



## HOW-TO BOOKLET # 3100

# DRILL KNOW-HOW



### TOOL AND MATERIAL CHECKLIST

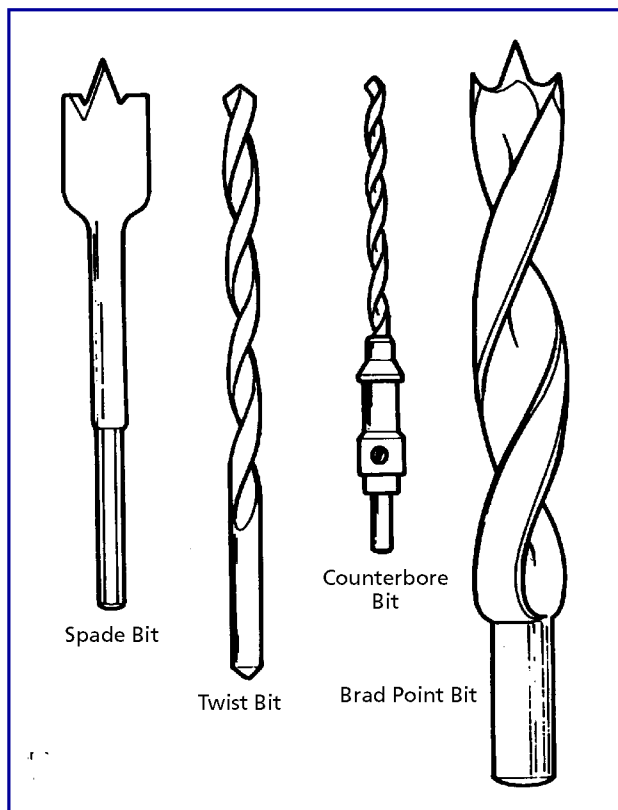
- Electric Drill Selected As To Project
- Drill Bits and Other Accessories
- Extension Cord
- Drill Chuck Key With Power Cord Keeper
- Attachment
- Safety Glasses
- Gloves
- Extra Chuck Key

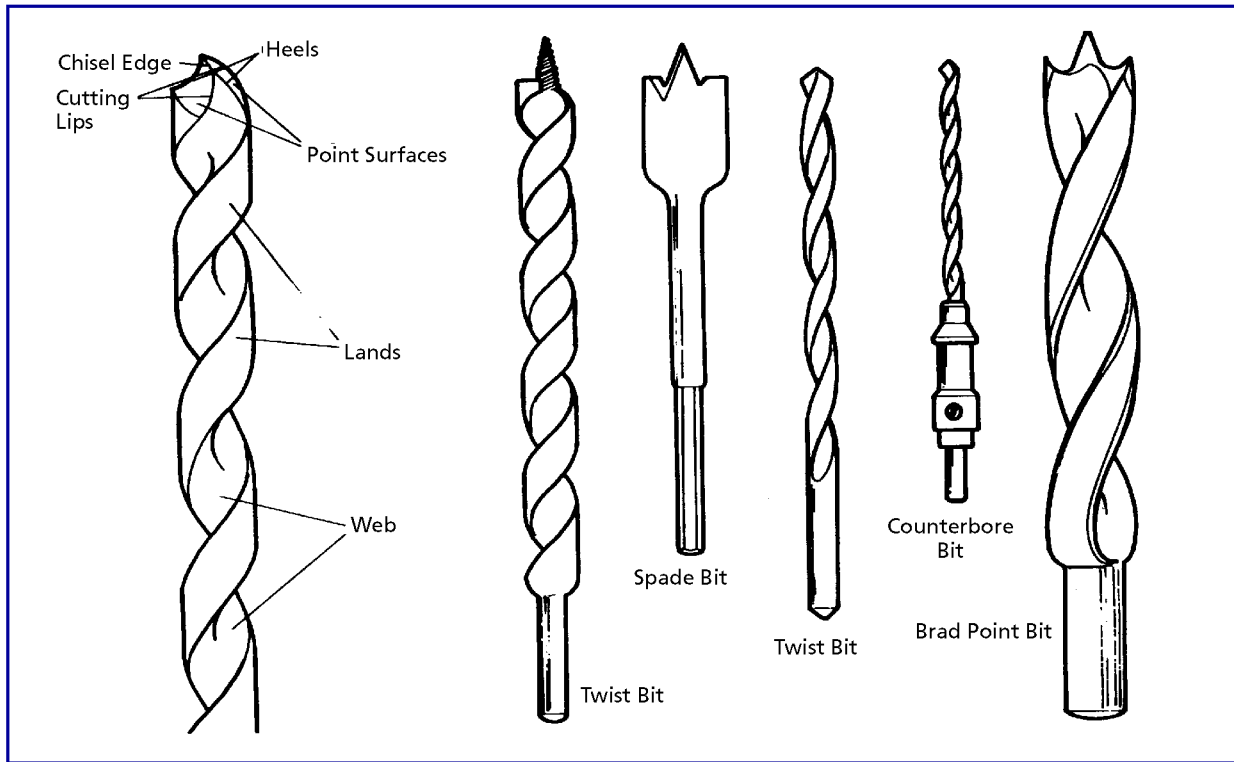
*Read This Entire How-To Booklet for Project Applications Utilizing A Portable Electric Drill.*

The Number One power tool for any homeowner or apartment dweller who tackles almost any home maintenance or improvement job is an electric power drill. You almost can't run a household without it. The time and money the drill will save you will far outweigh its initial cost. There are several different types or models of portable electric drills available. Some are designed for specific projects—such as drilling and hammering into concrete. The purpose of this How-To Booklet is to acquaint you with this drill assortment and provide you with the data you will need to operate the equipment efficiently.

### SIZE CONSIDERATIONS

There are three basic drill sizes available: 1/4-, 3/8-, and 1/2-inch. The fraction size refers to the capacity of the chuck—the business end of the drill where the bits are locked in. The size you buy really depends on the type of project for which the drill will be used. For all around work—a “general drill”—we recommend a 3/8- inch drill with a variable speed and a reversing feature. It is powerful enough to handle almost all repair jobs, yet light and compact enough to follow your commands.





For your comparison:

**The 1/4-inch drill.** This is the lightest of the three drills and is the least expensive. The drill will handle drill shanks up to 1/4-inch for 1/4-inch holes in metals and 1/2-inch holes on wood and other “soft materials” without a special hole saw or oversized wood bits. If possible, buy a drill with a variable speed feature. This feature lets you start the drill into the material you are drilling slowly, then increase the speed once you have the drill started squarely into the work.

Some 1/4-inch drills offer a reversing feature, but you may pay extra for it. Most of the drills do not have a low-torque feature, and the drills will not stand up to a lot of constant hard work, such as drilling multiple holes in concrete, brick and stone. However, a 1/4-inch drill is adequate if your household drilling chores are infrequent and light.

**The 3/8-inch drill.** This drill will give plenty of power and it will drill up to 3/8-inch holes in metal and 3/4-inch holes in wood—without a hole saw or special bits that increase the hole size. You can lean on this drill and the 1/3rd to 3/8ths (or more) horsepower windup keeps on turning without noticeable slow-down. The larger chuck size lets you use up to 3/8-inch twist drills and special large-shanked accessories.

Many models have the variable-speed feature, some with a hammer mode that lets you drill easily into concrete and masonry materials. Buy the reversing feature if you can; it will let you draw and drive screws. This can be important and very time-saving when you have a lot of fastening work to be done—installing hinges, for example.

The 3/8-inch drill offers a mid-range in speed, which permits clean hole drilling in wood. Its motor has lots of power and will take on a great deal of constant hard work and abuse.

**The 1/2-inch drill.** This is the model the professional buys, and it is the most expensive of the drills. It can punch holes in almost any material.

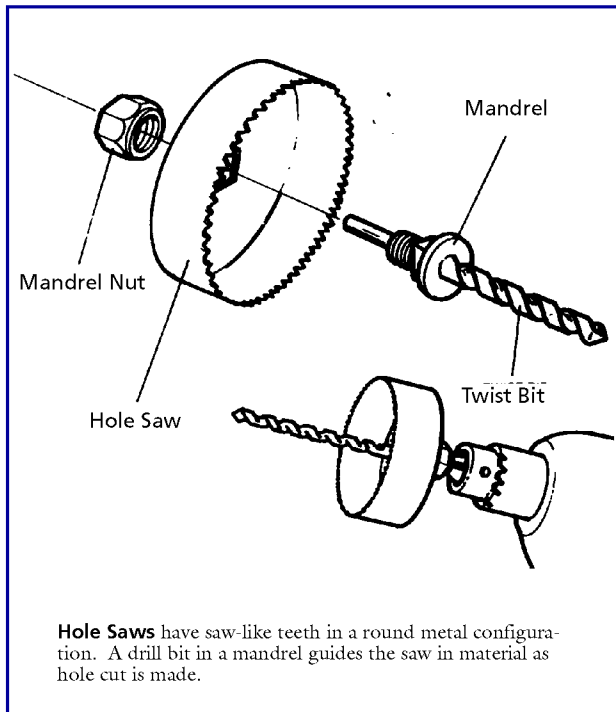
### COMPATIBLE SIZES: PLYWOOD, SCREWS, AND DRILLS

Plywood Thickness	Screw Length	Screw Size	Drill Size For Shank	Drill Size For Root of Thread
3/4"	1 1/2"	#8	11/64"	1/8"
5/8"	1 1/4"			
1/2"	1 1/4"	#6	9/6"	3/32"
3/8"	1"			
1/4"	1"	#4	7/64"	1/16"

\*If splitting is a problem (as in edges) make hole for threaded portion 1/64" larger (9/64", 7/64" respectively).

The 1/2-inch drill will drill up to 1/2-inch holes in metal and 1-inch holes in wood—or even larger holes with accessories such as hole saws. Some drills have a hammer mode and different drill chucks for different materials. The quality drills have variable speed with low rpms and high torque. Most have trigger locks.

**The hammer feature.** A drill with an impact or hammer mode actually adds another tool to your assortment. With a flip of a lever on the handle of the drill, the drill becomes more or less a wood chisel that is capable of making mortise and other type joints. The accessories available will give you an idea of what the hammer mode will do: drill bits, masonry bits, mortar chisels, scrapers, and a full set of wood chisels.



**Cordless drills.** You can buy drills that run on battery packs and they are recommended if you are involved in projects where you can't plug the drill into power. The batteries hold up fairly well. But don't expect to run the drill full out all day long on one battery set or battery charge. The pros use them for assembling metal grid work for suspended ceilings and joining metal duct work—among other jobs—where prolonged use is not necessary.

### DRILL ACCESSORIES

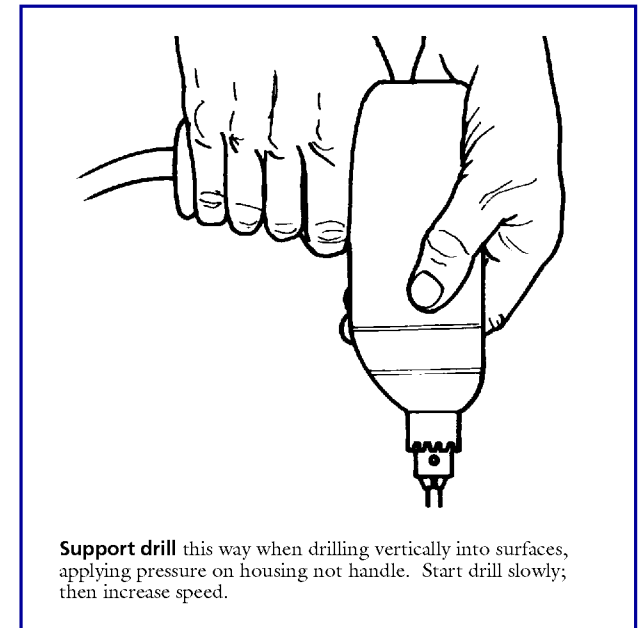
All three size drills offer many accessories: screw-driver attachments, paint paddles, wire brush attachments—even attachments to convert the drill into saws, lathes, and other woodworking tools.

The list of helpful drill accessories includes: paint mixers, hole saws, an assortment of spade bits, drum sanders, right angle drives (to drill at right or acute angles), wire brushes, wood countersinks, metal working drills, grinding wheels, rotary rasps and files, drill stands (to make a drill press out of the portable drill), and drill stops for depth drilling. These accessories cost extra, so buy them as your work dictates and ask for a demonstration in the store, if possible, before you make a purchase.

### DRILL BITS AND HOLE SAWS

Making holes, of course, is the primary purpose for which the electric portable drill is designed. There are a variety of drill bits for them. Unlike the square-tanged shank of a brace bit, the shank of a power drill bit that is held by the drill chuck is round and smooth.

Most common is the **twist bit**, which has a sharp point and two spiral-shaped cutting edges that lift chips out of the hole as the bit turns. High-speed steel twist bits are suitable for drilling wood and soft metals. Diameters range from 1/16-to 1/2-inch. While they can be purchased individually, twist bits are less costly if purchased in sets.



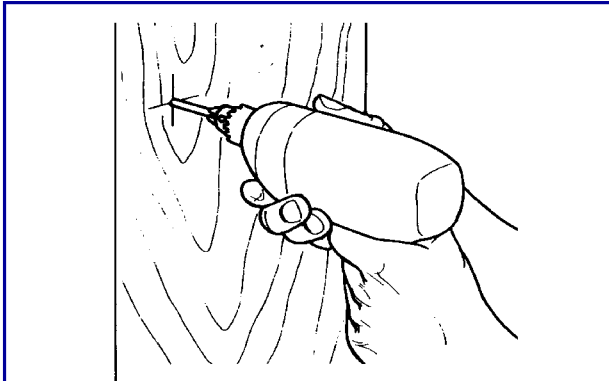
The **spade bit** cuts larger holes than a twist bit. It has a flat driving end with a pointed tip.

Cutting diameters range from 3/8- to 1- inch.

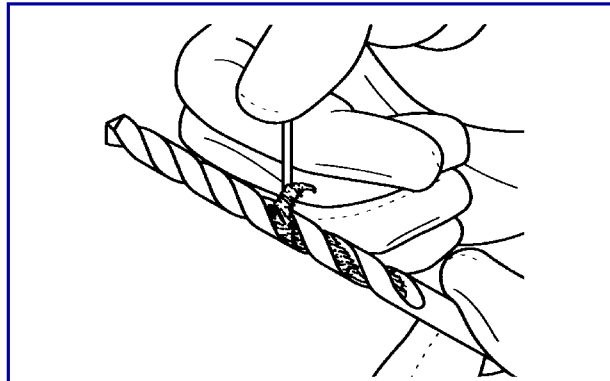
**Boring bits** have round cutting heads to drill holes in the same size range as spade bits.

For still larger holes, a **hole saw** may be locked into the chuck of the drill. The hole saw consists of a rim saw blade and a centered pilot bit. Common diameters range from 1 to 4 inches.

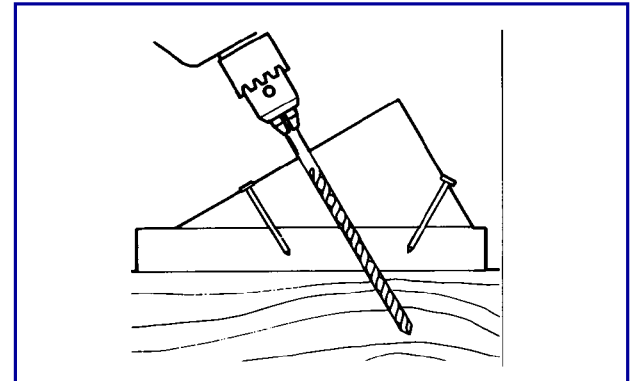
A wood screw **pilot bit** (sometimes called a "Screwmate") has three widths of cutting edge. The narrowest drills a pilot hole for screw threads. The next widest makes a shaft for the unthreaded screw shank. The widest makes a recess, or countersink, or flat head screws. A **counterbore bit** is similar except that it drills the countersink below the surface of the wood so that the screw head can be concealed by a wood plug.



**Hold housing of drill** this way on horizontal surfaces, applying pressure to back of drill and guiding drill with hand that holds the housing.



**When drilling into metal**, remove the drill bit often and clean the metal shavings from the webs and lands of bit. Protect your hands with work gloves and use oil for lubrication.



**To drill angles**, make an angled block to specifications. Then drill through block into work. Block offers support and guides drill bit.

**Masonry bits** are available in a variety of sizes for drilling holes in concrete, concrete block, cinder block, brick, stone, ceramics, and glass. The bits are tipped on the cutting edges with carbide so the edges remain sharper longer. If there is any “trick” to using masonry bits it’s not to force them into the material by pushing down hard on the drill. Use a little pressure and then let the drill do the work. Let the bit cool from time-to-time. For large holes, start with a small bit and then change to a larger bit. The work will go faster.

## SAFETY CONSIDERATIONS

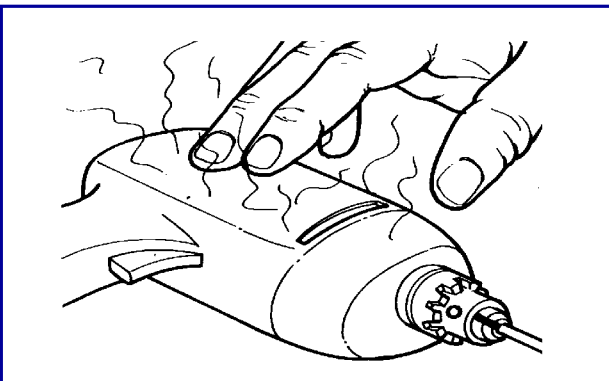
Most—if not all—portable electric drills are “double insulated.” This means that electrical wiring and metal parts are isolated within the housing of the drill so that electrical shock is not possible. If you buy a drill that is not double-insulated, it should be grounded with a three-prong plug grounding device. The device is worthless, however, unless the power source also is grounded in a three-wire system. Most of them are.

Even with this built-in safety equipment, we would advise you **never** to stand in water or on wet or damp ground when using a portable electric drill.

When using a drill, always keep the work locked in a vise or clamped to a table when drilling into the work, unless, of course, the work is fastened to something. Do not hand-hold the work. If you try to hand-hold it, the drill can catch on a knot or other imperfection in the material and cause the work to spin out of your hand.

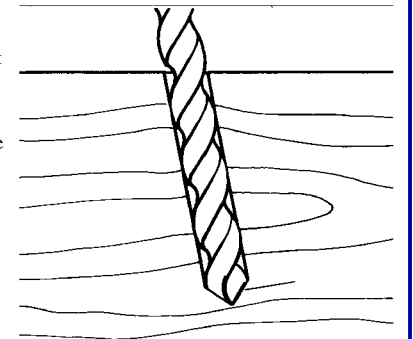
When drilling in any material, please wear safety glasses or goggles. Drills can stir-up a lot of sawdust and can flip metal shavings and chips across a room.

Gloves are a good idea, too, especially when working with metal, masonry and glass.



**Check drill for overheating** often. If housing feels hot to your touch, let the drill cool before you continue using it. Don’t force drill.

**If drill binds** in material, or becomes overheated, remove it and let cool. Then start work again, but go slowly and don’t force drill. Make sure drill is sharp.



**When drilling deeply** into any material remove drill bit often while the drill is still turning. This will clear hole of debris; aid cutting action.

