



HOW-TO BOOKLET #3105

NAILS & SCREWS



TOOL & MATERIAL CHECKLIST

- Nail and Screw Selection
- Washers
- 16 Oz. Claw Hammer
- Tack Hammer
- Phillipshead and Standard Slot Screwdrivers
- Assortment of Drill Bits/Countersinks/Nail Sets

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in the Basics Listed Above.

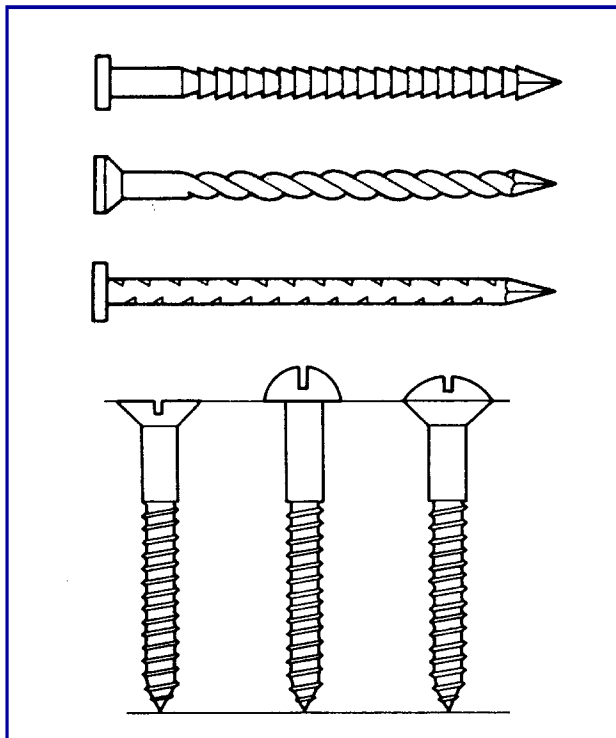
Nothing is deader than a door nail, the saying goes, and that's probably why nails (and screws, too) get no respect at all for the job both do—such as keeping houses from falling apart, shelving on walls, decks sturdy, railings in place, windows in openings.

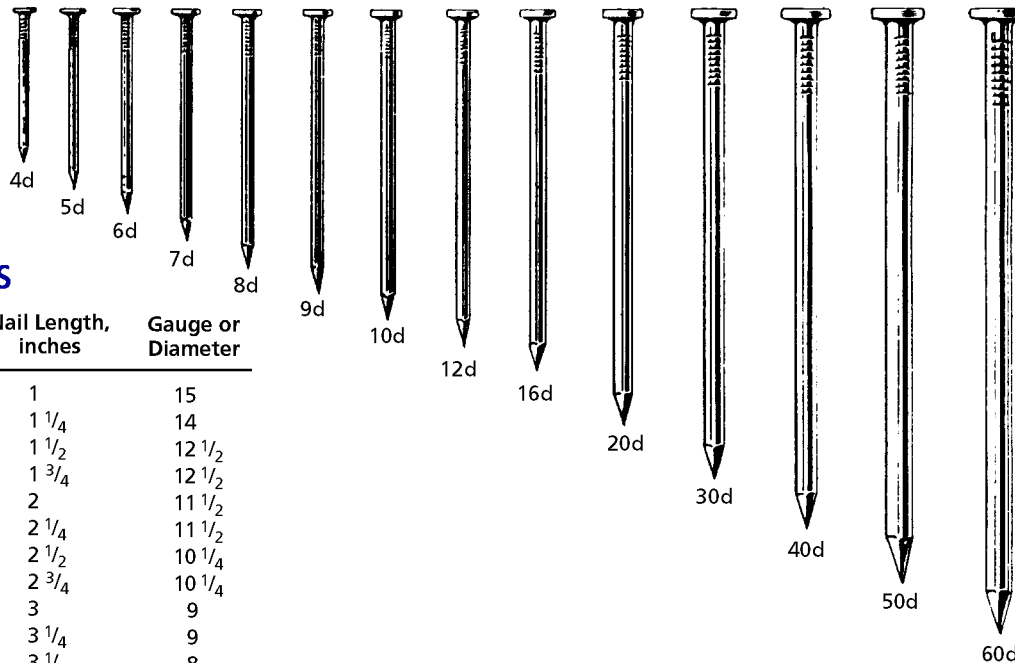
Regardless of the project that you undertake, nails and screws probably will be on the materials list, and that's why it's important to know what's available in these fasteners and what each one does specifically.

NAILS, BRADS, AND SPIKES

Nails are the most primitive and least sophisticated fastening device. They are also the most widely used, especially in structural carpentry, because they can be quickly driven into place to form a sturdy joint. The holding power of a nail is achieved by the pressure of wood fibers, displaced by the nail entering the wood, trying to return to their original positions.

A common nail has a large, flat head and is used for most rough work. A box nail is thinner and is also used for rough work. A finishing nail has a small head—only slightly larger than the shank of the nail—with a depression so that a nailset can be used to conceal the head below the surface.





NAIL SIZES

Penny Size (d)	Nail Length, inches	Gauge or Diameter
2	1	15
3	1 1/4	14
4	1 1/2	12 1/2
5	1 3/4	12 1/2
6	2	11 1/2
7	2 1/4	11 1/2
8	2 1/2	10 1/4
9	2 3/4	10 1/4
10	3	9
12	3 1/4	9
16	3 1/2	8
20	4	6
30	4 1/4	5
40	5	4
50	5 1/2	3
60	6	2

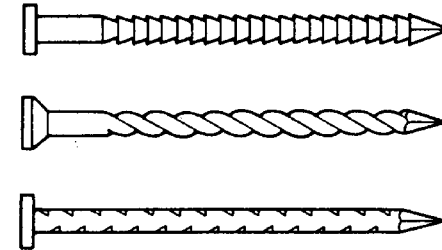
A **casings nail** is similar to a finishing nail, but the head is tapered and has no depression; it is often used for exterior trim work and may be driven either flush with the surface or set below it. **Brads** are small, lightweight nails with practically no head at all. They are used for light finishing work and are usually concealed beneath the surface.

A **double-headed nail** has two heads. One is above the other. These are used for scaffolding or concrete forms—work that must be disassembled later. The nail is driven only to the lower head. The upper head remains above the surface so that it can be grasped by a claw hammer for easy removal.

There are specialty nails. **Masonry nails** may be either cut steel or specially hardened wire. Rust-proof **aluminum nails** are used for exterior applications, such as on certain types of siding. **Galvanized steel nails** are used for the same purpose. **Hot-dipped galvanized nails** are more rust-proof than their plain cousins.

Roofing nails have large heads to hold soft asphalt shingles. **Drywall nails**, with slightly smaller heads, are used to install gypsum wallboard (drywall).

In addition of variations in head shapes and sizes, nail points also vary. In general, the sharper the



For more holding power in wood, these specialty nails should be used. From the top: ringed shanked; spiral shank; barbed shanked.

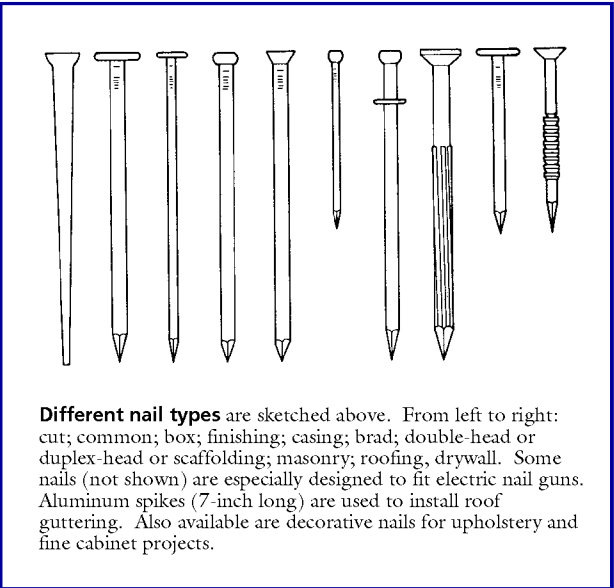
point, the greater the holding power of the nail. However, a sharp point is more likely to split the wood than a dull one.

The shanks of some nails are ringed, spiraled or barbed to increase holding power. Others may be coated with resin or cement. These nails are not recommended for use where they may have to be removed.

The “penny” system for sizing nails originated in England. The letter “d” was the designation for the English penny. In the early days, the same abbreviation was used to indicate a pound in weight. Nails were weighed by the thousand, so if 1,000 nails totaled 12 pounds, they were 12d, or 12-penny nails. The penny system has endured, although today it refers only to nail length. For example, a 2d nail is 1 inch long; the length increases 1/4-inch for each higher number up to 10d. Then the penny system gets more complicated (see chart).

Spikes are larger, thicker versions of common nails, overlapping some penny sizes—generally from 30d to 60d. Spikes longer than 6 inch are described by their actual length, ranging up to 12 inches

Most nails are sold by the pound, and, of course, the larger the nail, the fewer nails per pound. The type of nail also makes a difference in weight.



Different nail types are sketched above. From left to right: cut; common; box; finishing; casing; brad; double-head or duplex-head or scaffolding; masonry; roofing, drywall. Some nails (not shown) are especially designed to fit electric nail guns. Aluminum spikes (7-inch long) are used to install roof guttering. Also available are decorative nails for upholstery and fine cabinet projects.

The nail drivers. For do-it-yourselfers, a 16-ounce claw hammer is recommended to drive most nail fasteners, with the exception of brads. Use a tack hammer (or 10- to 12-ounce claw hammer) to drive brads—and tacks, of course.

A 20-ounce hammer is a professional tool and it takes lots and lots of muscle to swing it. However, it will drive nails faster than a 16-ouncer.

A ripping hammer differs from a claw hammer in that the claws are more in a straight line than curve. This design provides a “crowbar” action for ripping apart assembled framing.

Always buy quality hammers. They are easier and less tiring to swing and balanced for accuracy.

THE SCREW SELECTION

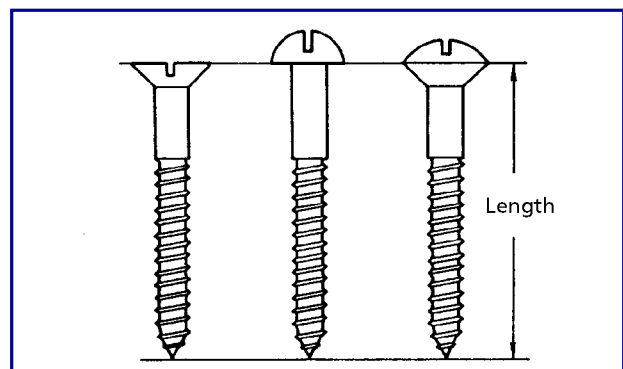
For pure holding power, screws are better than nails and if you want this added feature, always use screws

at wood joints when you can. Wood screws, however, are seldom used in structural carpentry. Common wood screws are made of steel or brass. The screw shank is threaded from the point up, about 2/3rds of its length. The upper third is smooth to the head. **Flat head** screws are used where the screw must be flush with the surface of the work. **Round head** screws protrude above the surface, making them easier to withdraw. **Oval head** screws combine features of flatheads and roundheads: they are partly countersunk in the work, and they protrude slightly above the surface.

Most screw heads have either a single slot across the entire width or a recessed, X-shaped slot called a Phillips head.

Wood screw length is measured from the point to the widest part of the head, see illustration below. Lengths range from 1/4-inch to 6 inches and are graduated by eighths of an inch to 1 inch. Screws also vary in body diameter, expressed as a gauge number from 0 (about 1/16-inch) to 24 (about 3/8-inch).

Lower-numbered (thinner) screws are for fastening thin wood or where there is a danger of splitting. High-numbered screws are used where greater strength is required.



Screw measurement is from the point to the wide part of the screw head. From left: flathead, roundhead, ovalhead. Screws for metal are called sheet metal and self-tapping screws.

APPROXIMATE NUMBER PER POUND OF VARIOUS NAILS*

Use this chart when selecting and buying the most used nails: common, box, finishing and casing. Some home centers, building material outlets and hardware stores sell nails by the bulk. Some also sell nails by the box in 1 and 5 pound weights. Or you can buy bulk nails in large quantities such as 55-pound kegs. The kegs once were wooden. Now they're made of cardboard.

Nail Size	Common Nails	Box Nails	Casing Nails	Finishing Nails
2d	890	1,010	1,010	1,380
3d	590	640	640	895
4d	318	440	440	605
5d	275	410	410	530
6d	190	240	240	322
7d	165	210	210	270
8d	106	145	145	200
9d	95	135	135	176
10d	72	95	95	130
12d	64	88	88	118
16d	48	72	72	92
20d	32	52	52	
30d	24	46	46	
40d	18	35		
50d	15			
60d	11			

*Based on average counts. Actual numbers may vary.

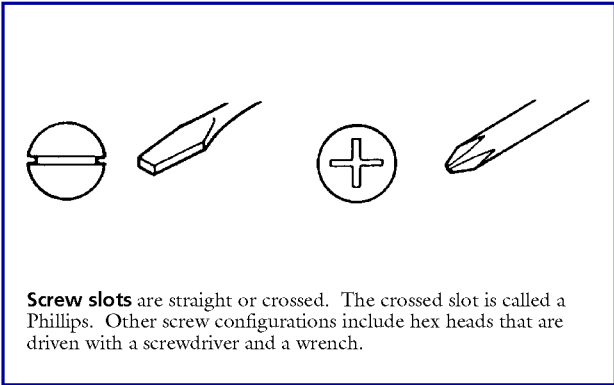
SCREW SIZES: LENGTHS AND GAUGES

Screws are designated by both length and diameter. Length is designated in inches. Diameter is designated by a gauge number. Lengths available run from 1/4-inch to 6 inches. Gauges available are 0 (1/16-inch) to 24 (3/8-inch). The label on the box of screws might read 1x6, meaning the box contains 1-inch screws of No. 6 gauge. Most stores carry all standard lengths of screws in appropriate gauges. Most common gauges are Nos. 2 through 16. The heavier the work required of the screw, the larger the gauge should be.

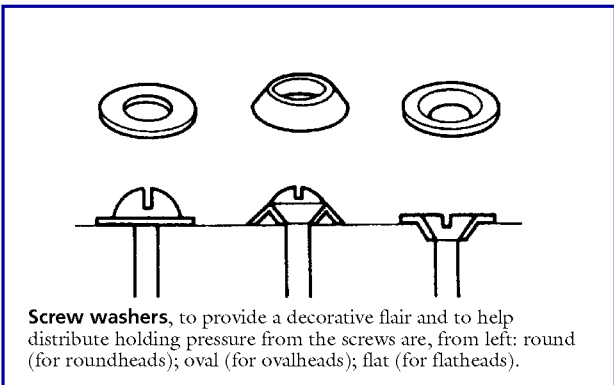
Length in inches	Gauges Available																								
	0	1	2	3	4	5	6	7	8	9	10	11	12	14	16	18	20	24							
1/4	x	x	x	x																					
3/8		x	x	x	x	x	x	x																	
1/2			x	x	x	x	x	x	x																
5/8				x	x	x	x	x	x	x	x														
3/4					x	x	x	x	x	x	x	x													
7/8							x	x	x	x	x	x	x												
1							x	x	x	x	x	x	x	x											
1 1/4							x	x	x	x	x	x	x	x	x										
1 1/2							x	x	x	x	x	x	x	x	x	x									
1 3/4								x	x	x	x	x	x	x	x	x	x								
2								x	x	x	x	x	x	x	x	x	x	x							
2 1/4									x	x	x	x	x	x	x	x	x	x	x						
2 1/2										x	x	x	x	x	x	x	x	x	x						
2 3/4											x	x	x	x	x	x	x	x	x						
3											x	x	x	x	x	x	x	x	x						
3 1/2												x	x	x	x	x	x	x	x						
4													x	x	x	x	x	x	x						
4 1/2														x	x	x	x	x	x						
5															x	x	x	x	x						
5 1/2																x	x	x	x						
6																	x	x	x						

To drive screws easier, pre-drill pilot holes for them about the same diameter as the threads of the screw. If you are countersinking, pre-drill the pilot hole then countersink it. You can also slide the screw threads over soap or beeswax to make them easier to drive—especially in hardwoods. You can buy countersinks for portable electric drills and stationary drills that, at one time, drill the pilot hole, shank the hole, and countersink the hole.

Lag bolts and **dowel screws** are part of the screw family. Lag bolts are thick and heavy for heavy fastening. Lengths range from 1 to 12 inches. Dowel screws are threaded on both ends and are used to join wood in butt joints—like dowel pins would be used. These fasteners are driven with pliers and wrenches after pilot holes are drilled.



Screw slots are straight or crossed. The crossed slot is called a Phillips. Other screw configurations include hex heads that are driven with a screwdriver and a wrench.



Screw washers, to provide a decorative flair and to help distribute holding pressure from the screws are, from left: round (for roundheads); oval (for ovalheads); flat (for flatheads).