

**Knowledge domain: Mechanical**

**Unit: Attachment**

**Skill: Tools for adjusting bolts/screws, choosing different heads**

**Tools and Parts Required:**

- 1) Assortment of screws (incl round, flathead, oval, hexagon-shaped, allen, trus, wood, machine, sheet metal, high-low, self-tapping)
- 2) Philips screwdriver
- 3) Flathead screwdriver

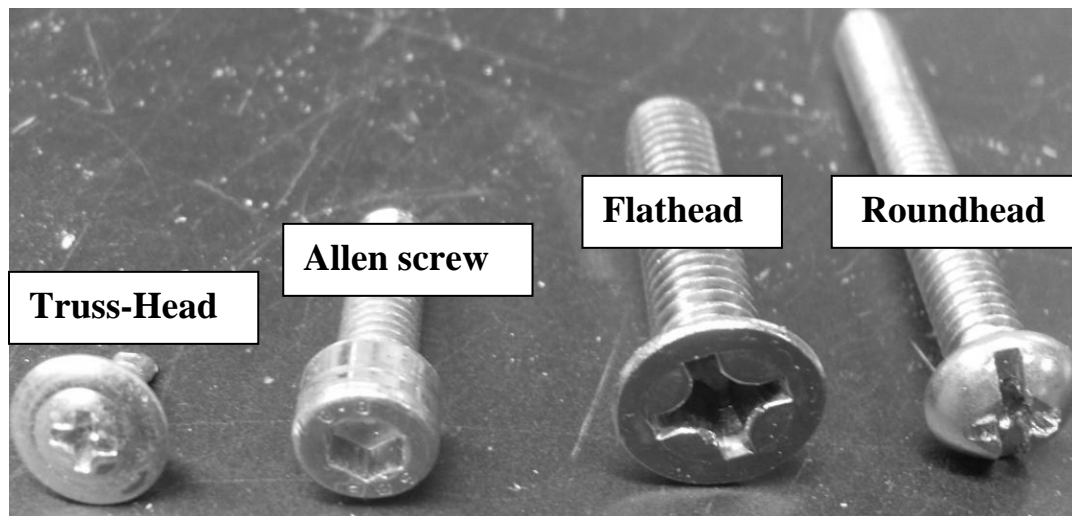
**Introduction**

Screws and bolts are used to attach two pieces of material together. Screws and bolts are very similar. Many people use the words “Screw” and “bolt” interchangeably. There are many types of screws and bolts. Most screws and bolts are steel, stainless steel or zinc-plated steel. There are also special screws created from other materials like nylon. Various head shapes, thread types, and driving methods exist for screws and bolts.

A screwdriver is a tool used to tighten screws. There are several types of screwdrivers. Screwdrivers correspond to certain types of screws.

**Example**

Below is a picture of a Truss head screw, a hex head screw, flathead screw and a round head screw.



**Identification and Diagnosis**

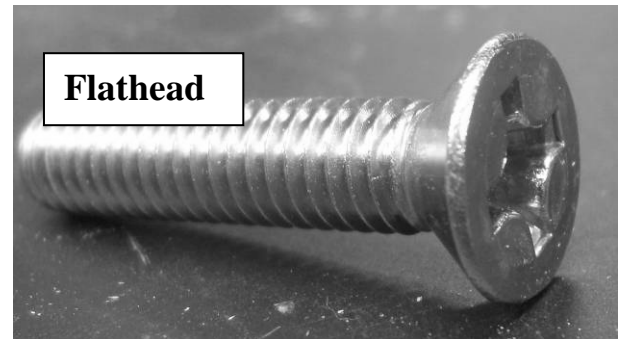
There are various types of screws. Screws differ in three areas: head shape, thread variety and driving method. Below, the most common types of screws are explained.

## Head Shape

- 1) *Round head* screws are shaped like a half sphere with a flat bottom. Round head screws are not flat with the surface. The round head of a round head screw protrudes even after you fasten the screw.



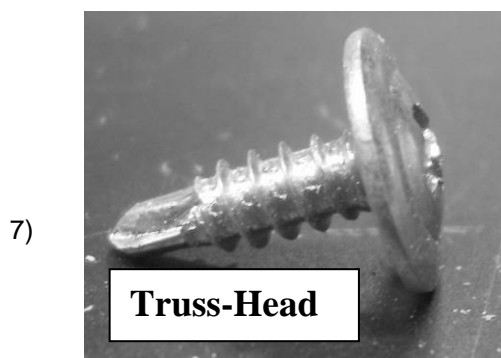
- 2) *Flathead* screws- The head of flathead screws is flat. The base of flathead screws is tapered. A flathead screw is flat with the surface when used properly . Flathead screws are used when you want to hide the screw head.



- 3) *Oval Head* screws- The base of oval head screws is tapered like a flathead. The top of oval head screws is oval shaped. The head protrudes slightly from the surface.
- 4) *Hexagon Shaped Head* screws – The top of hex-head screws are not indented. The top is shaped like a hexagon.



- 5) *Allen screws* - There is a hexagonal hole in the head of Allen screws.
- 6) *Truss Head* screws- The diameter of the head of truss head screws is large. Truss head screws are flat against the surface after installation. Truss head screws do not protrude.



*Fillister*



*Head*

screws are slightly rounded at the head. When you view the side of a Fillister head screw, the screw appears thick.

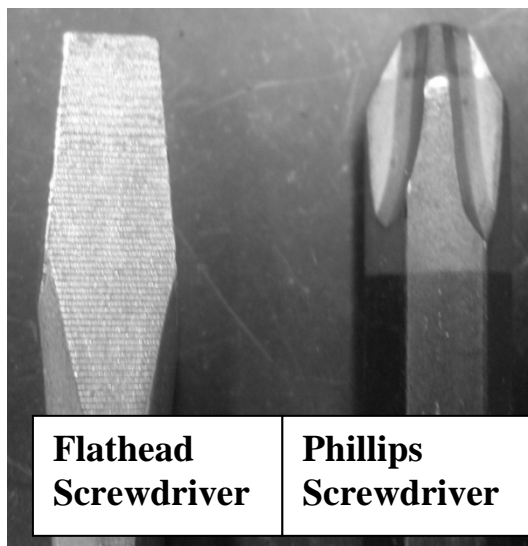
### Thread Varieties

- 1) **Wood Screw:** Wood screws are for wood. Use a wood screw when you work with wood. The threads are usually coarse and deep to help the screw grab the wood.
- 2) **Machine Screw:** The threads of machine screws are finer than the threads of wood screws. Machine screws are used with metal. Machine screws are common.
- 3) **Sheet Metal Screw:** Sheet metal screws are usually short. Sheet metal screws have coarse threads.
- 4) **High-Low:** Hi-Low screws have two sets of threads with alternating heights. High-low screws are used in certain plastics.
- 5) **Self-Tapping:** Self-tapping screws can tap their own holes. Self-tapping screws are used in softer materials such as wood and plastic. Do not use self-tapping screws in hard materials.

### Driving Methods

The methods used to insert screws are called driving methods. The type of screw head determines the type of screwdriver you should use.

- 1.) Screws with a slot (linear indentation) in the head: Use a standard, or flat, screwdriver. The tip of flat screwdrivers is linear.
- 2.) Screws that have cross-shaped grooves (Phillips head): Use a Phillips-head screwdriver.
- 3.) Screws that do not have any grooves or slots: The head of these screws is hexagonally shaped. Hex headed screws are tightened with a wrench. These hex headed screws come in different sizes. Use a wrench that fits snugly around the screw.
- 4.) Screws with an odd-shaped indentation: Use a special shaped driver for tightening and loosening. These include square, star, torx and other shapes.



### Procedure

If you replace screws on a medical device, try to insert the same type of screw the machine already uses.

Identify the material you are working with. Use the information about thread varieties (above) to decide which screw to use. If you fasten something to metal, use a machine screw or a self-tapping screw. If you fasten something to wood, use a wood screw. If you fasten something to sheet metal, use a sheet metal

screw. If you fasten something to plastic, use a high-low screw or a self-tapping screw.

If there are receiving threads, be careful of cross-threading. Start putting in a screw by hand. Twist clockwise a few times by hand before using a screwdriver. If you force a crooked screw in, the receiving threads may be destroyed.

To tighten a screw, use the screwdriver that corresponds to the screw head type. If the indentation on the top of the screw is a straight line, use a flat head screwdriver. If the indentation on the top of the screw is a cross, use the Philips head screwdriver. If the screw head is hexagonal, use a wrench which fits snugly around the screw. Do not use a screwdriver that does not match the screw or both may be destroyed.

### **Exercise**

Your instructor will give you a small bag of different screws and bolts. Use the information above to classify the screws and bolts. Choose the appropriate screwdriver you should use to tighten each screw.

Your instructor must verify your work before you continue.

### **Preventative Maintenance and Calibration**

Always calibrate every medical device before returning it to use.