

# Screws, Drill Bits & Drivers



# How screws are made



**Modern screws are made, oddly enough, by squeezing metal rather than cutting it. A steel or alloy blank, a cylinder with no threads, is rolled between two heavy dies that are grooved with diagonal lines.**

# Materials



**Unplated or Zinc Plated Hardened Steel** screws are the most popular, and are primarily used where they will not be visible or exposed to corrosive conditions.

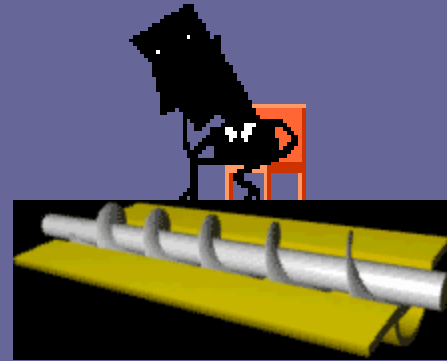
**Stainless Steel** provides the ultimate corrosion resistance for most woodworking projects. It is typically softer than hardened steel screws.



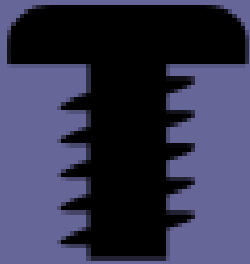
**Solid Brass** screws are also very soft, and virtually demand a carefully sized pilot hole to eliminate installation breakage. (Pre-threading the hole with a steel screw helps minimize this problem.)

# How Do I Decided Which Screw to Use

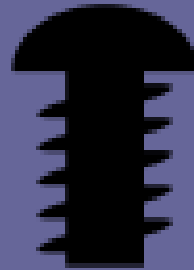
- Type of head
- Type of drive
- Size
- Thread/Use



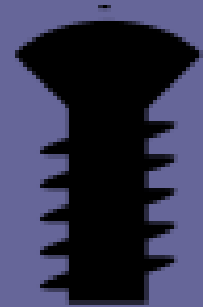
# Head Style



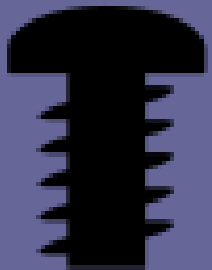
Pan



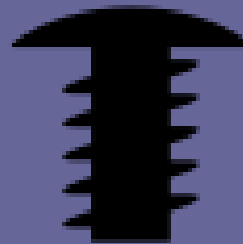
Round



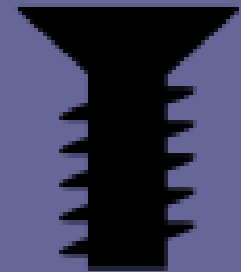
Oval  
(Countersink)



Button



Truss or Washer



Flat  
(Countersink)

# Type of Drive



**Slotted**



**Cross Drive**



**Hex**

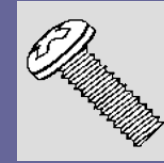
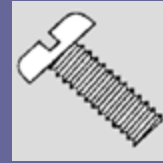
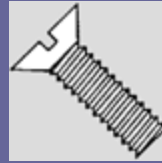


**Torx**

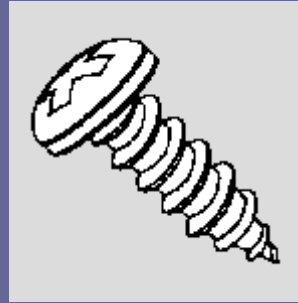
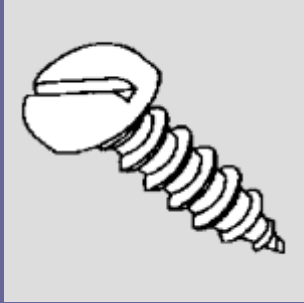


**Robertson**

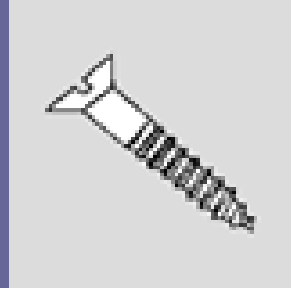
# Thread/Use



Machine



Sheet Metal



Wood



Sheet Metal – Self Drilling





# Screw Types



## **Flat Head**

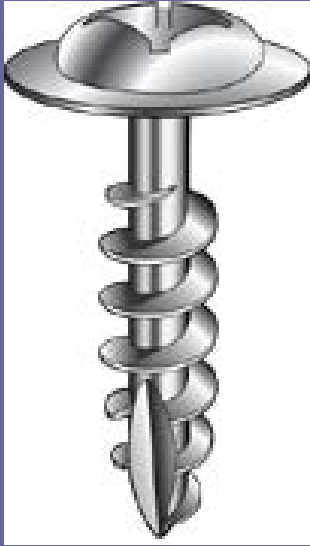
The screw head is designed to be flush with the surface or countersunk and plugged. Flat heads self-center in the mounting holes of most hinge hardware.

## **Pan Head**

Pan Heads provide a flat bearing surface under the head which is useful for attaching adjustable cabinet hardware such as drawer slides and hinges.



# Screw Types.



## **Round Washer Head**

An oversize washer is formed as part of the head itself, providing a larger bearing area which is especially useful when fastening soft materials. These screws are commonly used when hanging cabinets, installing drawer fronts, or installing table tops.

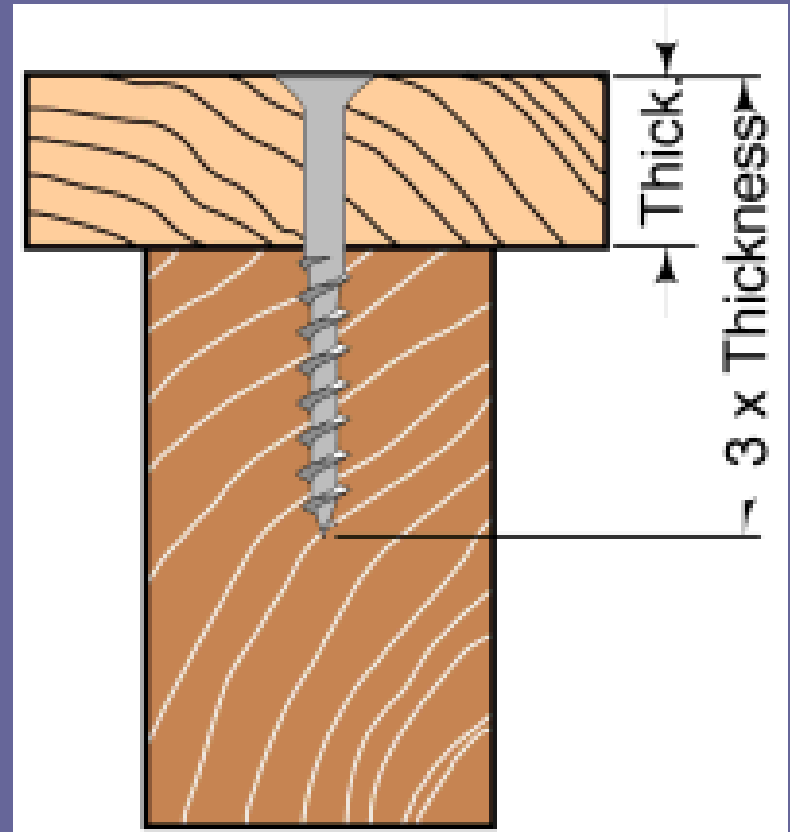
## **Trim Head**

The trim head screw resembles a finishing nail in both appearance and function. The small head permits the screw to countersink itself just like a finishing nail.



# Screw Length

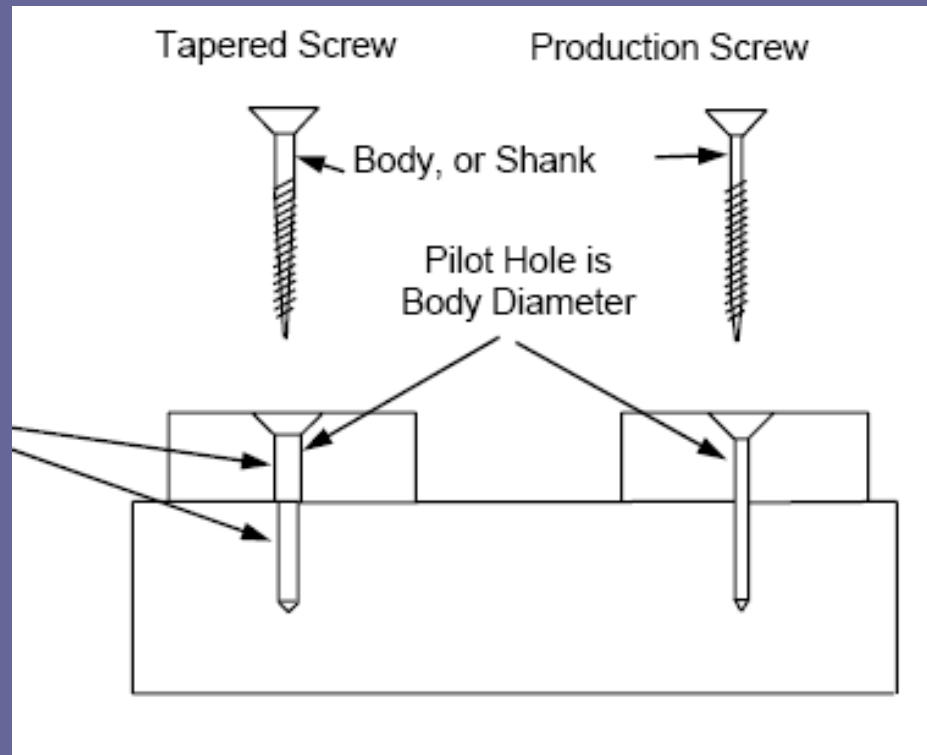
There is no hard and fast rule. Sometimes you don't have much choice as to length because of the construction details. In general though, the screw should always freely go through the thinner piece, and thread into the thicker piece. In choosing length, try to have about 2/3 of the screw threaded into the "secondary" piece, as shown.



# Countersinks and Pilot Holes

Countersunk pilot holes, for production screws, can use straight drill bits, instead of tapered bits. The body, or un-threaded portion of the shank diameter is the same as the root diameter of the thread.

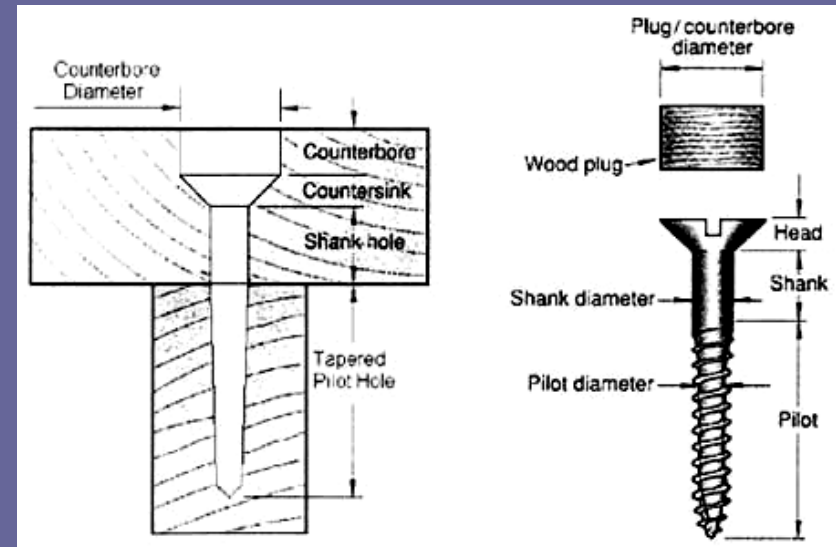
The pilot hole for a tapered screw must be stepped in two sizes, or tapered.



# Holes for Wood Screws

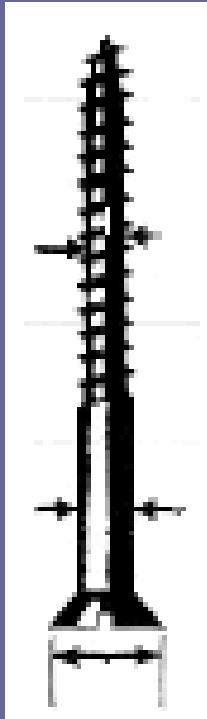
Wood screws are tapered. A properly drilled hole consists of three parts:

- **Pilot Hole** – drilled into both pieces. Size of the Root Diameter of the screw.
- **Shank or “Clearance” Hole** – drilled into the top piece. The screw should be able to slide freely through this hole.
- **Countersink and Counterbore** – allows flat head screws to be installed flush or below the wood’s surface.



Tapered plugs can be cut to fit counter-bores to hide the screw.

# 3 Step method for Drilling



**Step 1:** Pre drill for the threaded portion of the screw. The bit size is determined by the “Root Diameter” of the screw (as shown). Pilot depth should be about 1/8”-1/4” less than the length of the screw.

**Step 2:** Drill a clearance for the shank portion of the screw.

**Step 3:** Drill the countersink hole to the appropriate depth.

# Pilot Drill Size Recommendations

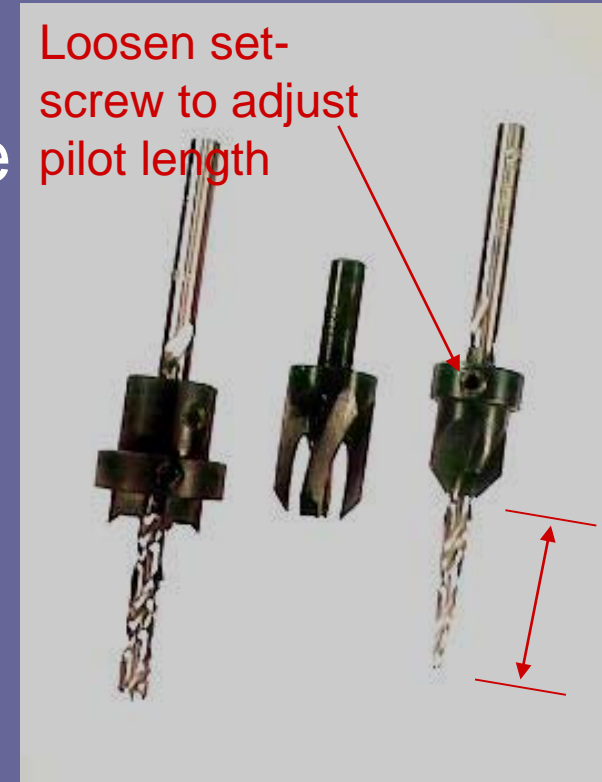
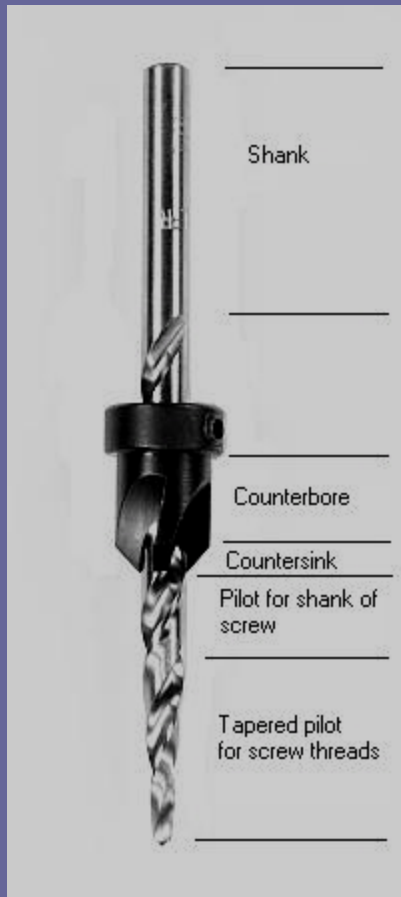
In general, the harder the material, or the softer the screw, the larger the pilot hole should be. Use the following table as a starting point. In practice, use a slightly larger bit for hardwoods, slightly smaller for softwoods.

Screw	Hardwoods	Softwoods	Plug Size
#4	5/64"	1/16"	1/4"
#6	7/64"	3/32"	3/8"
#8	1/8"	7/64"	3/8"

A quick and relatively safe technique is to simply hold a drill bit up to the shank of the screw. Nominally, the proper bit is the same size as the shank between the threads (this is known as the **Root Diameter**).

# Taper Point Drills

Taper Point Drills were designed to drill holes for most standard wood screws in one operation.





# Driver Bits

Driver bits are used to drive screws into wood. This is faster than using a hand screwdriver.

Commonly used screws are Phillips or Square Drive. Driver bits are available in different sizes - #1, #2 or #3 and must be matched to the screw size.

Bits are either directly chucked, or inserted into a magnetic bit holder.



**Magnetic Bit Holder with Phillips Drive Bit and Screw**



**Square Drive Bit with Cordless Driver & Screw**

# Vix Bits



When drilling screw holes for hardware, Vix Bits ensure that you drill perfectly centered holes.

Vix bits consist of a standard twist bit housed inside a spring loaded metal armature.

# Tips for properly installing screws

- Make sure pre-drilled holes are adequately sized for the fastener you are using.
- Whenever possible, use an impact driver to drive screws.
- When using a cordless drill, adjust the clutch so your driver bit does not “Cam-Out” and damage the bit or fastener head.
- When centering holes for hardware installation, use a Vix bit to accurately locate the pilot hole.