



Drilling

Te wiri

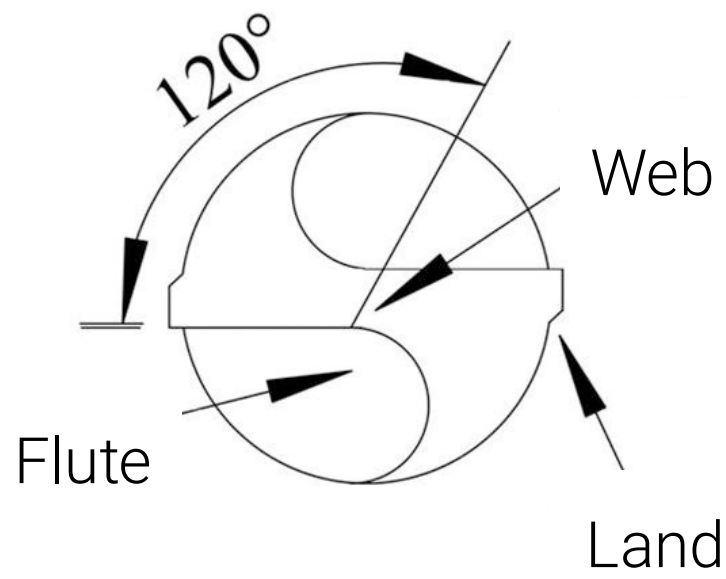
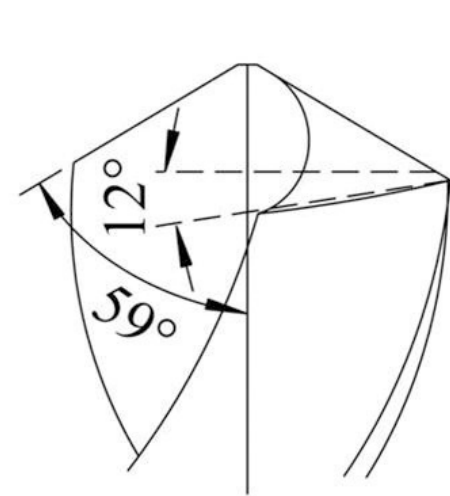
WARNING KIA TŪPATO

- » Clothing must be suitable, sleeves rolled up and ties, necklaces tucked away. *Kia tika ngā kākahu, pokaia ngā ringaringa o tō hāte, me pūroku te neketai, te hai kakī hoki.*
- » Safety glasses must be worn to protect against flying metal fragments. *Me whakamau mōhiti haumaru kia ārai atu i ngā maramara rere maitai.*
- » Long hair must be completely covered by a hair net. *Herea te makawe roa, ka ūhia ai ki te pōtae tika.*
- » Chuck should not be stopped with hand pressure. *Kaua e katia te tumu ki te ringa.*
- » No cleaning or measuring should be done with the machine running. *Ina haruru ana te mihini, kaua e horoi, e ine rānei.*



Smart tip

Before using a drill, check the drill angles and point symmetry.



118° Cutting tip



60° Countersink



Morse taper drill



Reduced shank drill



Straight shank drill

Drilling is used for cutting holes in solid material, by rotating and feeding the drill into the work piece. Drill bits are normally made from High Speed Steel (HSS). They can have either a straight or tapered shank.

Twist drills are the most common and are used to form deep straight holes.

Combination centre drills are generally used to centre larger drill bits.

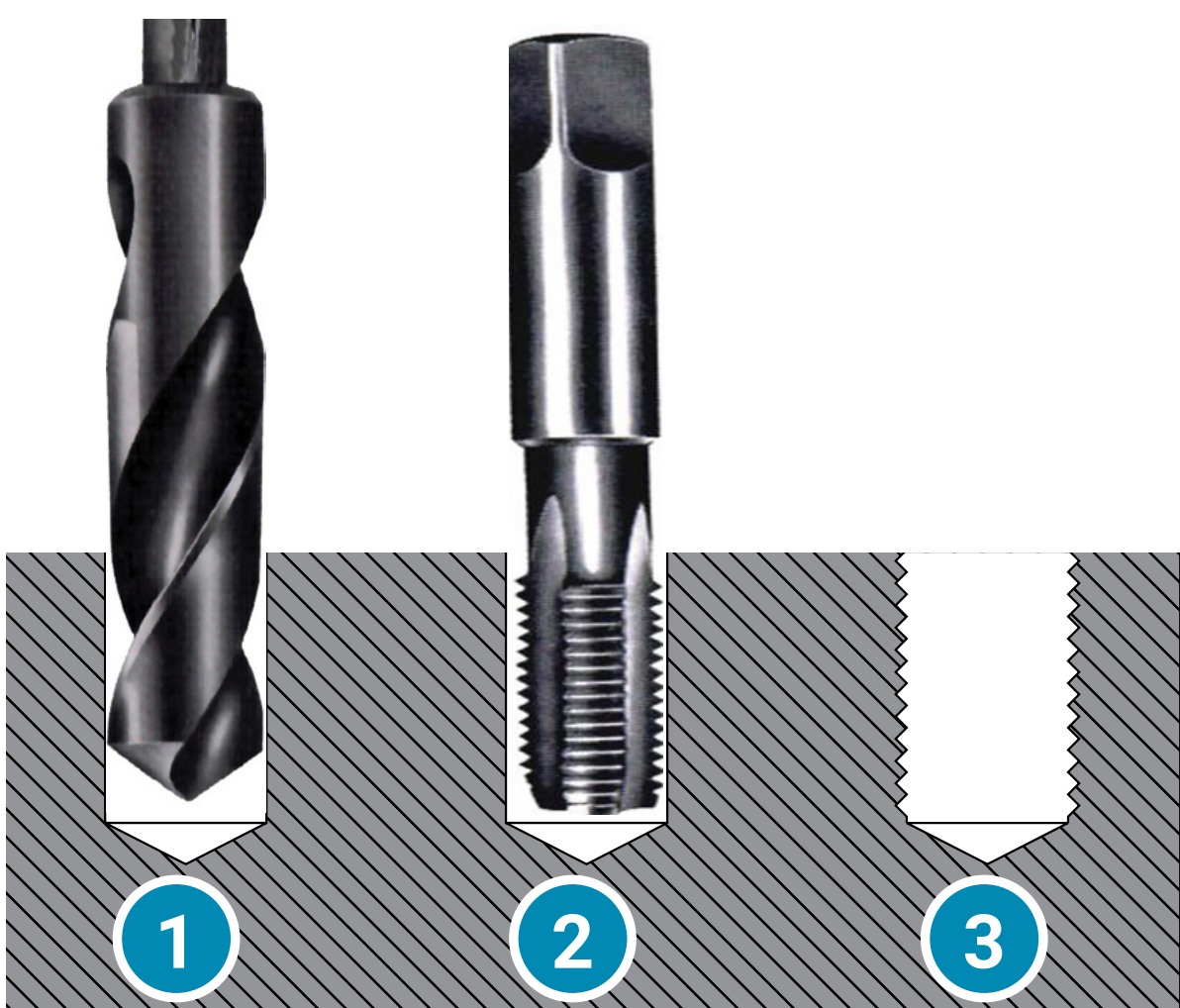
Countersink drills, enlarge existing holes to take countersunk screws or rivets.

Drill bits shear a small 'chip' from the material, this chip is then transported out of the formed hole by the flutes up the side of the shank.

The hole is formed straight due to the 'land' of the drill holding the cutting bit central. Drills sizes range from 0.05 mm to 100 mm and lengths up to 1000 mm.

Internal thread tapping

Te tā kōaka



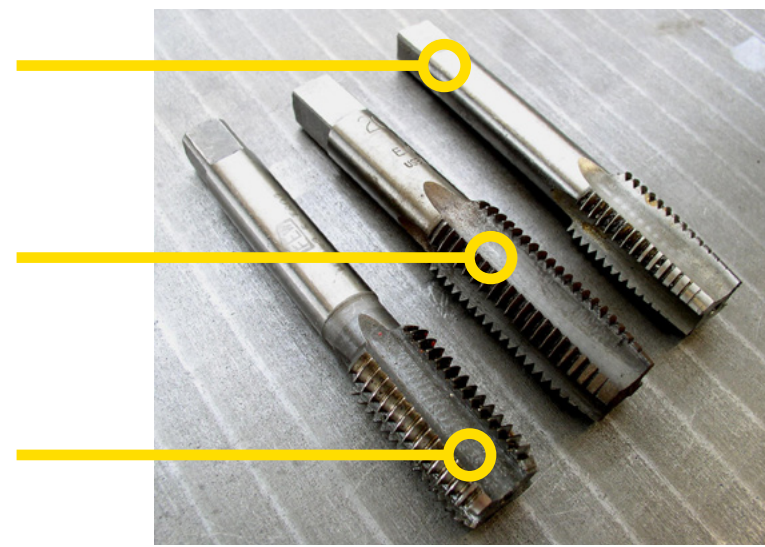
- 1 Mark out, centre-punch and drill the correct diameter pilot-hole to the depth required or all the way through the material.
- 2 Tap the hole to the depth required. Reverse the tap 1/4 turn after each full turn to break the swarf.
- 3 Clean the swarf from the tapped hole when finished.

Thread taps are made from High Speed Steel (HSS).

The **taper tap** is tapered for 2/3 of it's length and is used for starting a threaded hole.

The **intermediate tap** is tapered for 1/3 of it's length and is used to follow the taper tap.

The **plug tap** is parallel for its entire length and is used to finish-tap a blind hole.



Smart tip

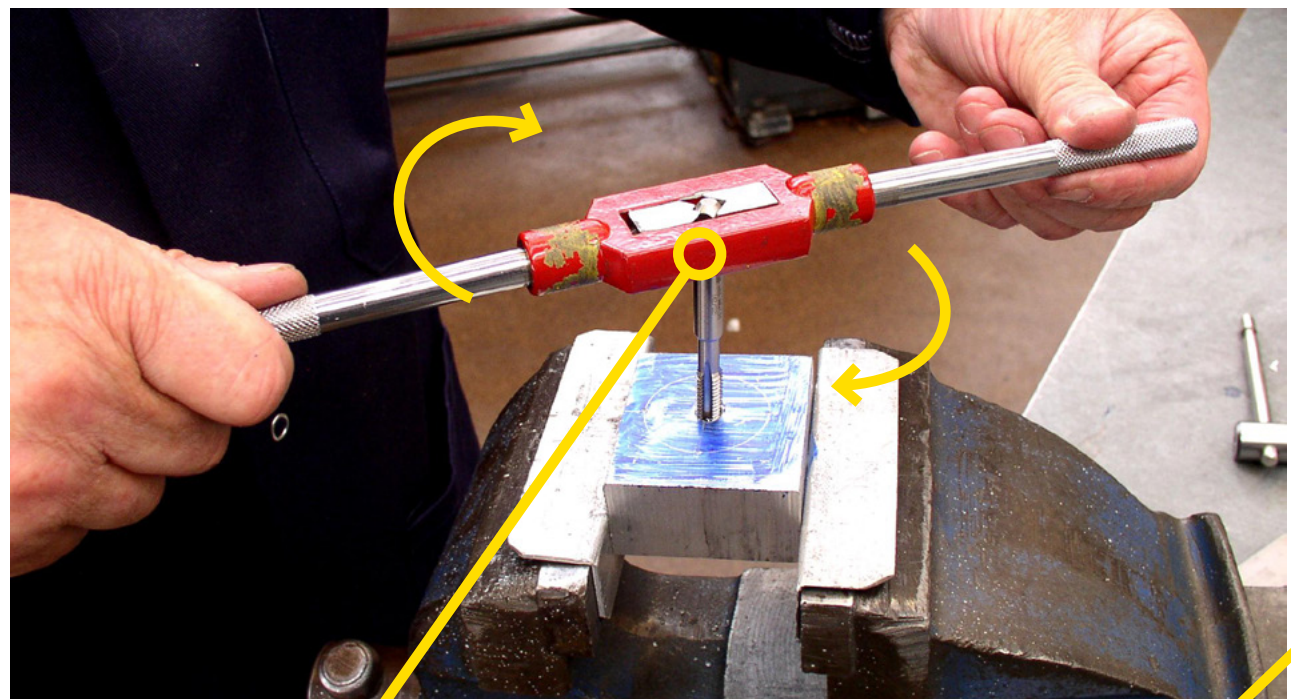
Use tapping fluid to lubricate the tap:

- **Oil** for steel, copper or bronze
- **Kerosene** for aluminum
- **Dry** for brass and cast iron



Smart tip

After a few turns, use an engineers square to check the tap is running true.



Use a **tap-wrench** for larger taps and a **tee-wrench** for smaller taps. Turn the tap clockwise while applying even downward pressure. Hold the work-piece securely in a vice with soft jaws to prevent damage.



Smart tip

Metric Tapping Drill Size = Outside Ø minus Pitch. This formula gives 80% engagement.