GarrettWade White Paper

Drilling

How To Select The Best Drill

There are many different kinds of drills, and each is designed to excel at a specific type of task. Apart from determining which style is best suited for your work, you should be aware of the quality of the drill, which can affect not only the hole itself (concentricity, smoothness, etc), the working life of the bit, and whether it will even cut the material you are working on. Higher quality drill bits will typically be more expensive than lower quality bits. Three general factors affect overall drill quality:

1) The general quality of the steel (hardness, alloy content)
2) The machining of the grooves (if any) and the cutting edges
3) The roundness of the drill (it should be *perfectly* round)

Quality concerns aside, you should, whenever possible, use a drill suited for the work you are doing. For example, despite the fact that most people use them for this purpose all the time, standard twist drills are not designed for drilling screw holes; taper point drills are, and they do a much better job, since they leave enough material on the sides of the hole to allow all the screw threads to bite.

Take the following into account when selecting any bit:

1) The size of the hole to be drilled
2) The size of the shank (which should be as large as possible but also fit your drill)
3) Whether or not you need a flat bottom hole
4) What your rate of entry will be (for fast production work, the high angle flutes on a brad point drill will deliver a cleaner hole)
5) Your tolerance for fuzziness at the edge of the hole
6) The direction of the hole (with the grain, angled cross-grain, etc.)
7) The type of wood you are drilling into (for example, a slightly larger drill should be used for pilot screw holes in hard wood as opposed to soft woods).

The drill descriptions in the catalog will help you to decide whether a particular drill will work for the application you have in mind. Whatever drill you ultimately choose, let the tool do the work for you. If you have to use undue pressure to cut, the drill is dull and should be re-sharpened or replaced right away. Consult the following table to match the job at hand to the correct bit:

General Drilling	Twist Drills Brad Point Drills Spade Bits
Drilling for Screw Holes	Taper Point Drills Vix Bits
Cutting Plugs	Machine Dowel and Plug Cutters Plug Cutters
Drilling Extra Deep Holes	Jennings Pattern Auger Bits Single Screw Auger Bits Large Brad Point Drills
Drilling Large Holes	Multi-Spur Bits Micro-Dial Expansion Bits Large Brad Point Drills Spade Bits Single Screw Auger Bits Jennings Pattern Auger Bits
Drilling End Grain, Angles and Overlapping Holes	Forstner Bits

Helpful Tips on Sharpening Drill Bits

Twist Drills
Because of the compound relief on the back of the cutting edge of a twist drill, it is best to use a jig or special machine (like a "Drill Doctor") to resharpen them. These are virtually impossible to re-sharpen by hand.

Single and Double Twist Auger Bits
Use an auger bit file or stone or a triangular saw file, never a grinder. Carefully examine the bit before sharpening and while filing. Each cutting lip should do the exact same amount of work, so be sure to maintain the original profile. First, sharpen the spurs on the inside. Never file on the outside as this will change the size of the drill. Then file the cutting edges on the underside—that is, with the file working through the throat of the bit.

Slot Mortise Miller Bits
Use a smooth auger bit stone for sharpening in the flute and for removing the burr. Sharpen the teeth with a small saw file, and use the file to sharpen the nose, taking care to maintain the critical angles. The plain edge is sharpened with the stone working in the flute. Never sharpen the outer edge.

Brad Point Drills
Use an auger bit file or stone, or a small triangular saw file to sharpen both the spurs and the cutters. Keep both pairs of cutters and spurs at the same height, so they do an equal amount of work. Take off as little as possible, and be sure to file only on the inside of the spurs or lips.

Flat Spade Bits
Using a very smooth file or a small stone, sharpen the forward cutting edges carefully, maintaining the original angle and keeping the ground surface flat. Sharpen both sides equally, and check the levels. Sharpen the brad point if necessary, maintaining the centricity of the point. Never touch the sides of the bit.

Forstner Bits
Unlike most bits, the Forstner runs on its rim. This scribes the circumference of the hole, and the lifters pass the chips up the throat. Use an auger bit file or stone to sharpen the lifters, working through the throat of the cutter. Maintain the original angle and keep the edge straight. Use a small, round-edge slipstone on the inside of the rim, using a continuous motion to maintain the

curve. Never touch the outside of the rim.

Saw Tooth Bits
Use a smooth auger file or stone to sharpen the lifters, working through the throat of the cutter. Maintain the original angle and keep the edge straight. Use a triangular saw file to file the teeth, maintaining an equal height around the periphery. Filing the brad point should rarely be necessary. Never file the lifter on the top, nor the outer periphery of the bit.

Tube Plug Cutters
Use a smooth file to sharpen the lifter, working through the throat of the cutter. Maintain the original angle and keep the edge straight, removing as little metal as possible. The rim should rarely need attention; just make sure it is clean. If necessary, stone the rim with a very fine stone (like honing). Do not file it.