Drillbits - the different types

To drill a satisfactory hole in any material, the correct type of **drill bit** must be used; it must be used correctly and be sharpened as appropriate.

Many jobs around the house require a hole of some kind to be drilled - whether it is putting up a shelf, building a cabinet or hanging a light fitting.

For basic requirements, a set of high-speed steel twist drills and some masonry bits will probably be sufficient for the average handyman. But for more sophisticated jobs/material, others bits will be required - perhaps larger, or designed for a specific material/purpose.

Good quality drill bits can be expensive, so take care of them, keep them in a case or box if possible, rather than allowing them to roll around loose in a toolbox where the cutting edges may be damaged.

Learning how to sharpen drill bits is cost effective, it better to keep a bit sharp by occasional sharpening rather than waiting until it becomes really blunt. A sharp bit cuts better with less effort whether used in a power or hand drill. A sharp bit will also give a cleaner hole.

Twist bits

Usually referred to as twist drills, twist bits are probably the most common drilling tools used by the handyman with either a hand or electric drill. The front edges cut the material and the spirals along the length remove the debris from the hole and tend to keep the bit straight.

They can be used on timber, metal, plastics and similar materials. Most twist bits are made from either:

- 'high speed steel' (HSS), these are suitable for drilling most types of material, when drilling metal the HSS stands up to the high temperatures.
- 'carbon steel', these bits are specially ground for drilling wood and should not be used for drilling metals, they tend to be more brittle, less flexible than HSS bits.

Twist bits are also available coated with Titanium nitride (TiN), these are easily identified by the gold like colour. This coating increases the hardness of the bit and adds a self-lubricating property. The coating is only really effective when metal is being drilled, it has little effect when working with other materials.

Twist drills are usually available in sizes 0.8-12 mm plus. They are designed for drilling relatively small holes, they sometimes tend to clog quickly especially when the wood is 'green' so when drilling deep holes (especially in hardwood) the bits should be withdrawn regularly to remove the waste.

Special care is required when using the smallest sizes since these bits are thin and brittle. Always hold the drill square to the work and apply only light pressure when drilling.

Sharpening - use a drill sharpener, a grindstone jig or an oilstone.

Titanium nitride bits cannot be sharpened without destroying the coating (although if the drill needs sharpening, the coating will probably have already been destroyed). Forming the correct angle at the tip is important for efficient cutting.

Screwdriver bit drills

Designed to fit in rechargeable screwdriver these bits have a hexagonal shank. They are ideal for drilling pilot holes but are limited by the low power of these type of screwdrivers and the limited size of small bits available.

Sharpening - as for twist drills.

Masonry bit

As the name suggests, these are designed for drilling into brick, block, stone, quarry tiles or concrete. The cutting tip is often made from tungsten carbide bonded to a spiralled steel shaft. Some masonry drills are described as 'durium tipped', this term refers to a highly durable silicon bronze alloy used instead of tungsten as the cutting point.

Masonry drills are usually used in a power drill; although they can be used with a lot of effort in a hand brace. Most masonry bits can be used with a hammer action power drill, but always check as the action is quite punishing on the bit and cheaper bits have been known to shatter when subjected to the pounding. Always use a slow rotational speed for drilling into harder materials to avoid overheating the tip, and frequently withdraw the bit to remove dust.

Long Masonry bits (300 to 400mm) are available for drilling through masonry walls.

Bit sizes range from 4 to 16mm.

Sharpening - use a drill sharpener or grindstone to sharpen the tungsten carbide tip.

Spur point bit

Also known as a wood or dowel bit, they have a central point and two raised spurs that help keep the bit drilling straight. The bit cuts timber very fast when used in a power drill and leaves a clean sided hole. They are ideal for drilling holes for dowels as the sides of the holes are clean and parallel. Sizes range from 3 to 10mm. Spur point bits should only be used for drilling wood or some plastics.

Sharpening - a bit fiddly as it has to be done by hand. Sharpen the point and spurs with a fine file or edge of a fine grindstone; the angle between the point and spurs should be 90°.

Bullet Pilot Point

With their central point and two spurs, Bullet drills resemble spur point bits, but can be used in metal, wood and plastics. Unlike normal twist drills, the twisted flutes are ground away; making a truer, more accurate bit than normal twist bits. They cut a clean hole and cause little damage when they break through the back of the workpiece.

Bit sizes range from 1.5 to 13 mm.

Sharpening - cannot be carried out satisfactorily.

Countersink

Although not a true 'drill', it is used in a power or hand drill to form the conical recess for the heads of countersunk screws. These bits tend to be designed for use on soft materials such as timber and plastics, not metals. When used with a power drill to counter sink an existing hole, the bit tends to 'chatter', leaving a rough surface. Better results be will obtained if the countersink bit is used before the hole is drilled, then take care to ensure that the hole is in the centre of the countersunk depression.

Countersinks are available with fitted handles so that they can be used by hand twisting, often easier than changing the bit in the drill when only a relatively few holes need countersinking.

Sharpening: difficult, but can be done with a fine triangular file.

Countersink with clearance drill

These combination bits are quite clever, they drill the clearance hole and countersinks it all in one stroke. Can be used in a power drill or some routers. Different bits are required for different size of clearance holes and they are probably not cost effective unless a large number of a given hole size need to be drilled and countersunk.

Sharpening - difficult, due to shape of spur points.

Tile Bit

A bit for drilling ceramic tiles and glass, it has a ground tungsten carbide tip. They can be used with a hand drill, but are best used in a variable speed power drill on a slow speed. When drilling glass, some form of lubricant (i.e. turpentine or white spirit) should be used to keep the tip cool.

Ceramic tiles can also be drilled using a masonry bit if it is used at slow speed and without hammer action.

Sharpening - difficult because of the hard tungsten carbide and curved cutting edge. With care and patience, a blunt edge can be made good using an oilstone.

Flat wood bit

Intended for power drill use only, the centre point locates the bit and the flat steel on either side cuts away the timber. These bits are used to drill fairly large holes and they give a flat bottomed hole (with a central point) so are ideal where the head of a screw/bolt needs to be recessed into the timber - always use this bit before drilling the clearance hole for the bolt.

The larger bits require a fairly powerful drill to bore deep holes. The bits cause a lot of splintering as they break out the back of the workpiece - using a sacrificial backing board will reduce this. Flat wood bits are not really suitable for enlarging an existing hole.

Sizes range between 8 and 32mm.

Sharpening - use a fine file, oilstone or grindstone.

Hole saw

Used for cutting large, fixed, diameter holes in wood or plastic. They will usually cut up to a depth of 18mm - deeper versions are available. Best used in a power drill at low speed as the blade saws it's way through the material.

Sharpening - could be done with a fine triangular file - as for an ordinary saw.

Combination hole saw

Like the Hole Saw above, these combination saws can cut large holes but they consist of a number of different sized round saw blades, usually ranging from about 25 to 62mm in diameter. Normally the blade are secures by a radial screw in the 'head', all blades other than the desired sized being removed before the screw is inserted to secure the required diameter blade. Best used in a power drill at low speed as the blade saws it's way through the material.

Sharpening - could be done with a fine triangular file and 'setter' as for an ordinary saw.

Forstner bit

Used to form holes with a flat bottom, such as for kitchen cupboard hinges. Best used in a power drill held in a drill stand as there's little in the way of a central point. If used freehand, the positioning is difficult to control as there is no central pilot bit. .

Sharpening - on an oilstone or with a fine file.

Wood Auger bit

This is ideal when drilling large-diameter, deep holes in wood or thick man-made boards. Generally an Auger bit should only be used in a hand brace. The bit will cut a clean and deep, flat bottomed holes. The single spur cuts and defines the edge of the hole while the chisel-like cutting edge removes the waste within the previously cut circle. The threaded centre bites into the wood and pulls the bit into the timber. This 'pulling' action means that the bit is really unsuitable for use in a power drill.

Sharpening - use a fine file or oilstone to keep the spur and main cutting edges sharp.