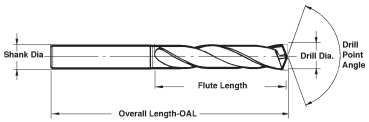
Enco Introduction to Drills



When selecting a drill, choose the right Drill Style, Grade and Length for the job, match the tool material to the workpiece material and select the best drill point for your application. For improved tool performance and tool life, add a Coating or surface treatment.

DRILL STYLE, GRADE & LENGTH

Styles:

Straight Shank Drills: Shank size always matches the cutting diameter.
· Twist Drills are the most widely used style. For ferrous and non-ferrous materials
· Parabolic Drills are for deep-hole drilling, reducing the need to peck
· Slow Spiral Drills are used for long chipping materials, such as aluminum and copper
· Fast Spiral Drills are used for small chipping materials like stainless steel
· Half-Round Drills are used for deep-hole drilling of very soft materials, like brass and rubber
· Straight Flute Drills are designed to drill the hardest steels
· Core Drills are used to enlarge existing holes

Reduced Shank Drills: Because the shank size is smaller than the drill diameter, they can drill holes larger than the typical drill chuck capacity.
· ⅜″ Reduced Shank drills holes up to ½″ with a standard ⅜″ chuck
· Silver and Deming (½″ Reduced Shank) drills holes up to 1½″ with a ½″ drill chuck
· ¾″ Reduced Shank drills holes up to 2″ with a ¾″ drill chuck

Taper Shank Drills are long length drills that are fitted with a special shank called a Morse Taper. These drills are made specifically for spindles that can hold Morse Taper shank drills.
· Taper Shank Drills come in many styles: Stub Length, Extra Long, Core Drills, Hi-Helix, Slow-Helix and Coolant-Fed

Grades:
· General Purpose - a perfect choice for maintenance and repair or short production runs in soft ferrous and non-ferrous materials
· Heavy-Duty - typically combine a split point to prevent walking, and stronger flutes for better rigidity. They are an excellent choice when drilling harder materials
· High Performance - typically designed for application specific operations where productivity and cost per hole is a concern. Maximizing speeds/feeds is essential, so always review published manufacturer's recommendations

Lengths:
Screw Machine - Stub length
· Jobber - Standard length
· Taper - Long length
· Extra Length

DRILL POINTS

The drill point has an impact on performance. Flat points provide better cutting action, while more aggressive point angles create torque.
Styles:
· 118° Point is designed to be an all-purpose point for soft metal, wood and plastics. Common on general purpose tools
· 135° Split Point is designed to cut metal. Self-centering, it will not walk or slide when starting a hole. Common on heavy-duty tools
· 130° Point is common on high-performance HSS parabolic drills. Disperses heat well, and helps keep drill straight in deeper holes
· 140° Point is common on high-performance Carbide drills, and helps get the cutting edge into tough materials quickly

TOOL MATERIAL

High Speed Steel (HSS: M1, M2, M7, M50):
· Combines good tool life and productivity with minimal cost
· Works well in free cutting and carbon steels, as well as soft, non-ferrous materials like aluminum, brass, bronze and copper
· Able to handle less than ideal setups

Cobalt (M-35, M-42):
· Provides better wear resistance, higher hardness and toughness than HSS
· Very little chipping or microchipping under severe cutting conditions, allowing the tool to run 10% faster than HSS
· With the right point angle and helix, cobalt is the most cost-effective for machining cast iron, heat-treated steels and titanium alloys
· Able to handle less than ideal setups

Solid Carbide:
· For high-performance applications; Carbide can run faster and withstand higher temperatures, while providing good wear resistance
· Provides better rigidity than HSS, yielding a higher degree of dimensional accuracy, often eliminating the need to ream
· Carbide is brittle, and tends to chip when conditions are not ideal; heavy feed rates are more suitable for HSS and Cobalt tools
· Carbide is used in abrasive and tough-to-machine materials: cast iron, non-ferrous alloys, glass, plastics and composites
· Carbide-Tipped tooling offers many of the advantages of solid carbide tooling at a reduced cost, especially larger diameter tools

COATINGS

One of the best methods to improve the productivity or tool life of a drill is to add a coating or surface treatment. Coatings and surface treatments build a barrier between the drill and the workpiece.

Black Oxide (Surface Treated):
· Retains lubricants to aid in wear resistance and chip flow
· Not to be used in non-ferrous materials

Polished (Bright Finish):
· Polished drills do not have a coating, which helps increase chip flow in soft materials
· For use in aluminum, wood and plastics

TiN (Titanium Nitride - Gold Color):
· Multi-purpose coating which increases tool life and performance
· Hardness and heat resistance allows tools to run at higher speeds and feeds (approx. 25% to 30% higher than uncoated tools)