



High Performance Cutting Tools

IDEAL PICK



Forbes & Company Limited

ICON GLOSSARY

TOOL MATERIAL

HSS-E High Speed Steel 5% Cobalt

STANDARD

ISO 529 ISO 529

DIN 374 DIN374

DIN 371 DIN371

DIN 376 DIN376

CLASS OF THREAD

6H 6H

6HX 6HX

CHAMFER

B/4-4.5P 4 to 4.5 Chamfer

C/2-3P 2 to 3 Chamfer

E/1.5-2P 1.5 to 2 Chamfer

SURFACE TREATMENT

BF Bright Finish

TiN Titanium Nitride Coating

TiAlN Titanium Aluminium Nitride Coating

TiCN Titanium Carbo Nitride Coating

HOLE TYPE

 Through Hole

 Blind Hole

WORKPIECE MATERIAL

P Steel

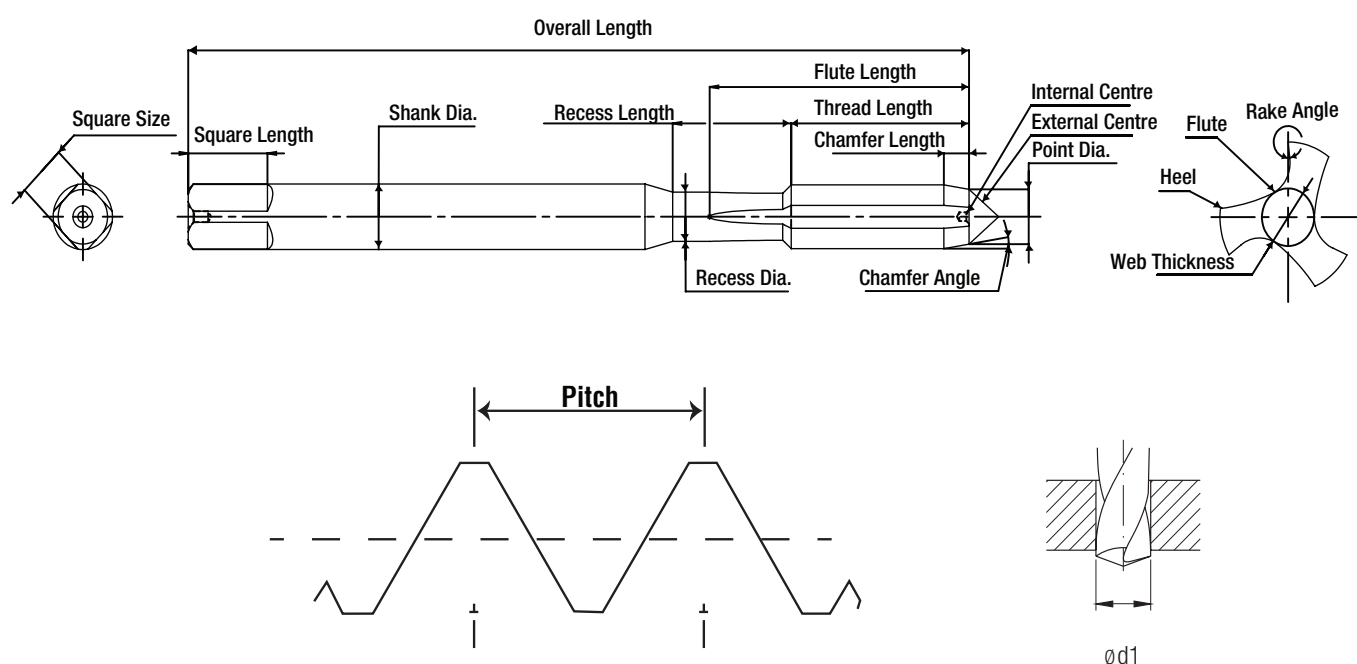
M Stainless Steel

K Cast Iron

N Non Ferrous

S Super Alloys

TAP NOMENCLATURE



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Common Workpiece Materials

P Steel

Steel is the most used workpiece material in metal cutting. Steel as a material is comprised mainly of iron and carbon, often with a modest mixture of alloying elements. Steel has a typical carbon content of .05% to 1.5 %

Plain Carbon Steel

This category of steels includes those materials that are a combination of iron and carbon with no alloying elements. As the carbon content in these materials is increased, the ductility of the material is reduced. The carbon content is usually 0.8%. The hardness varies from 90 up to 350HB

Typical uses of this steel include: Axles, shafts, tubes, forgings, welded constructions, structural steel, deep drawn and stamped products, pressure vessel steel, and a variety of cast steels.

Alloy Steels

Plain carbon steels are made up primarily of iron and carbon, while alloy steels include these same elements with many other elemental additions. The purpose of alloying steel is either to enhance the material's physical properties or its ultimate manufacturability. The physical property enhancements include improved toughness, tensile strength, hardenability, ductility and wear resistance. Alloyed steels have a carbon content lower than 1.7 % and alloying elements such as Ni, Cr, Mo, V and W.

The machinability of steel differs, depending on alloying elements, heat treatment and manufacturing process (forged, rolled, cast, etc.).

Components manufactured from this steel include Crank Shafts, Connecting Rods, Cam Shafts, Hubs, Axles, Shafts, other forging components.

M Stainless steel

As the name implies, this group of materials is designed to resist oxidation and other forms of corrosion, in addition to heat in some instances. These materials tend to have significantly greater corrosion resistance and strength at high temperatures than their plain or alloy steel counterparts due to the substantial additions of Chromium, Nickel, Molybdenum, Niobium and Titanium supply different characteristics, such as resistance towards corrosion and strength at high temperatures. These additions combine with Oxygen to create a passivating layer on the surface of the steel, which provides a non-corrosive property to the material.

Stainless steels are used extensively in the food processing, medical – surgical implants, chemical and petroleum industries to transfer corrosive liquids between processing and storage facilities. Stainless steels can be cold formed, forged, machined, welded or extruded.

Ferritic and martensitic stainless steel

Ferritic steels have magnetic properties. Martensitic stainless steels have relatively high carbon content, which make them hardenable. Weldability is low for both ferritic and martensitic and medium to low resistance against corrosion, which increases with a larger Cr-content.

Austenitic stainless steel

Austenitic Stainless steel are the most common and familiar types of stainless steel. They are most easily recognized as nonmagnetic. They are extremely formable and weldable, and they can be successfully used from cryogenic temperatures to the red-hot temperatures of furnaces and jet engines. They contain between about 16 and 25% chromium, and they can also contain nitrogen in solution, both of which contribute to their high corrosion resistance. Were it not for the cost of the nickel that helps stabilize their austenitic structure, these alloys would be used even more widely.

Work hardening produces hard surfaces and hard chips , which in turn lead to notch wear. It also creates adhesion and produces built-up edge. It has a relative machinability of 60%. The hardening condition can tear coating and substrate material from the edge, resulting in chipping and bad surface finish. Austenite produces tough, long, continuous chips, which are difficult to break. Generates lot of heat during machining.



Common Workpiece Materials

K Cast iron

Cast iron is an iron carbon mixture that is generally used to pour sand castings, as opposed to making billets or bar stock. It has excellent flow properties and therefore, when it is heated to extreme temperatures. Ideal material for complex cast shapes and intricate moulds.

This material is often used for automotive engine blocks, cylinder heads, valve bodies, manifolds, heavy equipment oil pans and machine bases.

Grey Cast Iron

Grey cast iron is an extremely versatile, very machinable relatively low strength cast iron used for pipe, automotive engine blocks, farm implements and fittings. This material receives its dark grey colour from the excess carbon in the form of graphite flakes, which give it its name. It has graphite in typical flake form and the main properties are low impact strength, good thermal conductivity, less heat when engine operates and low heat in cutting process; good dampening properties, absorbs the vibrations in the engine.

Malleable Cast Iron

When white cast iron castings are annealed, malleable iron castings are formed. Malleable iron castings result when hard, brittle cementite in white iron castings is transformed into tempered carbon or graphite in the form of rounded nodules or aggregate. The resulting material is a strong, ductile, tough and very machinable product that is used on a broad scope of applications.

Nodular Cast Iron

Nodular or “ductile” iron is used to manufacture a wide range of automotive engine components including cam shafts, crank shafts, bearing caps and cylinder heads. This material is also frequently used for heavy equipment cast parts as well as heavy machinery faceplates and guides. Nodular iron is strong, ductile, tough and extremely shock resistant.

Components manufactured from this material include hubs, tubing, rollers, exhaust manifolds, crankshafts, differential housings, bearing caps, exhaust manifolds, bedplates, turbo charger housings, clutch plates and fly wheels.

N Non-ferrous materials

Non-ferrous metals are metals that do not contain iron. Non-ferrous metals are used because of desirable properties such as low weight (e.g., Aluminium), higher conductivity (e.g., Copper), non-magnetic property or resistance to corrosion (e.g., Zinc).

Aluminium (Al) alloys comprising less than 12-13% Silicon (Si) represent the largest part.

LM2 (ADC 12)

One of the two most widely used alloys for all types of die-castings. Mainly used in Automobile Industry for manufacturing components like Crank case, cylinder head, transmission housings, brackets.

LM4

The most versatile of the alloys, has very good casting characteristics and is used for a very wide range of applications.

LM5

Suitable for sand and chill castings requiring maximum corrosion resistance. Mainly used for castings in marine application.

LM6

Suitable for large, intricate and thin walled castings in all types of moulds. Also used where corrosion resistance or ductility is required.

LM9

Used for applications especially in low pressure die casting, requiring the characteristics of LM6 with higher tensile strength after heat treatment.

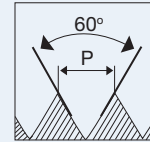
LM13

Used in applications where thermal stresses are more e.g Piston. This alloy can withstand higher temperature and load. It has a good wear resistance properties and machinability. But it requires heat treatment.

LM 24






Suitable for large, intricate and thin walled castings in all types of moulds, also used where corrosion resistance or ductility is required

Spiral Point Machine Taps


HOLE TYPE

HSS-E
6HX
DIN 371
DIN 374
DIN 376


- 1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

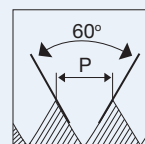
| M | DIN 371 | | | | | | |  |  |  |  |  |
|----------|---------|-----|---------------|----------------|--------|---------------|----------------|---|--|---|---|---|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | | | |
| M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 6 | 2.5 | FAB0203112 | FAB0203123 | FAB0204205 | FAB0204217 | FAB0204229 |
| M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 6 | 3.3 | FAB0203114 | FAB0203125 | FAB0204207 | FAB0204219 | FAB0204231 |
| M5 | 0.8 | 70 | 16 | 6 | 4.9 | 7 | 4.2 | FAB0203115 | FAB0203126 | FAB0204208 | FAB0204220 | FAB0204232 |
| M6 | 1 | 80 | 19 | 6 | 4.9 | 7 | 5 | FAB0203116 | FAB0203127 | FAB0204209 | FAB0204221 | FAB0204233 |
| M8 | 1.25 | 90 | 22 | 8 | 6.2 | 9 | 6.8 | FAB0203118 | FAB0203129 | FAB0204210 | FAB0204222 | FAB0204234 |
| M10 | 1.5 | 100 | 24 | 10 | 8 | 11 | 8.5 | FAB0203119 | FAB0203130 | FAB0204211 | FAB0204223 | FAB0204235 |

| DIN 376 | | | | | | | | | | | | | |
|---------|------|-----|----|----|---|----|------|------------|------------|------------|------------|------------|--|
| M12 | 1.75 | 110 | 28 | 9 | 7 | 10 | 10.3 | FAB0203120 | FAB0203131 | FAB0204212 | FAB0204224 | FAB0204236 | |
| M14 | 2 | 110 | 30 | 11 | 9 | 12 | 12 | FAB0203121 | FAB0203132 | FAB0204213 | FAB0204225 | FAB0204237 | |
| M16 | 2 | 110 | 32 | 12 | 9 | 12 | 14 | FAB0203122 | FAB0203133 | FAB0204214 | FAB0204226 | FAB0204238 | |

| DIN 374 | | | | | | | | | | | | | |
|---------|------|-----|----|----|-----|----|------|------------|------------|------------|------------|------------|--|
| M8 | 1 | 90 | 18 | 6 | 4.9 | 7 | 7 | FAB0204242 | FAB0204253 | FAB0204264 | FAB0204544 | FAB0204550 | |
| M10 | 1.25 | 100 | 22 | 7 | 5.5 | 8 | 8.8 | FAB0204243 | FAB0204254 | FAB0204265 | FAB0204545 | FAB0204551 | |
| M12 | 1.25 | 100 | 22 | 9 | 7 | 10 | 10.8 | FAB0204246 | FAB0204257 | FAB0204268 | FAB0204546 | FAB0204552 | |
| M12 | 1.5 | 100 | 22 | 9 | 7 | 10 | 10.5 | FAB0204245 | FAB0204256 | FAB0204267 | FAB0204547 | FAB0204553 | |
| M14 | 1.5 | 100 | 22 | 11 | 9 | 12 | 12.5 | FAB0204247 | FAB0204258 | FAB0204269 | FAB0204548 | FAB0204554 | |
| M16 | 1.5 | 100 | 22 | 12 | 11 | 12 | 14.5 | FAB0204249 | FAB0204260 | FAB0204271 | FAB0204549 | FAB0204555 | |

| Material Group | Material Description | Tensile Strength N/mm ² | Speed - Vc m/min (Coolant) | | | | |
|----------------|--|------------------------------------|----------------------------|-------------|-----------------|-------------|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | 10 - 12 (S) | 15 - 20 (S) | 20 - 25 (S) | | |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | | 15 - 20 (S) | 15 - 20 (S) | 15 - 20 (S) | 15 - 25 (S) |
| P2 | Medium- and High-Carbon Steels | <530 | | | 15 - 20 (S) | 15 - 20 (S) | 15 - 25 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | 8 - 12 (O) | 12 - 16 (S) | 15 - 20 (S) |
| K1 | Grey Cast Iron | 125-500 | | | 30 - 35 (S) (D) | | |
| K2 | Low- and Medium-Strength Ductile Irons | <600 | | 15 - 20 (S) | 20 - 25 (S) | | |
| K3 | High-Strength Ductile Irons | >600 | | 12 - 15 (S) | | | |
| N1 | Wrought Aluminium | - | 15 - 20 (S) | | | | |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 15 - 20 (S) | | | | |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | | | | | |
| N4 | Copper-, Brass-, Zinc | - | 25 - 30 (S) | | | | |

Spiral Point Machine Taps








HOLE TYPE

**HSS-E**

6HX

ISO
500



| Flute Type | | SPIRAL POINTED (SPPT) | | | | |
|-----------------------|----------------|---|---|---|---|---|
| Coating | | Bright | TiN | TiAlN | TiN | TiCN |
| Series Code | | SA1 | SA3 | SA4 | SAF3 | SAF5 |
| e Oil Oil pping | |  |  |  |  |  |
| | | | | | | |
| 2 | | | | | | |
| Square Length | Drill Diameter | | | | | |
| 5 | 2.5 | FAB0200647 | FAB0200648 | FAB0203044 | FAB0203060 | FAB0203077 |
| 6 | 3.3 | FAB0200659 | FAB0200661 | FAB0200662 | FAB0203061 | FAB0203078 |
| 7 | 4.2 | FAB0200671 | FAB0200673 | FAB0203046 | FAB0203062 | FAB0203079 |
| 8 | 5 | FAB0200682 | FAB0200684 | FAB0200685 | FAB0203063 | FAB0203080 |
| 9 | 6.8 | FAB0200694 | FAB0200696 | FAB0200697 | FAB0203065 | FAB0203082 |
| 8 | 11 | FAB0200718 | FAB0200720 | FAB0200721 | FAB0203068 | FAB0203085 |

| M | ISO 529 / IS 6175 Part 2 | | | | | | |
|----------|--------------------------|-----|---------------|----------------|--------|---------------|----------------|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter |
| M3 | 0.5 | 48 | 11 | 3.15 | 2.5 | 5 | 2.5 |
| M4 | 0.7 | 53 | 13 | 4 | 3.15 | 6 | 3.3 |
| M5 | 0.8 | 58 | 16 | 5 | 4 | 7 | 4.2 |
| M6 | 1 | 66 | 19 | 6.3 | 5 | 8 | 5 |
| M8 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 6.8 |
| M10 | 1.5 | 1.5 | 80 | 24 | 10 | 8 | 11 |

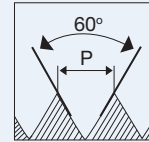
| M | ISO 529 / IS 6175 Part 3 | | | | | | | | | | | |
|-----|--------------------------|-----|----|------|-----|----|------|------------|------------|------------|------------|------------|
| M12 | 1.75 | 89 | 29 | 9 | 7.1 | 10 | 10.3 | FAB0200748 | FAB0200751 | FAB0203052 | FAB0203070 | FAB0203087 |
| M14 | 2 | 95 | 30 | 11.2 | 9 | 12 | 12 | FAB0200778 | FAB0200780 | FAB0203054 | FAB0203072 | FAB0203089 |
| M16 | 2 | 102 | 32 | 12.5 | 10 | 13 | 14 | FAB0200799 | FAB0200801 | FAB0203055 | FAB0203074 | FAB0203091 |

| MF | ISO 529 / IS 6175 Part 2 | | | | | | | | | | | |
|-----|--------------------------|----|----|---|-----|---|-----|------------|------------|------------|------------|------------|
| M8 | 1 | 69 | 19 | 8 | 6.3 | 9 | 7 | FAB0203034 | FAB0203041 | FAB0203048 | FAB0203064 | FAB0203081 |
| M10 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 8.8 | FAB0200708 | FAB0200710 | FAB0203050 | FAB0203067 | FAB0203084 |




| MF | ISO 529 / IS 6175 Part 3 | | | | | | | | | | | |
|-----|--------------------------|-----|----|------|-----|----|------|------------|------------|------------|------------|------------|
| M12 | 1.25 | 89 | 29 | 9 | 7.1 | 10 | 10.8 | FAB0204631 | FAB0204632 | FAB0204633 | FAB0204634 | FAB0204635 |
| M12 | 1.5 | 89 | 29 | 9 | 7.1 | 10 | 10.5 | FAB0200738 | FAB0200740 | FAB0203051 | FAB0203069 | FAB0203086 |
| M14 | 1.5 | 95 | 30 | 11.2 | 9 | 12 | 12.5 | FAB0200769 | FAB0200771 | FAB0203053 | FAB0203071 | FAB0203088 |
| M16 | 1.5 | 102 | 32 | 12.5 | 10 | 13 | 14.5 | FAB0200787 | FAB0200789 | FAB0200790 | FAB0203073 | FAB0203090 |

| Material Group | Material Description | Tensile Strength N/mm² | Speed - Vc m/min (Coolant) | | | | |
|----------------|--|------------------------|----------------------------|-------------|-----------------|-------------|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | 10 - 12 (S) | 15 - 20 (S) | 20 - 25 (S) | | |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | | 15 - 20 (S) | 15 - 20 (S) | 15 - 20 (S) | 15 - 25 (S) |
| P2 | Medium- and High-Carbon Steels | <530 | | | 15 - 20 (S) | 15 - 20 (S) | 15 - 25 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | 8 - 12 (O) | 12 - 16 (S) | 15 - 20 (S) |
| K1 | Grey Cast Iron | 125-500 | | | 30 - 35 (S) (D) | | |
| K2 | Low- and Medium-Strength Ductile Irons | <600 | | 15 - 20 (S) | 20 - 25 (S) | | |
| K3 | High-Strength Ductile Irons | >600 | | 12 - 15 (S) | | | |
| N1 | Wrought Aluminium | - | 15 - 20 (S) | | | | |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 15 - 20 (S) | | | | |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | | | | | |
| N4 | Copper-. Brass-. Zinc | - | 25 - 30 (S) | | | | |

Spiral Point Machine Taps


HOLE TYPE

HSS-E
6HX
DIN 371
DIN 376

| Flute Type | SPIRAL POINTED (SPPT) | | |
|-------------|---|---|---|
| Coating | TiN | TiCN | TiAlN |
| Series Code | SAS3 | SAS5 | SAI4 |
| |  |  |  |

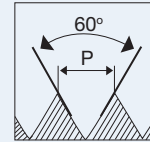
- 1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

| M | DIN 371 | | | | | | | | | |
|----------|---------|-----|---------------|----------------|--------|---------------|----------------|------------|------------|------------|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | |
| M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 6 | 2.5 | FAB0204675 | FAB0204665 | FAB0204694 |
| M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 6 | 3.3 | FAB0204676 | FAB0204666 | FAB0204695 |
| M5 | 0.8 | 70 | 16 | 6 | 4.9 | 7 | 4.2 | FAB0204677 | FAB0204667 | FAB0204696 |
| M6 | 1 | 80 | 19 | 6 | 4.9 | 7 | 5 | FAB0204678 | FAB0204668 | FAB0204697 |
| M8 | 1.25 | 90 | 22 | 8 | 6.2 | 9 | 6.8 | FAB0204679 | FAB0204669 | FAB0204698 |
| M10 | 1.5 | 100 | 24 | 10 | 8 | 11 | 8.5 | FAB0204680 | FAB0204670 | FAB0204699 |




| M | DIN 376 | | | | | | | | | |
|-----|---------|-----|----|----|---|----|------|------------|------------|------------|
| M12 | 1.75 | 110 | 28 | 9 | 7 | 10 | 10.3 | FAB0204681 | FAB0204671 | FAB0204700 |
| M14 | 2 | 110 | 30 | 11 | 9 | 12 | 12 | FAB0204682 | FAB0204672 | FAB0204701 |
| M16 | 2 | 110 | 32 | 12 | 9 | 12 | 14 | FAB0204683 | FAB0204673 | FAB0204702 |

| Material Group | Material Description | Tensile Strength N/mm2 | Speed - Vc m/min (Coolant) | | |
|----------------|--|------------------------|----------------------------|------------|-------------|
| M1 | Austenitic Stainless Steel | <600 | 5 - 10 (O) | 5 - 10 (O) | |
| M2 | High-Strength Austenitic Stainless, Cast Stainless Steel | 600-850 | | 4 - 6 (O) | |
| S4 | Titanium unalloyed - TA1 - TA9 | <700 | | | 10 - 15 (O) |
| | Titanium unalloyed - TA10 - TA14 | >700 - 900 | | | 6 - 12 (O) |
| S3 | Nickel unalloyed - Nickel 200 | <500 | | | 8 - 12 (O) |
| | Nickel alloyed - Nickel 600, Nimonic 75, Incoloy 802 | >500 - 900 | | | 4 - 6 (O) |




Spiral Point Machine Taps


HOLE TYPE

HSS-E
6HX
ISO 529

| Flute Type | SPIRAL POINTED (SPPT) | | |
|-------------|---|---|---|
| Coating | TiN | TiCN | TiAlN |
| Series Code | SAS3 | SAS5 | SAI4 |
| |  |  |  |

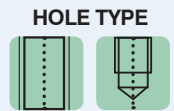
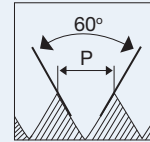
- 1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

| M | ISO 529 / IS 6175 Part 2 | | | | | | |  |  |  |
|----------|--------------------------|-----|---------------|----------------|--------|---------------|----------------|---|---|---|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | |
| M3 | 0.5 | 48 | 11 | 3.15 | 2.5 | 5 | 2.5 | FAB0204685 | FAB0203103 | FAB0204712 |
| M4 | 0.7 | 53 | 13 | 4 | 3.15 | 6 | 3.3 | FAB0204686 | FAB0203104 | FAB0204713 |
| M5 | 0.8 | 58 | 16 | 5 | 4 | 7 | 4.2 | FAB0204687 | FAB0203105 | FAB0204714 |
| M6 | 1 | 66 | 19 | 6.3 | 5 | 8 | 5 | FAB0204688 | FAB0203106 | FAB0204715 |
| M8 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 6.8 | FAB0204689 | FAB0203107 | FAB0204716 |
| M10 | 1.5 | 1.5 | 80 | 24 | 10 | 8 | 11 | FAB0204690 | FAB0203108 | FAB0204717 |






| M | ISO 529 / IS 6175 Part 3 | | | | | | | | | |
|-----|--------------------------|-----|----|------|-----|----|------|------------|------------|------------|
| M12 | 1.75 | 89 | 29 | 9 | 7.1 | 10 | 10.3 | FAB0204691 | FAB0203109 | FAB0204718 |
| M14 | 2 | 95 | 30 | 11.2 | 9 | 12 | 12 | FAB0204692 | FAB0203110 | FAB0204719 |
| M16 | 2 | 102 | 32 | 12.5 | 10 | 13 | 14 | FAB0204693 | FAB0203111 | FAB0204720 |

| Material Group | Material Description | Tensile Strength N/mm2 | Speed - Vc m/min (Coolant) | | |
|----------------|--|------------------------|----------------------------|------------|-------------|
| M1 | Austenitic Stainless Steel | <600 | 5 - 10 (O) | 5 - 10 (O) | |
| M2 | High-Strength Austenitic Stainless, Cast Stainless Steel | 600-850 | | 4 - 6 (O) | |
| S4 | Titanium unalloyed - TA1 - TA9 | <700 | | | 10 - 15 (O) |
| | Titanium unalloyed - TA10 - TA14 | >700 - 900 | | | 6 - 12 (O) |
| S3 | Nickel unalloyed - Nickel 200 | <500 | | | 8 - 12 (O) |
| | Nickel alloyed - Nickel 600, Nimonic 75, Incoloy 802 | >500 - 900 | | | 4 - 6 (O) |

Spiral Flute Machine Taps



1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

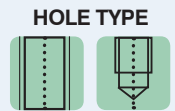
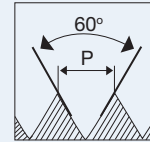
| M | DIN 371 | | | | | | |  |  |  |  |  |
|----------|---------|-----|---------------|----------------|--------|---------------|----------------|---|---|---|---|---|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | | | |
| M3 | 0.5 | 56 | 6 | 3.5 | 2.7 | 6 | 2.5 | FAB0203197 | FAB0203207 | FAB0204334 | FAB0204556 | FAB0204341 |
| M4 | 0.7 | 63 | 8 | 4.5 | 3.4 | 6 | 3.3 | FAB0203198 | FAB0203208 | FAB0200968 | FAB0204557 | FAB0204343 |
| M5 | 0.8 | 70 | 8 | 6 | 4.9 | 7 | 4.2 | FAB0203199 | FAB0203209 | FAB0203685 | FAB0204558 | FAB0204344 |
| M6 | 1 | 80 | 10 | 6 | 4.9 | 7 | 5 | FAB0203200 | FAB0203210 | FAB0203686 | FAB0204559 | FAB0204345 |
| M8 | 1.25 | 90 | 13 | 8 | 6.2 | 9 | 6.8 | FAB0203202 | FAB0203212 | FAB0203687 | FAB0204560 | FAB0204347 |
| M10 | 1.5 | 100 | 15 | 10 | 8 | 11 | 8.5 | FAB0203203 | FAB0203213 | FAB0203688 | FAB0204561 | FAB0204348 |

| DIN 376 | | | | | | | | | | | | | |
|---------|------|-----|----|----|---|----|------|------------|------------|------------|------------|------------|--|
| M12 | 1.75 | 110 | 18 | 9 | 7 | 10 | 10.3 | FAB0203204 | FAB0203684 | FAB0203689 | FAB0204562 | FAB0204349 | |
| M14 | 2 | 110 | 20 | 11 | 9 | 12 | 12 | FAB0203205 | FAB0203215 | FAB0204337 | FAB0204563 | FAB0204350 | |
| M16 | 2 | 110 | 20 | 12 | 9 | 12 | 14 | FAB0203206 | FAB0203216 | FAB0204338 | FAB0204564 | FAB0204351 | |






| DIN 374 | | | | | | | | | | | | | |
|---------|------|-----|----|----|-----|----|------|------------|------------|------------|------------|------------|--|
| M8 | 1 | 90 | 11 | 6 | 4.9 | 7 | 7 | FAB0204355 | FAB0203297 | FAB0204376 | FAB0204565 | FAB0204387 | |
| M10 | 1.25 | 100 | 13 | 7 | 5.5 | 8 | 8.8 | FAB0204356 | FAB0204366 | FAB0204377 | FAB0204566 | FAB0204388 | |
| M12 | 1.25 | 100 | 15 | 9 | 7 | 10 | 10.8 | FAB0204359 | FAB0204369 | FAB0204380 | FAB0204567 | FAB0204391 | |
| M12 | 1.5 | 100 | 15 | 9 | 7 | 10 | 10.5 | FAB0204358 | FAB0204368 | FAB0204379 | FAB0204568 | FAB0204390 | |
| M14 | 1.5 | 100 | 15 | 11 | 9 | 12 | 12.5 | FAB0204360 | FAB0204370 | FAB0204381 | FAB0204569 | FAB0204392 | |
| M16 | 1.5 | 100 | 15 | 12 | 11 | 12 | 14.5 | FAB0204362 | FAB0204372 | FAB0204383 | FAB0204570 | FAB0204394 | |

| Material Group | Material Description | Tensile Strength N/mm ² | Speed - Vc m/min (Coolant) | | | |
|----------------|--|------------------------------------|----------------------------|----------------|----------------|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | 8 - 12 (S) (O) | 10 - 15 (S)(O) | 15 - 20 (S)(O) | |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | 8 - 12 (S) (O) | 10 - 15 (S)(O) | 15 - 20 (S)(O) | |
| P2 | Medium- and High-Carbon Steels | <530 | | 8 - 15 (S) (O) | 10 - 18 (S)(O) | 18 - 22 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | | 16 - 20 (S) |
| K1 | Grey Cast Iron | 125-500 | | | 10 - 20 (S)(D) | |
| K2 | Low- and Medium-Strength Ductile Irons | <600 | | 8 - 12 (S) | 8 - 12 (S) | |
| N1 | Wrought Aluminium | - | 15 - 25 (S) | | | |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 15 - 25 (S) | | | 15 - 20 (S) |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | | 15 - 20 (S) | | 20 - 25 (S) |
| N4 | Copper-, Brass-, Zinc | - | 20 - 25 (S) | 20 - 25 (S) | | |

Spiral Flute Machine Taps



- 1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

| M | ISO 529 / IS 6175 Part 2 | | | | | | |  |  |  |  |  |
|----------|--------------------------|-----|---------------|----------------|--------|---------------|----------------|---|---|---|---|---|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | | | |
| M3 | 0.5 | 48 | 11 | 3.15 | 2.5 | 5 | 2.5 | FAB0200649 | FAB0200650 | FAB0203145 | FAB0204636 | FAB0203158 |
| M4 | 0.7 | 53 | 13 | 4 | 3.15 | 6 | 3.3 | FAB0200663 | FAB0200665 | FAB0200666 | FAB0204637 | FAB0203159 |
| M5 | 0.8 | 58 | 16 | 5 | 4 | 7 | 4.2 | FAB0200674 | FAB0200676 | FAB0200677 | FAB0204638 | FAB0203160 |
| M6 | 1 | 66 | 19 | 6.3 | 5 | 8 | 5 | FAB0200686 | FAB0200688 | FAB0200689 | FAB0204639 | FAB0203161 |
| M8 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 6.8 | FAB0200698 | FAB0200700 | FAB0200701 | FAB0204640 | FAB0203163 |
| M10 | 1.5 | 1.5 | 80 | 24 | 10 | 8 | 11 | FAB0200722 | FAB0200724 | FAB0200725 | FAB0204641 | FAB0203166 |

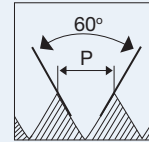
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|--------------------------|------|-----|----|------|-----|----|------|------------|------------|------------|------------|------------|--|
| M12 | 1.75 | 89 | 29 | 9 | 7.1 | 10 | 10.3 | FAB0200752 | FAB0200754 | FAB0200755 | FAB0204642 | FAB0203169 | |
| M14 | 2 | 95 | 30 | 11.2 | 9 | 12 | 12 | FAB0200781 | FAB0200782 | FAB0203152 | FAB0204643 | FAB0203171 | |
| M16 | 2 | 102 | 32 | 12.5 | 10 | 13 | 14 | FAB0200802 | FAB0200804 | FAB0203153 | FAB0204644 | FAB0203173 | |

| ISO 529 / IS 6175 Part 2 | | | | | | | | | | | | | |
|--------------------------|------|----|----|---|-----|---|-----|------------|------------|------------|------------|------------|--|
| M8 | 1 | 69 | 19 | 8 | 6.3 | 9 | 7 | FAB0203136 | FAB0202157 | FAB0203148 | FAB0204645 | FAB0203162 | |
| M10 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 8.8 | FAB0200711 | FAB0200713 | FAB0203150 | FAB0204646 | FAB0203165 | |

| ISO 529 / IS 6175 Part 3 | | | | | | | | | | | | | |
|--------------------------|------|-----|----|------|-----|----|------|------------|------------|------------|------------|------------|--|
| M12 | 1.25 | 89 | 29 | 9 | 7.1 | 10 | 10.8 | FAB0204651 | FAB0204652 | FAB0204653 | FAB0204647 | FAB0204654 | |
| M12 | 1.5 | 89 | 29 | 9 | 7.1 | 10 | 10.5 | FAB0200741 | FAB0200743 | FAB0200744 | FAB0204648 | FAB0204731 | |
| M14 | 1.5 | 95 | 30 | 11.2 | 9 | 12 | 12.5 | FAB0200772 | FAB0200774 | FAB0203151 | FAB0204649 | FAB0204732 | |
| M16 | 1.5 | 102 | 32 | 12.5 | 10 | 13 | 14.5 | FAB0200791 | FAB0200793 | FAB0200794 | FAB0204650 | FAB0204733 | |

| Material Group | Material Description | Tensile Strength N/mm ² | Speed - Vc m/min (Coolant) | | | | | |
|----------------|--|------------------------------------|----------------------------|----------------|----------------|-------------|--|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | 8 - 12 (S) (O) | 10 - 15 (S)(O) | 15 - 20 (S)(O) | | | |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | 8 - 12 (S) (O) | 10 - 15 (S)(O) | 15 - 20 (S)(O) | | | |
| P2 | Medium- and High-Carbon Steels | <530 | | 8 - 15 (S) (O) | 10 - 18 (S)(O) | 18 - 22 (S) | | 18 - 22 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | | 16 - 20 (S) | | 16 - 20 (S) |
| K1 | Grey Cast Iron | 125-500 | | | 10 - 20 (S)(D) | | | |
| K2 | Low- and Medium-Strength Ductile Irons | <600 | | 8 - 12 (S) | 8 - 12 (S) | | | |
| N1 | Wrought Aluminium | - | 15 - 25 (S) | | | | | |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 15 - 25 (S) | | | 15 - 20 (S) | | 15 - 20 (S) |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | | 15 - 20 (S) | | 20 - 25 (S) | | 20 - 25 (S) |
| N4 | Copper-, Brass-, Zinc | - | 20 - 25 (S) | 20 - 25 (S) | | | | |

Spiral Flute Machine Taps


HOLE TYPE

HSS-E
6HX
DIN 371
DIN 376

| Flute Type | SPIRAL FLUTE | |
|-------------|---|---|
| Coating | TiCN | TiAlN |
| Series Code | SBS5 | SBI4 |
| |  |  |

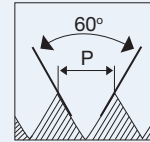
| | | |
|------------|-----|-------------|
| 1st Choice | (S) | Soluble Oil |
| 2nd Choice | (O) | Cutting Oil |
| | (D) | Dry Tapping |

| M | DIN 371 | | | | | | | | |
|----------|---------|-----|---------------|----------------|--------|---------------|----------------|------------|------------|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | |
| M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 6 | 2.5 | FAB0204655 | FAB0204703 |
| M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 6 | 3.3 | FAB0204656 | FAB0204704 |
| M5 | 0.8 | 70 | 16 | 6 | 4.9 | 7 | 4.2 | FAB0204657 | FAB0204705 |
| M6 | 1 | 80 | 19 | 6 | 4.9 | 7 | 5 | FAB0204658 | FAB0204706 |
| M8 | 1.25 | 90 | 22 | 8 | 6.2 | 9 | 6.8 | FAB0204659 | FAB0204707 |
| M10 | 1.5 | 100 | 24 | 10 | 8 | 11 | 8.5 | FAB0204660 | FAB0204708 |

| M | DIN 376 | | | | | | | | |
|-----|---------|-----|----|----|---|----|------|------------|------------|
| M12 | 1.75 | 110 | 28 | 9 | 7 | 10 | 10.3 | FAB0204661 | FAB0204709 |
| M14 | 2 | 110 | 30 | 11 | 9 | 12 | 12 | FAB0204662 | FAB0204710 |
| M16 | 2 | 110 | 32 | 12 | 9 | 12 | 14 | FAB0204663 | FAB0204711 |

| Material Group | Material Description | Tensile Strength N/mm2 | Speed - Vc m/min (Coolant) | |
|----------------|--|------------------------|----------------------------|------------|
| M1 | Austenitic Stainless Steel | <600 | 5 - 8 (O) | |
| M2 | High-Strength Austenitic Stainless, Cast Stainless Steel | 600-850 | 4 - 6 (O) | |
| S4 | Titanium unalloyed - TA1 - TA9 | <700 | | 6 - 10 (O) |
| | Titanium unalloyed - TA10 - TA14 | >700 - 900 | | 5 - 8 (O) |
| S3 | Nickel unalloyed - Nickel 200 | <500 | | 6 - 8 (O) |
| | Nickel alloyed - Nickel 600, Nimonic 75, Incoloy 802 | >500 - 900 | | 3 - 5 (O) |

Spiral Flute Machine Taps


HOLE TYPE

HSS-E
6HX
ISO 529

| Flute Type | | SPIRAL FLUTE | |
|-------------|--|---|---|
| Coating | | TiCN | TiAlN |
| Series Code | | SBS5 | SBI4 |
| | |  |  |

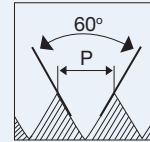
| | | |
|------------|-----|-------------|
| 1st Choice | (S) | Soluble Oil |
| 2nd Choice | (O) | Cutting Oil |
| | (D) | Dry Tapping |

| ISO 529 / IS 6175 Part 2 | | | | | | | |
|--------------------------|-------|-----|---------------|----------------|--------|---------------|----------------|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter |
| M3 | 0.5 | 48 | 11 | 3.15 | 2.5 | 5 | 2.5 |
| M4 | 0.7 | 53 | 13 | 4 | 3.15 | 6 | 3.3 |
| M5 | 0.8 | 58 | 16 | 5 | 4 | 7 | 4.2 |
| M6 | 1 | 66 | 19 | 6.3 | 5 | 8 | 5 |
| M8 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 6.8 |
| M10 | 1.5 | 1.5 | 80 | 24 | 10 | 8 | 11 |

| ISO 529 / IS 6175 Part 3 | | | | | | | |
|--------------------------|------|-----|----|------|-----|----|------|
| M12 | 1.75 | 89 | 29 | 9 | 7.1 | 10 | 10.3 |
| M14 | 2 | 95 | 30 | 11.2 | 9 | 12 | 12 |
| M16 | 2 | 102 | 32 | 12.5 | 10 | 13 | 14 |





| Material Group | Material Description | Tensile Strength N/mm2 | Speed - Vc m/min (Coolant) | |
|----------------|--|------------------------|----------------------------|------------|
| M1 | Austenitic Stainless Steel | <600 | 5 - 8 (O) | |
| M2 | High-Strength Austenitic Stainless, Cast Stainless Steel | 600-850 | 4 - 6 (O) | |
| S4 | Titanium unalloyed - TA1 - TA9 | <700 | | 6 - 10 (O) |
| | Titanium unalloyed - TA10 - TA14 | >700 - 900 | | 5 - 8 (O) |
| S3 | Nickel unalloyed - Nickel 200 | <500 | | 6 - 8 (O) |
| | Nickel alloyed - Nickel 600, Nimonic 75, Incoloy 802 | >500 - 900 | | 3 - 5 (O) |

Straight Flute Machine Taps

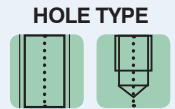
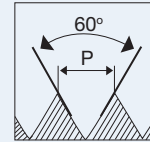

HOLE TYPE

HSS-E
6HX
DIN 371
DIN 374
DIN 376






1st Choice
 (S) Soluble Oil
 2nd Choice
 (O) Cutting Oil
(D) Dry Tapping

| M | DIN 371 | | | | | | |  |  |  |  |
|----------|---------|-----|---------------|----------------|--------|---------------|----------------|---|---|---|---|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | | |
| M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 6 | 2.5 | FAB0204433 | FAB0204441 | FAB0204571 | FAB0204586 |
| M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 6 | 3.3 | FAB0204434 | FAB0204442 | FAB0204572 | FAB0204587 |
| M5 | 0.8 | 70 | 16 | 6 | 4.9 | 7 | 4.2 | FAB0203676 | FAB0204443 | FAB0204573 | FAB0204588 |
| M6 | 1 | 80 | 19 | 6 | 4.9 | 7 | 5 | FAB0203677 | FAB0203679 | FAB0204574 | FAB0204589 |
| M8 | 1.25 | 90 | 22 | 8 | 6.2 | 9 | 6.8 | FAB0203678 | FAB0203680 | FAB0204575 | FAB0204590 |
| M10 | 1.5 | 100 | 24 | 10 | 8 | 11 | 8.5 | FAB0200969 | FAB0203682 | FAB0204576 | FAB0204591 |

Straight Flute Machine Taps



- 1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

| M | ISO 529 / IS 6175 Part 2 | | | | | | |  |  |  |  |
|----------|--------------------------|-----|---------------|----------------|--------|---------------|----------------|---|--|---|---|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Drill Diameter | | | | |
| M3 | 0.5 | 48 | 11 | 3.15 | 2.5 | 5 | 2.5 | FAB0200645 | FAB0200646 | FAB0204601 | FAB0204616 |
| M4 | 0.7 | 53 | 13 | 4 | 3.15 | 6 | 3.3 | FAB0200657 | FAB0200658 | FAB0204602 | FAB0204617 |
| M5 | 0.8 | 58 | 16 | 5 | 4 | 7 | 4.2 | FAB0200669 | FAB0200670 | FAB0204603 | FAB0204618 |
| M6 | 1 | 66 | 19 | 6.3 | 5 | 8 | 5 | FAB0200680 | FAB0200681 | FAB0204604 | FAB0204619 |
| M8 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 6.8 | FAB0200692 | FAB0200693 | FAB0204605 | FAB0204620 |
| M10 | 1.5 | 1.5 | 80 | 24 | 10 | 8 | 11 | FAB0200716 | FAB0200717 | FAB0204606 | FAB0204621 |

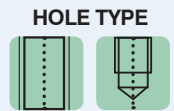
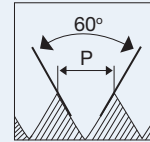
| ISO 529 / IS 6175 Part 3 | | | | | | | | | | | |
|--------------------------|------|-----|----|------|-----|----|------|------------|------------|------------|------------|
| M12 | 1.75 | 89 | 29 | 9 | 7.1 | 10 | 10.3 | FAB0200747 | FAB0200871 | FAB0204607 | FAB0204622 |
| M14 | 2 | 95 | 30 | 11.2 | 9 | 12 | 12 | FAB0200776 | FAB0200777 | FAB0204608 | FAB0204623 |
| M16 | 2 | 102 | 32 | 12.5 | 10 | 13 | 14 | FAB0200797 | FAB0200798 | FAB0204609 | FAB0204624 |

| MF | ISO 529 / IS 6175 Part 2 | | | | | | | | | | |
|-----|--------------------------|----|----|---|-----|---|-----|------------|------------|------------|------------|
| M8 | 1 | 69 | 19 | 8 | 6.3 | 9 | 7 | FAB0202976 | FAB0203740 | FAB0204610 | FAB0204625 |
| M10 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | 8.8 | FAB0200706 | FAB0200707 | FAB0204611 | FAB0204626 |

| MF | ISO 529 / IS 6175 Part 3 | | | | | | | | | | |
|-----|--------------------------|-----|----|------|-----|----|------|------------|------------|------------|------------|
| M12 | 1.25 | 89 | 29 | 9 | 7.1 | 10 | 10.8 | FAB0200727 | FAB0200728 | FAB0204612 | FAB0204627 |
| M12 | 1.5 | 89 | 29 | 9 | 7.1 | 10 | 10.5 | FAB0200736 | FAB0200737 | FAB0204613 | FAB0204628 |
| M14 | 1.5 | 95 | 30 | 11.2 | 9 | 12 | 12.5 | FAB0200767 | FAB0200768 | FAB0204614 | FAB0204629 |
| M16 | 1.5 | 102 | 32 | 12.5 | 10 | 13 | 14.5 | FAB0200785 | FAB0200786 | FAB0204615 | FAB0204630 |

| Material Group | Material Description | Tensile Strength N/mm ² | Speed - Vc m/min (Coolant) | | | |
|----------------|--|------------------------------------|----------------------------|----------------|-------------|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | | | 10 - 12 (S) | |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | | | 12 - 16 (S) | 12 - 16 (S) |
| P2 | Medium- and High-Carbon Steels | <530 | | | | 10 - 14 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | | 8 - 12 (S) |
| K1 | Grey Cast Iron | 125-500 | 25 - 30 (S) | 30 - 40 (S)(D) | | |
| K2 | Low- and Medium-Strength Ductile Irons | <600 | 15 - 20 (S) | 20 - 25 (S) | | |
| K3 | High-Strength Ductile Irons | >600 | | 12 - 15 (S) | | |
| N1 | Wrought Aluminium | - | | | | |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 25 - 30 (S) | | | |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | 20 - 25 (S) | | | |

Forming Machine Taps


HSS-E
6HX
DIN 371
DIN 374
DIN 376


- 1st Choice
 (S) Soluble Oil
 2nd Choice
 (O) Cutting Oil
(D) Dry Tapping

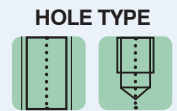
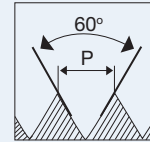
| DIN 371 | | | | | | | FORMING WITH OIL GROOVE | | FORMING W/O OIL GROOVE | |
|----------|-------|-----|---------------|----------------|--------|---------------|-------------------------|-----|------------------------|-----|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | Bright | TiN | TiAlN | TiN |
| M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 6 | SD1 | SD3 | SD5 | SD1 |
| M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 6 | | | | |
| M5 | 0.8 | 70 | 16 | 6 | 4.9 | 7 | | | | |
| M6 | 1 | 80 | 19 | 6 | 4.9 | 7 | | | | |
| M8 | 1.25 | 90 | 22 | 8 | 6.2 | 9 | | | | |
| M10 | 1.5 | 100 | 24 | 10 | 8 | 11 | | | | |

| DIN 376 | | | | | | | | | | |
|---------|------|-----|----|----|---|----|------------|------------|------------|---|
| M12 | 1.75 | 110 | 28 | 9 | 7 | 10 | FAB0200960 | FAB0200967 | FAB0204517 | - |
| M14 | 2 | 110 | 30 | 11 | 9 | 12 | FAB0203285 | FAB0203287 | FAB0204518 | - |
| M16 | 2 | 110 | 32 | 12 | 9 | 12 | FAB0203286 | FAB0203288 | FAB0204519 | - |

| DIN 374 | | | | | | | | | | |
|---------|------|-----|----|----|-----|----|------------|------------|------------|---|
| M8 | 1 | 90 | 18 | 6 | 4.9 | 7 | FAB0204520 | FAB0204528 | FAB0204536 | - |
| M10 | 1.25 | 100 | 22 | 7 | 5.5 | 8 | FAB0204521 | FAB0204529 | FAB0204537 | - |
| M12 | 1.25 | 100 | 22 | 9 | 7 | 10 | FAB0204523 | FAB0204531 | FAB0204539 | - |
| M12 | 1.5 | 100 | 22 | 9 | 7 | 10 | FAB0204522 | FAB0204530 | FAB0204538 | - |
| M14 | 1.5 | 100 | 22 | 11 | 9 | 12 | FAB0204524 | FAB0204532 | FAB0204540 | - |
| M16 | 1.5 | 100 | 22 | 12 | 11 | 12 | FAB0204525 | FAB0204533 | FAB0204541 | - |

| Material Group | Material Description | Tensile Strength N/mm ² | Speed - Vc m/min (Coolant) | | | |
|----------------|--|------------------------------------|----------------------------|-------------|-------------|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | 15 - 20 (S) | | 15 - 20 (S) | 15 - 20 (S) |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | 15 - 20 (S) | 15 - 20 (S) | 15 - 20 (S) | 15 - 20 (S) |
| P2 | Medium- and High-Carbon Steels | <530 | | 15 - 20 (S) | | 15 - 20 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | | |
| N1 | Wrought Aluminium | - | 20 - 25 (S) | 25 - 30 (S) | 20 - 25 (S) | 25 - 30 (S) |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 20 - 25 (S) | 25 - 30 (S) | 20 - 25 (S) | 25 - 30 (S) |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | 20 - 25 (S) | | | 20 - 25 (S) |

Forming Machine Taps



| Flute Type | FORMING WITH OIL GROOVE | | FORMING W/O OIL GROOVE | |
|-------------|-------------------------|-----|------------------------|-----|
| Coating | Bright | TiN | Bright | TiN |
| Series Code | SD1 | SD3 | SD1 | SD3 |

- 1st Choice (S) Soluble Oil
2nd Choice (O) Cutting Oil
(D) Dry Tapping

| M | ISO 529 / IS 6175 Part 2 | | | | | | | | | |
|----------|--------------------------|-----|---------------|----------------|--------|---------------|------------|------------|------------|------------|
| Tap Size | Pitch | OAL | Thread Length | Shank Diameter | Square | Square Length | | | | |
| M3 | 0.5 | 48 | 11 | 3.15 | 2.5 | 5 | FAB0203460 | FAB0203461 | FAB0201417 | FAB0202740 |
| M4 | 0.7 | 53 | 13 | 4 | 3.15 | 6 | FAB0203462 | FAB0203463 | FAB0201421 | FAB0202747 |
| M5 | 0.8 | 58 | 16 | 5 | 4 | 7 | FAB0203464 | FAB0203465 | FAB0201420 | FAB0202748 |
| M6 | 1 | 66 | 19 | 6.3 | 5 | 8 | FAB0203466 | FAB0203467 | FAB0201422 | FAB0202749 |
| M8 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | FAB0201425 | FAB0202750 | FAB0203883 | FAB0203772 |
| M10 | 1.5 | 1.5 | 80 | 24 | 10 | 8 | FAB0201426 | FAB0202751 | - | - |

| M | ISO 529 / IS 6175 Part 3 | | | | | | | | | |
|-----|--------------------------|-----|----|------|-----|----|------------|------------|---|---|
| M12 | 1.75 | 89 | 29 | 9 | 7.1 | 10 | FAB0201428 | FAB0202752 | - | - |
| M14 | 2 | 95 | 30 | 11.2 | 9 | 12 | FAB0203228 | FAB0203238 | - | - |
| M16 | 2 | 102 | 32 | 12.5 | 10 | 13 | FAB0203230 | FAB0203240 | - | - |

| MF | ISO 529 / IS 6175 Part 2 | | | | | | | | | |
|-----|--------------------------|----|----|---|-----|---|------------|------------|---|---|
| M8 | 1 | 69 | 19 | 8 | 6.3 | 9 | FAB0203223 | FAB0203233 | - | - |
| M10 | 1.25 | 72 | 22 | 8 | 6.3 | 9 | FAB0203225 | FAB0203235 | - | - |

| MF | ISO 529 / IS 6175 Part 3 | | | | | | | | | |
|-----|--------------------------|-----|----|------|-----|----|------------|------------|---|---|
| M12 | 1.5 | 89 | 29 | 9 | 7.1 | 10 | FAB0203226 | FAB0203236 | - | - |
| M14 | 1.5 | 95 | 30 | 11.2 | 9 | 12 | FAB0203227 | FAB0203237 | - | - |
| M16 | 1.5 | 102 | 32 | 12.5 | 10 | 13 | FAB0203229 | FAB0203239 | - | - |

| Material Group | Material Description | Tensile Strength N/mm ² | Speed - Vc m/min (Coolant) | | | |
|----------------|--|------------------------------------|----------------------------|-------------|-------------|-------------|
| P0 | Low-Carbon Steels, Long Chipping | <530 | 15 - 20 (S) | 15 - 20 (S) | 15 - 20 (S) | |
| P1 | Low-Carbon Steels, Short Chipping, Free Machining | <530 | 15 - 20 (S) | 15 - 20 (S) | 15 - 20 (S) | |
| P2 | Medium- and High-Carbon Steels | <530 | | | | 15 - 20 (S) |
| P3 | Alloy Steels and Tool Steels | 600-850 | | | | |
| N1 | Wrought Aluminium | - | 20 - 25 (S) | 25 - 30 (S) | 20 - 25 (S) | 25 - 30 (S) |
| N2 | Low-Silicon Aluminium Alloys and Magnesium Alloys | - | 20 - 25 (S) | 25 - 30 (S) | 20 - 25 (S) | 25 - 30 (S) |
| N3 | High-Silicon Aluminium Alloys and Magnesium Alloys | - | 20 - 25 (S) | | | 20 - 25 (S) |

Case Studies

| Industry Segment | Automotive |
|----------------------|---------------------------|
| Tap series | SA3 |
| Size | M8 X 1.25 SA3 6HX DIN 371 |
| Component | Bush |
| Work material | EN8 |
| Type of hole | Through hole |
| Hole dia | 6.8mm |
| Drill depth | 12mm |
| Tapping depth | 12mm |
| Machine | Radial drilling |
| Tapping direction | Vertical |
| Speed (Vc) | 20 m/min |
| Coolant | Tapping Oil |
| Tool Life | 40m |
| Competitor tool life | 25m |

| Industry Segment | Automotive |
|----------------------|-----------------------|
| Tap series | SAF5 |
| Size | M12X1.25 SAF5 DIN 374 |
| Component | Wheel Hub |
| Work material | 16MnCr5 |
| Type of hole | Through hole |
| Hole dia | 6.8mm |
| Drill depth | 12mm |
| Tapping depth | 12mm |
| Machine | HMC (2 spindle) |
| Tapping direction | Horizontal |
| Speed (Vc) | 22 m/min |
| Coolant | Water Soluble Oil |
| Tool Life | 754 nos |
| Competitor tool life | 400 nos |

| Industry Segment | Automotive |
|----------------------|-----------------------|
| Tap series | SA3 |
| Size | M3 X 0.5 SA3 |
| Component | Hub |
| Work material | S45C |
| Type of hole | Through hole (4holes) |
| Hole dia | 5.0 mm |
| Drill depth | 6.0 mm |
| Tapping depth | 6.0 mm |
| Machine | Tapping Machine |
| Tapping direction | Vertical |
| Speed (Vc) | 25 m/min |
| Coolant | Neat cutting oil |
| Tool Life | 730 nos |
| Competitor tool life | 600 nos |

| Industry Segment | Automotive |
|----------------------|-------------------|
| Tap series | SBF5 |
| Size | M14 X 1.5 SBF5 |
| Component | Housing |
| Work material | C40 |
| Type of hole | Blind hole |
| Hole dia | 12.5 mm |
| Drill depth | 40.0 mm |
| Tapping depth | 35.0 mm |
| Machine | Tapping Machine |
| Tapping direction | Vertical |
| Speed (Vc) | 15 m/min |
| Coolant | Water Soluble Oil |
| Tool Life | 470 nos |
| Competitor tool life | 430 nos |

Case Studies

| Industry Segment | Automotive |
|----------------------|-------------------------|
| Tap series | SC4 |
| Size | M8 X 1.25 SC4 DIN 371 |
| Component | Cylinder Head |
| Work material | Grey Cast Iron (220BHN) |
| Type of hole | Blind hole |
| Hole dia | 6.8 mm |
| Drill depth | 20.0 mm |
| Tapping depth | 16.0 mm |
| Machine | Makino HMC |
| Tapping direction | Horizontal |
| Speed (Vc) | 50 m/min |
| Coolant | Water Soluble Oil |
| Tool Life | 67 mtrs |
| Competitor tool life | 58 mtrs |

| Industry Segment | Automotive |
|----------------------|--------------------|
| Tap series | SD3 |
| Size | M6 X 1 SD3 DIN 371 |
| Component | Under Bracket |
| Work material | EN8D |
| Type of hole | Through hole |
| Hole dia | 5.55 mm |
| Drill depth | 10.0 mm |
| Tapping depth | 10.0 mm |
| Machine | AMS - VMC |
| Tapping direction | Vertical |
| Speed (Vc) | 20 m/min |
| Coolant | Water Soluble Oil |
| Tool Life | 2200 nos |
| Competitor tool life | 800 nos |

| Industry Segment | Automotive |
|----------------------|--------------------|
| Tap series | SD3 |
| Size | M6 X 1 SD3 DIN 371 |
| Component | Bracket |
| Work material | AC4C (Al. Casting) |
| Type of hole | Blind hole |
| Hole dia | 5.55 mm |
| Drill depth | 23.0 mm |
| Tapping depth | 20.0 mm |
| Machine | AMS |
| Tapping direction | Vertical |
| Speed (Vc) | 30 m/min |
| Coolant | Water Soluble Oil |
| Tool Life | 353 mtrs |
| Competitor tool life | 240 mtrs |

| Industry Segment | Automotive |
|----------------------|--------------------------|
| Tap series | SAF5 |
| Size | HPT 12X1.25 SAF5 OAL 110 |
| Component | Bearing Hub |
| Work material | C56 E2 |
| Type of hole | Through hole (4nos) |
| Hole dia | 10.2 mm |
| Drill depth | 12.0 mm |
| Tapping depth | 12.0 mm |
| Machine | Hyundai - VMC |
| Tapping direction | Vertical |
| Speed (Vc) | 20 m/min |
| Coolant | Water Soluble Oil |
| Tool Life | 505 comp |
| Competitor tool life | 400 comp |

Technical Details

Cutting speeds based on machining condition

Tapping speeds are determined by many factors. The main ones are:-

- a) Thread pitch
- b) Material being tapped
- c) Hole depth
- d) Hole type, through or blind
- e) Depth of thread

Tapping speeds can be decreased if

- a) Lubricant is poor, or flow is restricted
- b) Bottom lead or Spiral flute taps are used
- c) Thread depth (%) increases.
- d) Thread pitch is coarse
- e) Cutting taper threads (50% normal speed)

Tapping speeds can be increased if

- a) Thread depth decreases
- b) Thread pitch is fine
- c) Coolant flow and quality is good
- d) Spiral point or Fluteless (Roll) taps are used

TROUBLESHOOTING

Many factors can affect the quality of a tapped thread. Some more common problems are listed along with probable cause.

POOR THREAD FINISH

Misalignment of tap and work piece
Incorrect feed rate
Chips/swarf not being cleared properly
Tapping device or machine faulty
Insufficient or incorrect lubricant
Incorrectly ground or blunt tap
Wrong tap selection

OVERSIZE/BELL MOUTHED

Misalignment
Incorrect feed rate
Incorrect tapping drill
Tapping device or machine faulty
Insufficient or incorrect lubricant
Incorrectly ground or eccentric tap
Wrong tap selection

EXCESSIVE TAP WEAR

Wrong tap selection
Blunt or Incorrectly sharpened tap
Insufficient or incorrect lubricant
Tapping speed too high
Hole work hardened
Taps Technical Information

COLD WELDING

Wrong material composition
Blunt or Incorrectly sharpened tap
Insufficient or incorrect lubricant
Tapping speed too high
Material too soft

TAP BREAKING

Incorrectly sharpened/blunt tap
Tap hits bottom of hole
Machine or tapping device faulty
Wrong tap selection
Incorrect or insufficient lubricant
Tapping speed too high
Hole work hardened
Inefficient chip or swarf removal
Incorrect tapping drill size

TAP TEETH CHIPPING

Incorrectly sharpened/blunt tap
Tap hits bottom of hole
Machine or tapping device faulty

IN ORDER TO MINIMIZE PROBLEMS THE FOLLOWING RULES SHOULD BE FOLLOWED:

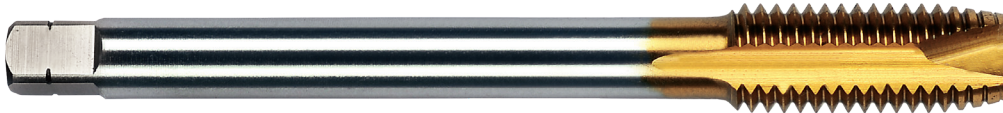
- 1 Use a pitch controlled tapping attachment
- 2 Choose the correct lubricant
- 3 Use the correct type of tap for the job
- 4 Use the correct tapping drill size
- 5 Choose the correct speed and feeds
- 6 Insure taps are not blunt. Regrind with a proper machine
- 7 Ensure accurate alignment
- 8 Check hardness of material, especially when changing batches
- 9 Ensure thread gauging is recently certified - they do wear!

Surface Treatment

While selecting the correct type of tap for a job, the material to be tapped should also be considered. This may determine the surface coating that should be applied to the tap in order to extend its life. Most taps are supplied with no surface treatment. They are referred to as 'Bright Finish'. These taps are mainly for use on non-ferrous materials, or steels that do not cold weld. Bright finish taps are therefore suitable for all hand operations, where speeds are too low for cold welding to occur, and for most machine operations.

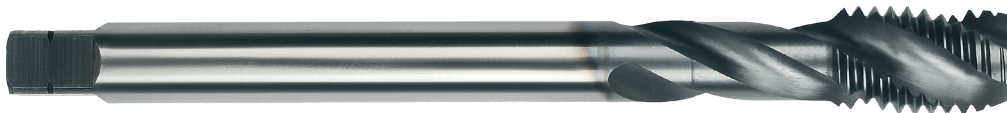
TITANIUM NITRIDE (TiN)

A thin deposit (approx. 0.0001") applied to the surface of a finished tap utilizing PVD coating technology. TiN coating increases the surface hardness and wear resistance. Use of TiN coating on standard tools will help increase tool life in harder materials (up to 32 HRC), such as stainless steels, steel forgings, tool and die steels and hot and cold rolled steels. TiN coating also works very well with water-base cutting fluids.



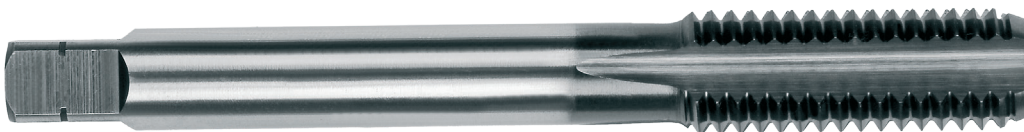
TITANIUM CARBO NITRIDE (TiCN)

Similar to TiN, TiCN is applied utilizing PVD coating technology. This coating combines high hardness (approx. 2800 vickers) with the anti-seizure properties of Nitride. A lower coefficient of friction helps reduce welding by 75% over TiN coated tools. These features make TiCN especially beneficial in non-ferrous material and hardened steels.



TITANIUM ALUMINUM NITRIDE (TiAlN)

TiAlN is applied using PVD coating technology. The addition of aluminum reduces friction and increases the coating oxidation temperature. As a result, TiAlN has increased resistance to heat and oxidation wear. This makes TiAlN better suited for High Speed/High Heat applications. TiAlN coating is incorporated into many of our tools.





Custom Tool Request Form

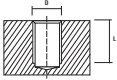
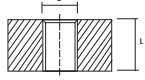
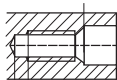
| | | | |
|--|---|--|---------------------------------------|
| Customer: | | | |
| Customer Name | | Date | |
| Address: | | | |
| Contact Person: | | | |
| Contact No. | Tel. _____ | Mobile: _____ | |
| | Email : _____ | | |
| Tap Details: | | Work material Details: | |
| Tap Size : | | Component Name: | |
| Tolerance/Gauge Details: | | Material Type: | |
| Standard: | | Hardness: | |
| Tap Dimensional Details (For Special) | | Tensile Strength | |
| Pre Tapping Hole | | | |
| Type Of Hole | | | |
| <input type="checkbox"/> Drilled | <input type="checkbox"/> Reamed | <input type="checkbox"/> Punched | <input type="checkbox"/> Cast |
| <input type="checkbox"/> Blind Hole | <input type="checkbox"/> Through Hole | <input type="checkbox"/> Steped Hole | |
|  |  |  | |
| Drill /Hole Dia | Hole Depth: | Thread Depth: | |
| Machine Details | | | |
| Machine make/ Type : | | | |
| Operation: | <input type="checkbox"/> Vertical | <input type="checkbox"/> Horizontal | <input type="checkbox"/> Angular |
| | <input type="checkbox"/> Hand Tapping | <input type="checkbox"/> Machine Tapping | |
| Type Of Tap Holder: | <input type="checkbox"/> Rigid Type | <input type="checkbox"/> Floating Type | <input type="checkbox"/> Collet Chuck |
| Cutting Speed | _____ RPM | _____ M/Min | M/c Power: _____ hp |
| Lubrication | <input type="checkbox"/> Oil | <input type="checkbox"/> Water Soluble | <input type="checkbox"/> Brush |
| | <input type="checkbox"/> Air/Dry | <input type="checkbox"/> Other | |
| Type Of Chips: | <input type="checkbox"/> Continuous | <input type="checkbox"/> Semi Continuous | <input type="checkbox"/> Short |
| | <input type="checkbox"/> Powder | | |
| Coatings: | <input type="checkbox"/> TiN | <input type="checkbox"/> TiAlN | <input type="checkbox"/> TiCN |
| | <input type="checkbox"/> Other | | |
| Current Supplier's Detail | | | |
| Tool Make: | | Consumption/mth.: _____ | |
| Tool Size: _____ | | Tool Price: _____ | |
| Tool Life : _____ | | Cost Per Component: _____ | |
| Additional Information if any: | | | |
| | | | |
| Sales Engineer | | Branch Manager | |
| DSO: | | | |



Table of Cutting Speeds

| M/min | 5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 150 |
|----------------------|------------------------------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Tool dia mm /inch | Revolutions Per Minute (RPM) | | | | | | | | | | | | | | | |
| 1 | 1592 | 2546 | 3138 | 4775 | 6366 | 7958 | 9549 | 12732 | 15916 | 19099 | 22282 | 25465 | 28648 | 31831 | 35014 | 47747 |
| 1.5 | 1061 | 1698 | 2122 | 3183 | 4244 | 5305 | 6366 | 8488 | 10610 | 12732 | 14854 | 16977 | 19099 | 21221 | 23343 | 31831 |
| 2 | 796 | 1273 | 1592 | 2387 | 3183 | 3979 | 4775 | 6366 | 7958 | 9549 | 11141 | 12732 | 14324 | 15916 | 17507 | 23873 |
| 2.5 | 637 | 1019 | 1273 | 1910 | 2546 | 3183 | 3820 | 5093 | 6366 | 7639 | 8913 | 10186 | 11459 | 12732 | 14006 | 19099 |
| 3 | 531 | 849 | 1061 | 1592 | 2122 | 2653 | 3183 | 4244 | 5305 | 6366 | 7427 | 8488 | 9549 | 10610 | 11671 | 15916 |
| 1/8" | 500 | 801 | 1001 | 1501 | 2002 | 2502 | 3003 | 4004 | 5005 | 6006 | 7007 | 8008 | 9009 | 10010 | 11011 | 15015 |
| 3.5 | 455 | 728 | 909 | 1364 | 1819 | 2274 | 2728 | 3638 | 4547 | 5457 | 6366 | 7176 | 8185 | 9095 | 10004 | 13642 |
| 4 | 398 | 637 | 796 | 1194 | 1592 | 1989 | 2387 | 3183 | 3979 | 4775 | 5570 | 6366 | 7162 | 7958 | 8754 | 11937 |
| 4.5 | 354 | 566 | 707 | 1061 | 1415 | 1768 | 2122 | 2829 | 3537 | 4244 | 4951 | 5659 | 6366 | 7074 | 7781 | 10610 |
| 3/16" | 334 | 535 | 669 | 1003 | 1337 | 1672 | 2006 | 2675 | 3344 | 4012 | 4681 | 5350 | 6018 | 6687 | 7356 | 10031 |
| 5 | 318 | 509 | 637 | 955 | 1273 | 1592 | 1910 | 2546 | 3183 | 3820 | 4456 | 5093 | 5730 | 6366 | 7003 | 9549 |
| 6 | 265 | 424 | 531 | 796 | 1061 | 1326 | 1592 | 2122 | 2653 | 3183 | 3714 | 4244 | 4775 | 5305 | 5836 | 7958 |
| 1/4" | 251 | 401 | 501 | 752 | 1003 | 1253 | 1504 | 2005 | 2506 | 3008 | 3509 | 4010 | 4511 | 5013 | 5514 | 7519 |
| 7 | 227 | 364 | 455 | 682 | 909 | 1137 | 1364 | 1819 | 2274 | 2728 | 3183 | 3638 | 4093 | 4547 | 5002 | 6821 |
| 5/16" | 200 | 321 | 401 | 601 | 802 | 1002 | 1203 | 1604 | 2004 | 2405 | 2806 | 3207 | 3608 | 4009 | 4410 | 6013 |
| 8 | 199 | 318 | 398 | 597 | 796 | 995 | 1194 | 1592 | 1989 | 2387 | 2785 | 3183 | 3581 | 3979 | 4377 | 5968 |
| 9 | 177 | 283 | 354 | 531 | 707 | 884 | 1061 | 1415 | 1768 | 2122 | 2476 | 2829 | 3183 | 3537 | 3890 | 5305 |
| 3/8" | 167 | 267 | 334 | 501 | 668 | 835 | 1002 | 1336 | 1670 | 2004 | 2338 | 2672 | 3006 | 3340 | 3674 | 5010 |
| 10 | 159 | 255 | 318 | 477 | 637 | 796 | 955 | 1273 | 1592 | 1910 | 2228 | 2546 | 2865 | 3183 | 3501 | 4775 |
| 7/16" | 143 | 229 | 287 | 430 | 573 | 716 | 860 | 1146 | 1433 | 1719 | 2006 | 2292 | 2579 | 2865 | 3152 | 4298 |
| 12 | 133 | 212 | 265 | 398 | 531 | 663 | 796 | 1061 | 1326 | 1592 | 1857 | 2122 | 2387 | 2653 | 2918 | 3979 |
| 1/2" | 125 | 201 | 251 | 376 | 501 | 627 | 752 | 1003 | 1253 | 1504 | 1754 | 2005 | 2256 | 2506 | 2757 | 3760 |
| 14 | 114 | 182 | 227 | 341 | 455 | 568 | 682 | 909 | 1137 | 1364 | 1592 | 1819 | 2046 | 2274 | 2501 | 3410 |
| 9/16" | 111 | 178 | 223 | 334 | 446 | 557 | 668 | 891 | 1114 | 1337 | 1559 | 1782 | 2005 | 2228 | 2450 | 3341 |
| 15 | 106 | 170 | 212 | 318 | 424 | 531 | 637 | 849 | 1061 | 1273 | 1485 | 1698 | 1910 | 2122 | 2334 | 3183 |

TAPPING FORMULAE

RPM

$$N = \frac{V_c \times 1000}{3.14 \times D} \text{ RPM}$$

Torque Calculations

$$M_d = \frac{P^2 \times D \times K_c}{8000} \text{ Nm}$$

Power

$$P = \frac{M_d \times 2 \times 3.14 \times N}{60} \text{ (KW)}$$

V_c - Cutting Speed (m/min)

P - Pitch (mm)

K_c - Specific cutting force (N/mm²) N - RPM

P - Power (KW)

M_d - Torque (Nm)

D - Nominal Dia (mm)



High Performance Cutting Tools



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