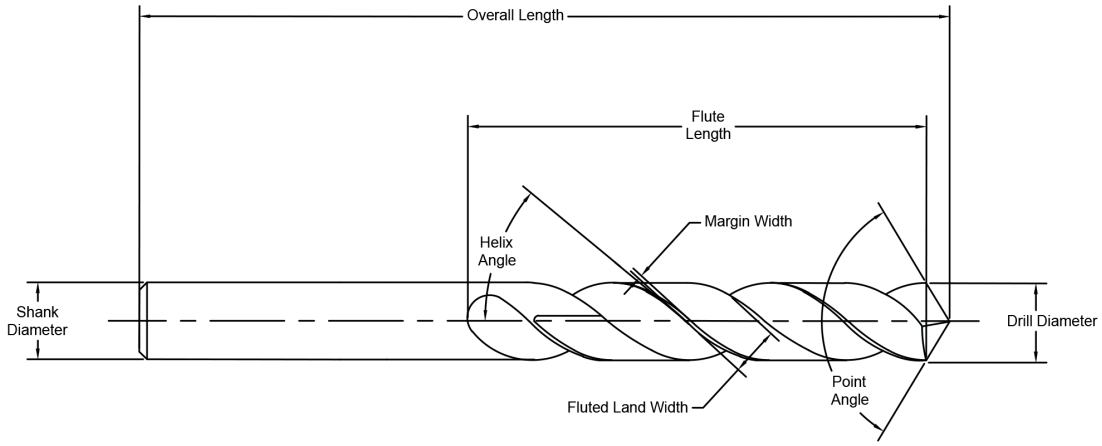
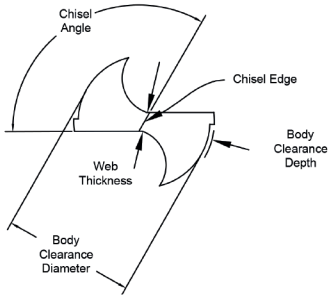
Increase Productivity • Work Efficiently • Optimize Tool Performance

Twist drills (aka drill bits) are designed to create NEW holes. They cut using their point and spread the load from the center outward. Different twist drills are recommended based on the application (see Champion Twist Drill Guide). The guidelines below are recommended for proper drill use and care. Never use a twist drill to ENLARGE an existing hole - a reamer is the proper tool for this application.

Anatomy & Nomenclature

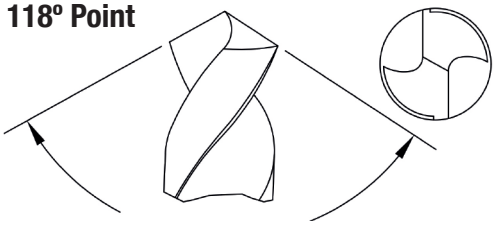




Pilot Holes

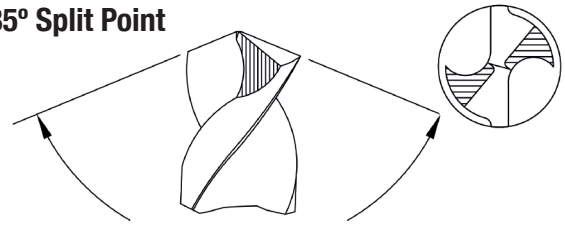
> Split point drills eliminate the need for pilot holes because the drills are designed to self-center
> Champion highly recommends using a split point drill in portable, handheld drilling applications
> If a pilot hole is necessary for the application, drill the smallest hole possible so that only the larger drill's point engages the material

118º Point



General Purpose Use - Not Self-Centering
Ideal For Use In Stationary Drill Press
For Drilling Softer Materials Like Wood, Aluminum And Low To Medium Steel Alloys

135º Split Point



Drill Harder Steel Alloys - Self-Centering
Ideal For Use In Handheld Power Drill
Requires Less Operator Force Than 118° Point Drills

Rigidity

> Work piece should be secure and supported properly for efficient drilling
> If the material is thin or frail, bending may cause oversize, out-of-line holes, or excessive drill breakage

Power Tool Guidelines

> Twist drill shank style and drilling application dictate the type of power tool used
> Handheld Drilling
  - Cordless power drill technology continues to improve, however, corded power drills are highly recommended for tough drilling applications (ex: thick material, stainless steel, lots of repetitive drilling)
> Most twist drills can be used in RotoBrute Magnetic Drill Press systems with the proper chuck attachment

Lubrication

BruteLube Cutting Fluid and Wax are ideal to optimize the performance of your twist drills when drilling metal. The purpose is to lubricate the contact surfaces between the tool and the work piece to reduce friction and heat. Lubrication of the chip provides better chip disposal, and reduced heat. It also prevents the chip from welding to the tool, which can cause "build up edge" and shorten cutting tool life dramatically.

Lubrication (cont.)

By enhancing tool heat resistance, operators will experience smoother cuts, longer tool life, and increased production

Speeds & Feeds - General Rules

> Feed rates are governed by the diameter of the tool and the material being drilled
  - Run larger diameter drills slower than smaller diameter drills
> Heat is the number one enemy when drilling metal and will decrease tool productivity
  - Use cutting wax or fluid when possible
> Take a good chip
  - Large chips, preferably spirals, are an indicator that you are running your drill properly

Speeds & Feeds - Handheld Drilling

> Choose the correct power tool based on drill shank and material application
> Pay attention to color
  - If your tool is blue, you are running the tool too hard or too fast
> Adjust your technique if necessary
  - If you are creating powder instead of true chips, you are not drilling properly
> RPM= 3.82 x SFM / Diameter
  - SFM Stainless Steel = 50
  - SFM Steel = 100
  - SFM Aluminum / Non-Ferrous = 150

Speeds & Feeds - Machining

> Use Surface Feet Per Minute as a guide, the rate which the outside or periphery of the tool moves in relation to the work being drilled

Tips For Drilling Difficult Materials

> Stainless Steel, Armor Plate
  - These materials may work-harden, so it is important to keep drills continuously cutting, use heavy feeds, & cutting lubricant
> Sheet Metal
  - Lack of rigid, work-piece support & inconsistent feed pressure from handheld drilling is challenging & can lead to drill breakage
  - Use the shortest drill available for drilling to optimize productivity (ex: screw machine “stubby” drills)
> Deep Hole Drilling
  - Chip disposal and greater heat build-up are challenging so reduce speeds 10 to 40% when drilling

Twist Drill Misuse & Abuse

> Chipped Outer Lips
  - Twist drill used to enlarge a hole
  - Pilot hole drilled is too large or a pilot hole is drilled before using a split point twist drill
> Outer Corners Break Down
  - Cutting speed too high
  - Hard spots in material
  - Cutting fluid not being used
  - Flutes clogged with chips
  - Twist drill used to enlarge a hole
> Drill Breakage
  - Incorrect twist drill for application
  - Feed is too heavy
  - Drill is dull
  - Flutes clogged with chips
> Drill Will Not Cut Work-Piece
  - Incorrect twist drill for application
  - Drill is dull
  - Lip relief is too small
  - Too heavy a web

*** Never use a twist drill to ENLARGE an existing hole- a reamer is the proper tool for this application**