### Chip Expulsion

Tap selection is also influenced by the type of hole being threaded. Through hole tapping usually requires a tap that pushes the chips out in front of the cutting edge and through the other end of the hole. A bottom hole tap must pull chips up and out of the hole.



### Tap Jamming

Some possible causes of tap jamming are:

- unsuitable tap
- tap with incorrect cutting geometry
- unsuitable coolant for material
- insufficient coolant
- axial pressure (pull or push) on the tap
- core hole too small
- breaks in walls of core hole
- speed too high or too low
- swarf trapped in the hole
- incorrect alignment of tap and core hole
- tap eccentricity

### Results of Tap Jamming

- torn threads
- short tap life
- rejected threads
- tap breakage
- scrap workpieces

### Tap Mounting

The tap must be mounted on the axis of the core hole. On non-synchronized machines (feed/speed) we recommend using a tapping spindle (for **ISCAR GTI, GTIN** collets, see page 445)

### Tapping Heads

As a rule, with non-synchronized machine spindles (feed/ speed), the feed rate should be programmed approximately 5-10% lower than the thread pitch. In these cases, a tapping chuck must be used which will compensate the difference between the feed rate and the thread pitch. It is important that the tension spring in the axial compensation is set to a minimum pressure to avoid axially loading the tap. The compression spring should be tensioned so the tap starts to cut by compressing the spring up to one-half pitch.

### Important

Verify that the correct speed has been selected. Ensure that ample lubricating coolant is being used. Machine and equipment stability are essential for optimal performance and results.

### Forming Taps

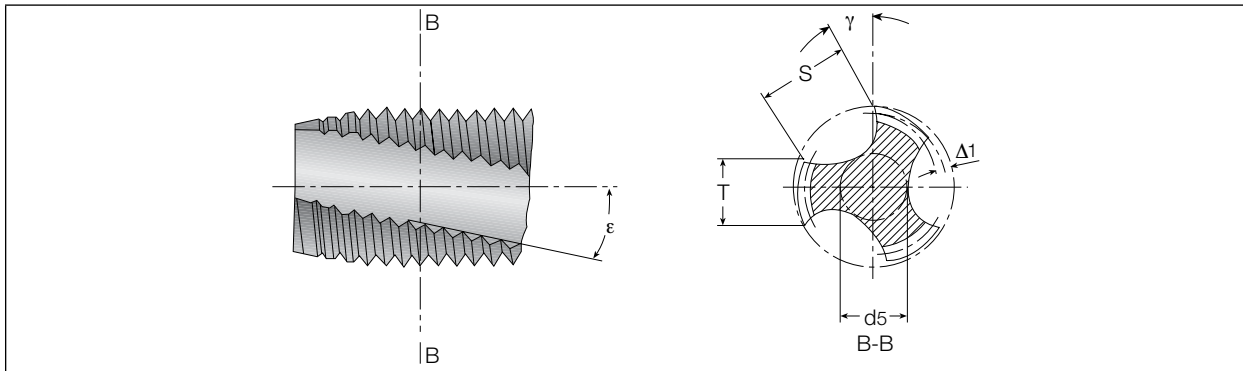
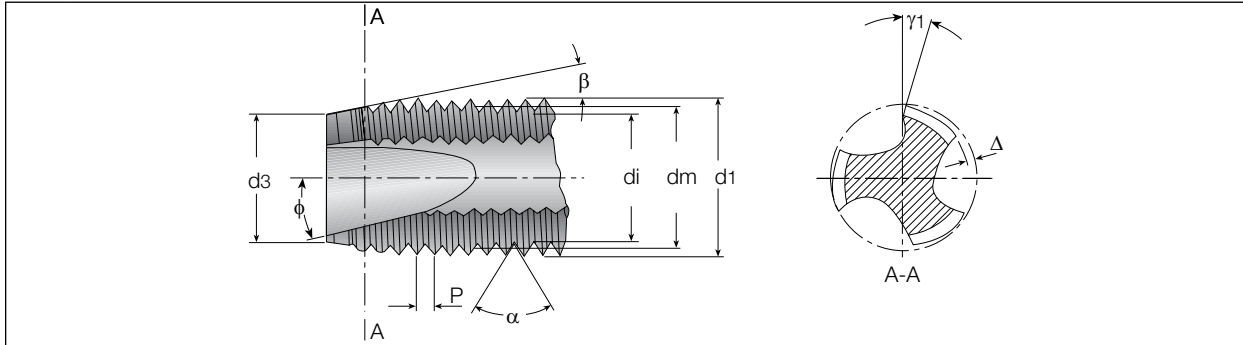
Forming taps (roll forming or cold forming) produce threads by deforming the material near the hole walls rather than by cutting the material. This method often works well in ductile materials. However, in brittle materials it often results in unsatisfactory threads.

Torque requirements for forming taps are considerably higher than for cutting taps. When forming taps are used, chuck capacity must be decreased by 25%. Forming taps do not produce chips.

## Troubleshooting

| Problem                                     | Cause   | Solution   |
|---|---|--|
| <b>Tapped hole oversized</b>                | Incorrect tap (cutting geometry unsuitable for application).                            | Use tap selected from the relevant material group.   |
|   | Faulty alignment.   | Ensure that the tap is correctly aligned with the core hole axis.  |
|   | Tap jamming.  | Improve lubrication and direction of coolant<br>Adjust cutting speed.  |
|   | Incorrectly reground tap (lead tip is not concentric).                                  | Regrind tap.   |
| <b>Stripped threads</b>                     | Incorrect tap (cutting geometry incorrect for application).                             | Use a tap from the relevant material group.  |
|   | Spindle speed and feed rate are not synchronized.                                       | Check feed rate programming and/or pitch of leading spindle. Use a tapping spindle with axial float ( <b>GTI/GTIN</b> ). |
|   | Insufficient starting pressure exerted on tap (causes peeling).                         | Increase starting pressure.  |
| <b>Bell mouthed tapped hole</b>             | Incorrect starting pressure.  | Use a tapping spindle with axial float ( <b>GTI/GTIN</b> ).  |
| <b>Unsatisfactory thread surface finish</b> | Incorrect tap (cutting geometry unsuitable for application).                            | Select tap for the relevant material group.  |
|   | The tap is blunt.   | Replace or regrind tap.  |
|   | Tap badly re-ground.  | Regrind tap. Check that cutting geometry is suitable for material.   |
|   | Incorrect lubricant, concentration or quantity.   | Ensure the use of a suitable coolant and an ample supply.  |
| <b>Partial tap chipping</b>                 | Swarf jamming.  | Check cutting speed. Use alternative tap.  |
|   | Tap has jammed against bottom of pre-hole.  | Check hole and thread depths. Drill a deeper pre-hole.   |
|   | Tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth). | Ensure that correct dimensions are maintained when regrinding.   |
|   | Irregular workpiece material structure.   | Adjust cutting speed. Improve lubricant quality of coolant.  |
| <b>Excessive tap wear</b>                   | Incorrect cutting speed.  | Adjust cutting speed to suit workpiece material.   |
|   | Coolant lacking in lubricating qualities and/or quantity.                               | Ensure the use of a suitable coolant and an ample supply.<br>Check that the coolant is reaching the cutting zone.        |
|   | Surface of the pre-hole is compacted.   | Check pre-hole drilling conditions (drill carefully to reduce risk of surface compacting). Check drill cutting edges.    |
| <b>Tap breakage</b>                         | Incorrect tap in use (cutting geometry unsuitable for application).                     | Use tap from the relevant material group.  |
|   | Centering error.  | Ensure that axes of tap and pre-hole are aligned.  |
|   | Blunt tap.  | regrind tap.   |
|   | Tap has reached bottom of pre-hole.   | Use tapping spindle with axial float and slipping clutch ( <b>GTI/GTIN</b> ).  |
|   | Pre-hole too small.   | Check for correct pre-hole size, see pages 428-429.  |

Tap Nomenclature (Regrinding)



- d1 Major diameter
- dm Flank diameter
- di Minor diameter
- d3 Chamfer diameter
- P Pitch
- $\alpha$  Flank angle
- $\beta$  Chamfer angle
- $\phi$  Gun nose angle
- $\gamma$  Gun nose front rake angle
- $\Delta$  Chamfer relief
- $\Delta 1$  Pitch diameter relief on the land
- $\gamma_1$  Rake angle
- T Width of land
- S Flute width
- d5 Web thickness
- $\epsilon$  Angle of spiral flute

## Regrinding

### Regrinding

Tap regrinding takes place in two steps:

- 1 regrinding of relieved chamfer
- 2 regrinding of flutes (see picture 1)

### Regrinding of Relieved Chamfer

It is recommended that the resharpening be executed either on specific tap regrinding machines or on conventional resharpening machines equipped with an auxiliary device to generate the circular back relief. Picture 2 shows regrinding done with the cylindrical surface of a grinding wheel. Before regrinding, verify that the tap, fixed between points or on the pincer, runs concentric. Also ensure that angle B is in the correct order to keep the same number of threads on chamfer.

### Resharpening of Flutes

The rake angle  $\gamma$  is obtained by moving the tap axis, in relation to the regrinding surface, of an amount X to be calculated with the formula:  $X = 1/2 d_1 \sin (\gamma)$  (see picture 3).  
( $d_1$  =tap major diameter)

Example:

**Tap 10 X 1,5 to cut on steel  
strength = 87 ksi**

**$d_1 = 10 \text{ mm}$  ;  $\gamma = 15^\circ$  ;  
 $\sin (\gamma) = 0,25882$ ;**

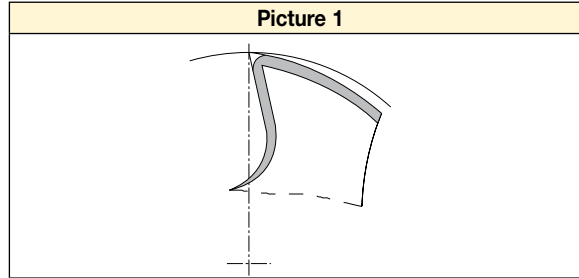
$$X = \frac{0,25885}{2} \times 10 ; X = .051''$$

On all taps with spiral flutes, it is possible to find the pitch of the spiral in reference to the lead screw necessary for resharpening. In case of using taps equipped with a deburring tool, it is necessary to extend the flutes according to the supplier's recommendation. As the wear on a tap is mainly on the chamfer area, for taps with a gun nose, regrinding the flutes can be done on the front area only (see picture 4).

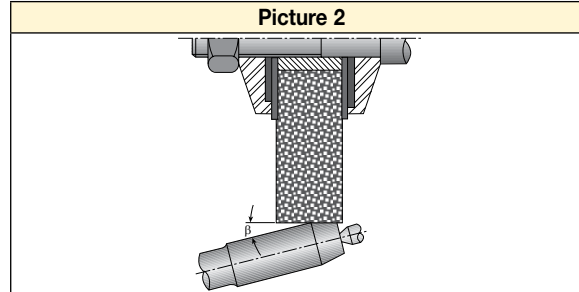
In cases where the thread flanks are worn (in addition to the active edges), regrinding as described above is impractical. In this case restoration is done, by cutting the chamfer away (thus creating a shorter tap) and then reproducing the chamfer with same angle and relief. (see picture 5)

In the absence of special regrinding machines, such restoration is advisable for regrinding taps with spiral flutes. This is because regrinding the flutes becomes unnecessary.

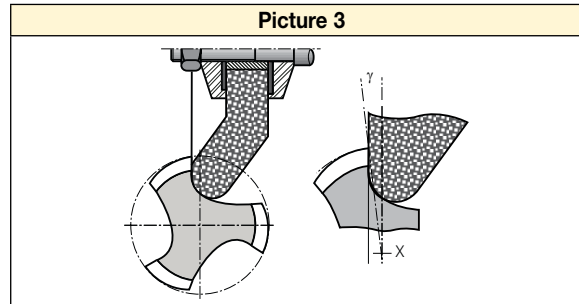
Picture 1



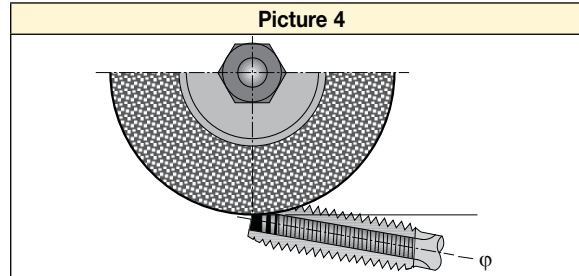
Picture 2



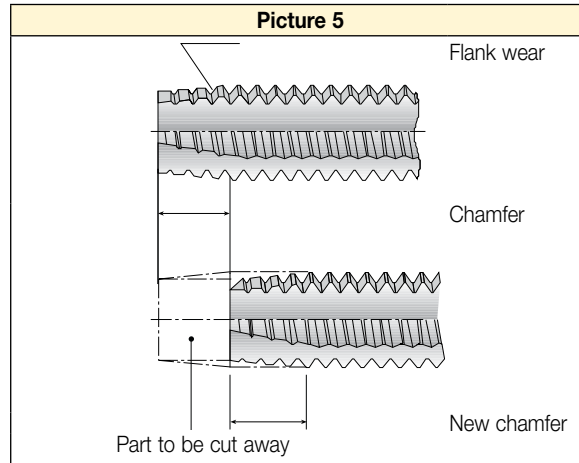
Picture 3



Picture 4



Picture 5



## General Recommendations (Regrinding)

### Maintenance

It is important to periodically regrind the worn tap. This is to avoid permanent damage or even tool breakage.

### The Grinding Wheels

The structure and grain of grinding wheels must be appropriate for the tap to be resharpened.

### Taps for Cast Iron

Taps used on cast iron can rarely be resharpened, as it is very abrasive and tends to wear the flank in such a way that it becomes grossly out of tolerance.

### Taps for Aluminum

After regrinding it is advisable to remove the steel burrs with a wire brush.

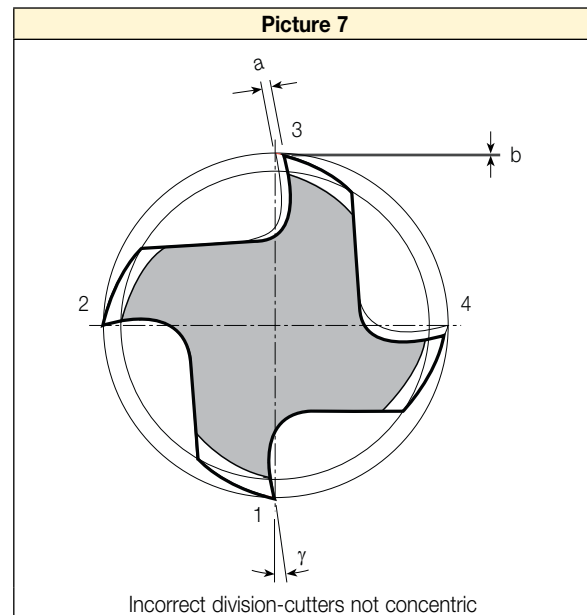
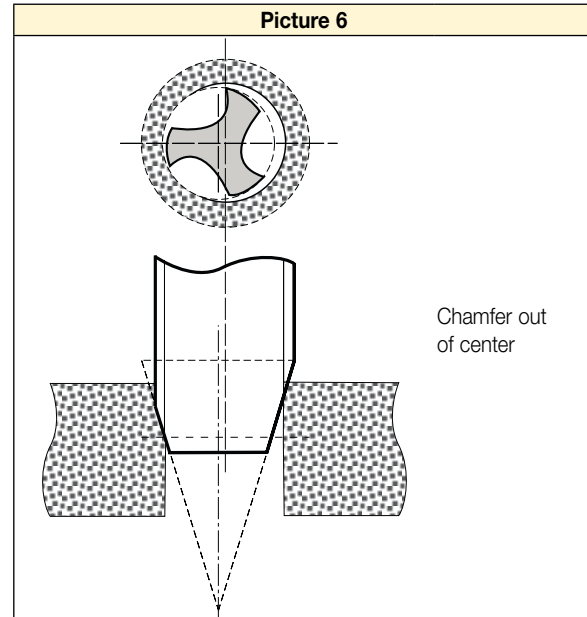
### Tap Inspection

It is important to inspect the tap after regrinding to ensure that all of the dimensions and angles have remained according to its specifications.

### Controls (tests)

Once the tap is resharpened, it is always best to test it to correctly obtain the same threads as when the tap was new.

- The chamfer must be perfectly on axis in order to avoid the effects of picture 6. The cutters must have correct divisions.
- The results of resharpening with an incorrect division is shown in picture 7.
- The length and number of threads in chamfer must be precisely identical to those of the new tap.



**Test Report Form**

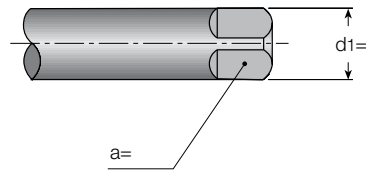
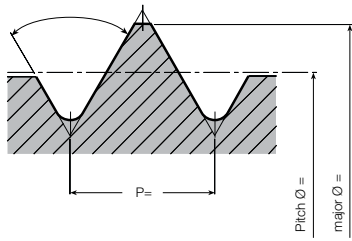
Company \_\_\_\_\_ Department \_\_\_\_\_  
 Address \_\_\_\_\_ Phone \_\_\_\_\_  
 \_\_\_\_\_

**Tool**

Description of the tap being used at present thread diameter and pitch \_\_\_\_\_  
 \_\_\_\_\_  
 Make \_\_\_\_\_ Type \_\_\_\_\_  
 Class of tolerance \_\_\_\_\_

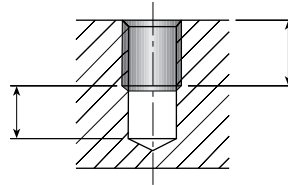
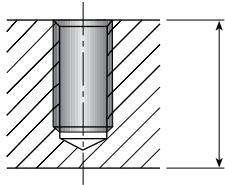
Right-hand cutting  Left-hand cutting \_\_\_\_\_  
 Fluteless  Right-hand spiral flutes \_\_\_\_\_ degrees \_\_\_\_\_  
 Straight flutes  Left-hand spiral flutes \_\_\_\_\_ degrees \_\_\_\_\_  
 Spiral point  Length of chamfer \_\_\_\_\_ inch \_\_\_\_\_

Additional information for special pitches or thread forms \_\_\_\_\_  
 Major diameter \_\_\_\_\_  
 Pitch diameter \_\_\_\_\_ Flank angle \_\_\_\_\_ degrees \_\_\_\_\_  
 Minor diameter \_\_\_\_\_



**Hole**

Tap drill diameter \_\_\_\_\_ Length of hole \_\_\_\_\_  
 Through hold  Depth of full thread \_\_\_\_\_  
 Blind hole \_\_\_\_\_  
 Special requirements or unusual characteristics of the threaded product \_\_\_\_\_



Unusual characteristics of the threaded product or of the tapping method. \_\_\_\_\_  
 ie. counterbore, tapping on an angle, etc. \_\_\_\_\_

**Test Report Form**

|                              |   |
|------------------------------|---|
| <b>Tapping speed</b>         | _____ SFM<br>_____ RPM  |
| <b>Lubricant</b>             | <input type="checkbox"/> none <input type="checkbox"/> Emulsion _____% <input type="checkbox"/> Cutting oil <input type="checkbox"/> Other _____<br><input type="checkbox"/> Under pressure <input type="checkbox"/> Vaporization _____   |
| <b>Machine</b>               | Type _____ <input type="checkbox"/> Horizontal Tapping <input type="checkbox"/> Vertical Tapping  |
| <b>Driving</b>               | <input type="checkbox"/> Tap revolvers      Number of spindles _____<br><input type="checkbox"/> Workpiece revolvers  |
| <b>Feed</b>                  | <input type="checkbox"/> Without <input type="checkbox"/> Power <input type="checkbox"/> CNC _____%   |
| <b>Toolholder</b>            | <input type="checkbox"/> Rigid <input type="checkbox"/> Floating <input type="checkbox"/> Safety clutch<br>Make _____ Type _____  |
| <b>Material to be tapped</b> | Material no. or designation _____<br>Composition, if known _____<br>Tensile strength or hardness _____ksi      _____HB      _____HRc<br>Chip form <input type="checkbox"/> Short <input type="checkbox"/> Long<br><input type="checkbox"/> Annealed steel <input type="checkbox"/> Hardened steel <input type="checkbox"/> Heat treated steel |
| More details: _____          |   |
| _____                        |   |
| _____                        |   |
| _____                        |   |
| _____                        |   |
| _____                        |   |
| _____                        |   |
| _____                        |   |
| _____                        |   |
| Contact person               | _____   |
| Date                         | _____ Signature _____   |



## Thread Standards

| Cylindrical Threads |   |
|---------------------|---|
| <b>UNC</b>          | Unified coarse thread series  |
| <b>UNF</b>          | Unified fine thread series  |
| <b>UNEF</b>         | Unified extra-fine thread series  |
| <b>UN</b>           | Constant pitch series - threads with constant pitch of T.P.I. 4, 6, 8, 12, 16, 20, 28, 32             |
| <b>UNS</b>          | Selected combinations - threads with special dia. - pitch combinations                                |
| <b>UNJ</b>          | Unified threads with constant pitch with radius on minor diameter from 0.15011 pitch to 0.18042 pitch |
| <b>UNJC</b>         | Unified coarse thread with radius on minor diameter from 0.15011 pitch to 0.18042 pitch               |
| <b>UNJEF</b>        | Unified extra-fine thread with radius on minor diameter from 0.15011 pitch to 0.18042 pitch           |
| <b>UNJF</b>         | Unified fine threads with radius on minor diameter from 0.15011 pitch to 0.18042 pitch                |

| Pipe Cylindrical Threads |  |
|--------------------------|--|
| <b>NPS</b>               | Cylindrical threads for pipe   |
| <b>NPSC</b>              | American Standard for pipe coupling                                      |
| <b>NPSF</b>              | American Standard for internal threads on pipe, dryseal                  |
| <b>NPSH</b>              | American Standard for cylindrical threads for pipes, joints and nipples  |
| <b>NPSI</b>              | American Standard for internal cylindrical threads on pipe (dryseal)     |
| <b>NPSL</b>              | American Standard for cylindrical threads on pipes for nuts              |
| <b>NPSM</b>              | American Standard for cylindrical threads on pipes for mechanical joints |
| <b>NGO</b>               | American National pipe threads for gas exhaust                           |
| <b>NGS</b>               | American National pipe threads for gas                                   |

| Taper Pipe Threads |  |
|--------------------|--|
| <b>ANPT</b>        | Taper pipe threads for Army, Navy and Airforce |
| <b>F-PTE</b>       | Taper pipe fine threads (dryseal)              |

| Taper Pipe Threads         |   |
|----------------------------|---|
| <b>NPT</b>                 | Taper pipe threads                              |
| <b>NPTF</b>                | Taper pipe threads (dryseal)                    |
| <b>NPTR</b>                | Taper pipe threads for railway equipment        |
| <b>PTF-SAE SHORT</b>       | Taper pipe short threads (dryseal)-SAE          |
| <b>PTF-SPL SHORT</b>       | Taper pipe special threads (dryseal)-SAE        |
| <b>PTF-SPL EXTRA SHORT</b> | Extra short special threads (dryseal)-SAE       |
| <b>SPL-PTF</b>             | Special taper pipe dryseal threads              |
| <b>NGT</b>                 | National American taper pipe threads            |
| <b>SGT</b>                 | Special taper pipe threads                      |
| <b>API</b>                 | American Petroleum Institute taper pipe threads |

| Trapezoidal and Saw Tooth Threads |   |
|-----------------------------------|---|
| <b>ACME-C ACME</b>                | Self-centering threads                      |
| <b>ACME-G ACME</b>                | General application                         |
| <b>STUB-ACME</b>                  | ACME Flat threads with reduced thread depth |
| <b>60° STUB-ACME</b>              | ACME Flat threads with 60° flank angle      |
| <b>N BUTT</b>                     | American National Saw tooth threads         |

| British Standard |   |
|------------------|---|
| <b>BSW</b>       | Whitworth British Standard coarse pitch                                       |
| <b>BSF</b>       | Whitworth British Standard fine pitch   |
| <b>WHIT</b>      | Whitworth Standard special pitch  |
| <b>R</b>         | British Standard external threading for taper pipe (dryseal) (already BSP-Tr) |
| <b>Rc</b>        | British Standard internal threading taper thread for pipe (BSP-Tr)            |
| <b>Rp</b>        | British Standard cylindrical thread for pipe (already BSP.PI)                 |
| <b>BA</b>        | British Standard Association threads  |
| <b>BSC</b>       | British Standard threads for bicycles   |
| <b>CEI</b>       | British Standard for bicycles   |

## GTI / GTIN - Tapping Attachment

Compact tapping collet with tension and compression floating mechanism for ER32 collet chucks.  
A tapping collet for standard and rigid tapping operations. The **GTIN** ER32 collet makes tap removal and replacement easy, quick and reliable. Designed for stationary and rotating applications, the **GTIN** ER32 collets are economical and efficient due to the ability to use existing ER32 collet chucks (with various shank sizes and types).

### Applications:

The **GTIN** ER32 tapping collet is designed especially for CNC mill/turn centers, for regular and rigid tapping.

### Advantages:

Quick tap change with a front clamping nut

- Compact design for minimal clearance between the turret and chuck
- Fits every type of stationary and rotating ER32 collet chuck
- Positive tap drive with internal square driver
- Compensates for machine feed and tap pitch variance, resulting in greater thread accuracy
- Floating mechanism compensates for misalignment between tap and workpiece
- High accuracy due to tension and compression mechanism
- Available for all tap shank standards (DIN, ISO, ANSI, JIS)
- Tapping range M1-M16 (#0 to 5/8")
- Saves setup time by quick tap changing without removing **GTIN** from the machine
- Optimal for machines which have limited space between the turret and workpiece

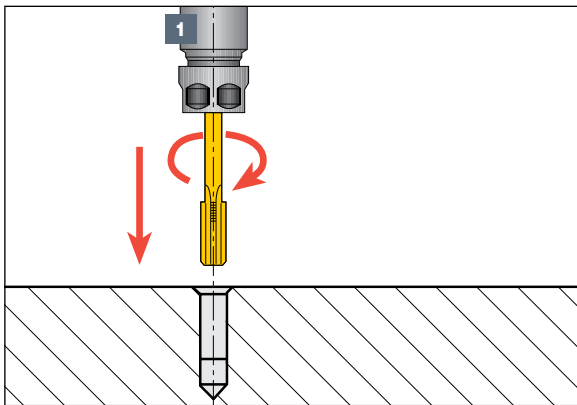


## GTI / GTIN - Tapping Attachment

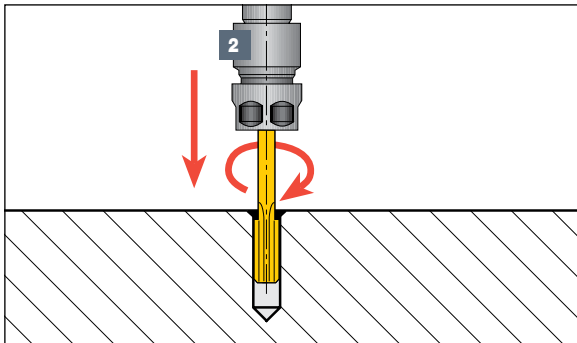
**Operation**

For through- and blind-hole tapping:

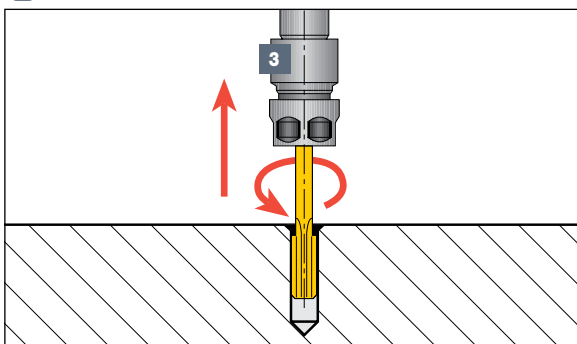
- 1 Enter feed rate according to thread pitch (or 1-2 % lower). Set spindle to starting point with 0.08 mm clearance.



- 2 Start spindle forward with right hand rotation until reaching desired depth.



- 3 Stop feed and rotation and reverse to starting point.

**Description:**

Short tap chucks for ER collets.

**Application:**

**Axial float/tension/compression type for CNC milling machines and lathes with reversing motors and rigid tapping.**

**Features:**

- Compensates for machine feed and tap pitch variance
- Floating mechanism compensates for misalignment between tap and workpiece
- Right- and left-hand tapping

**Advantages:**

- Practical and efficient tap holding by the ER spring collet without using jaw drive
- Compact design for minimal clearance applications
- Heavy duty design for high torque drive ensures the same accuracy as the tap itself

