

Chapter 7- Sections

To produce a Section View of an object, a **cutting plane** is assumed to pass through the part. Imagine the cutting plane is then removed, and the two halves are pulled apart, exposing the interior of the part.

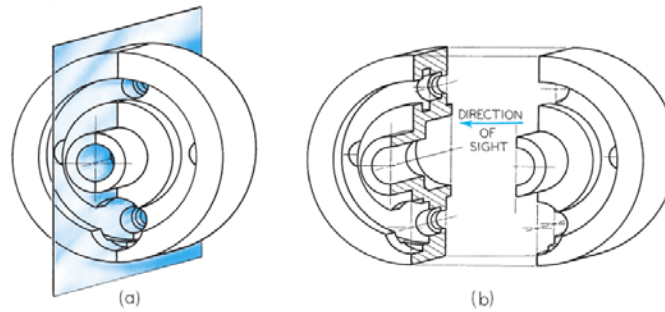


FIGURE 7.1 A Section.

Section Lining

Section lining is used to **represent the surface being cut**. The basic section lining is the ANSI31 symbols which are **thin 45 degree lines, spaced evenly apart**.

However, special section lining symbols can be used to show what **materials are to be used**.

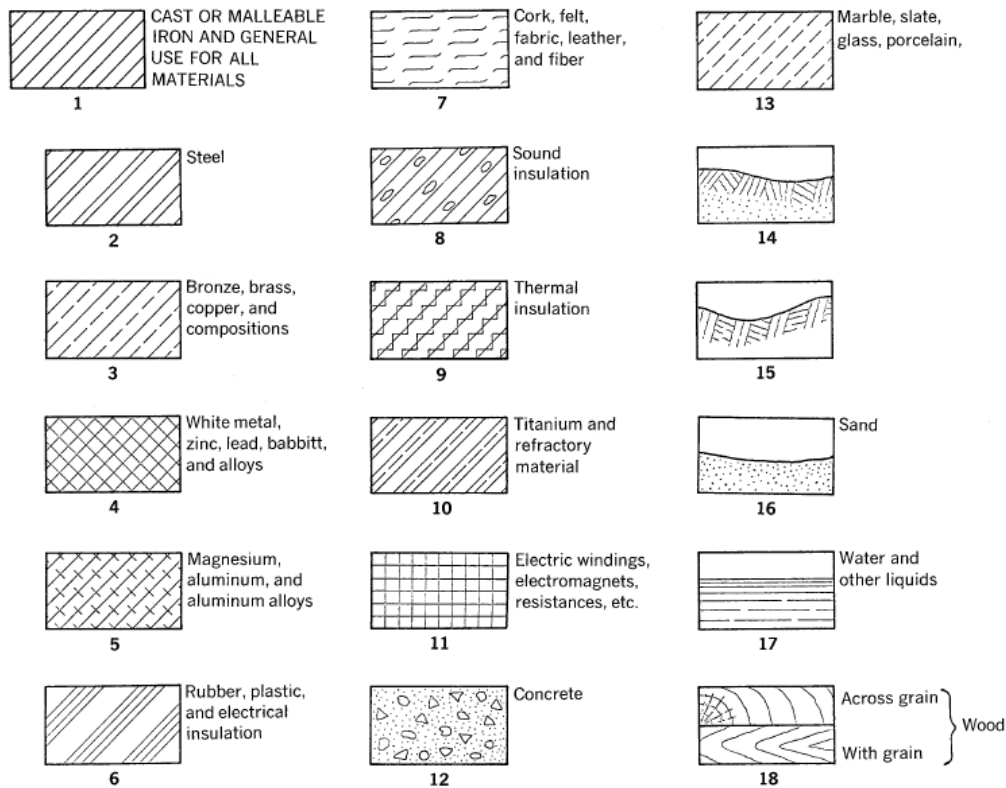


FIGURE 7.5 Symbols for Section Lining.

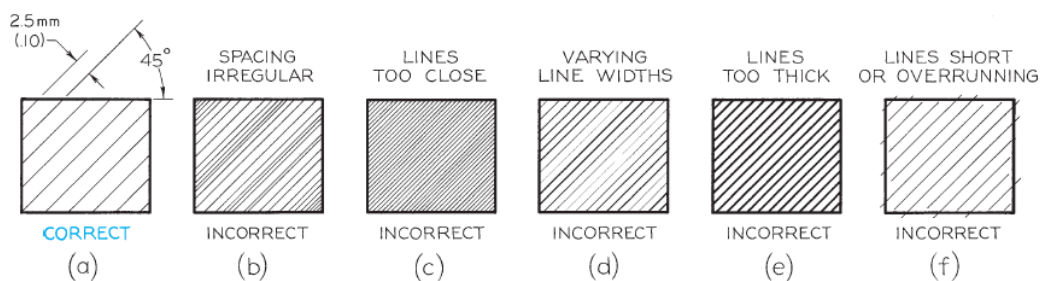
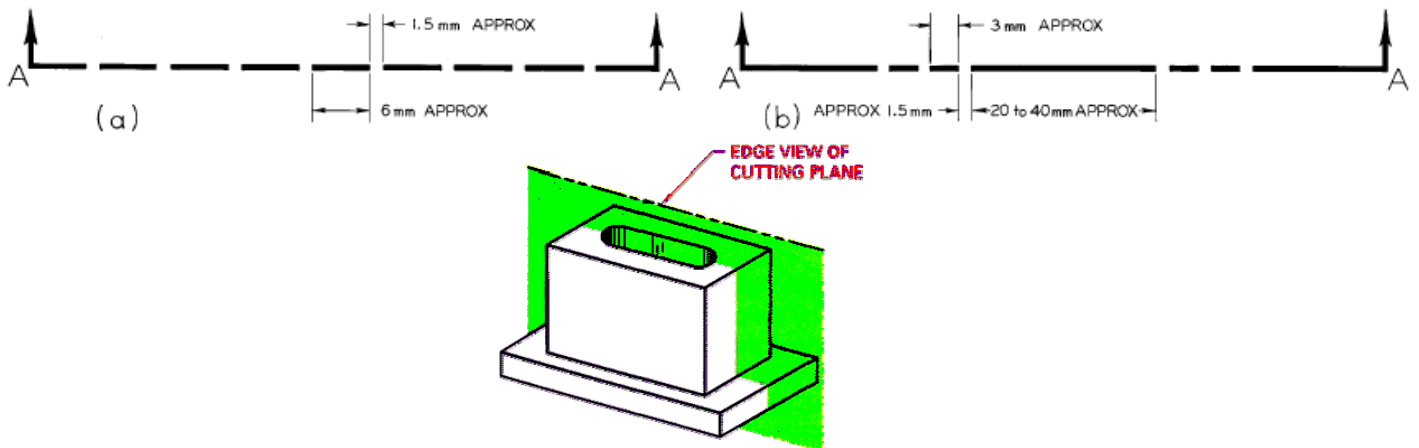


FIGURE 7.6 Section-Lining Technique.

The Cutting Plane Line

The cutting plane line indicates where the object is being cut. This is represented with a heavy, dark, **hidden line** or **phantom line**.

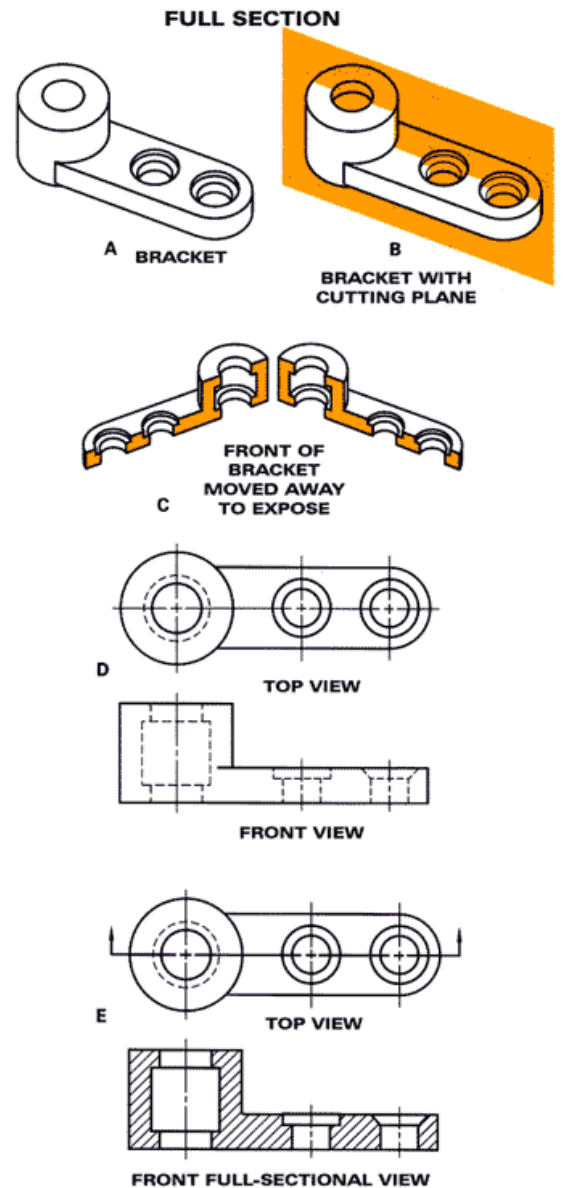
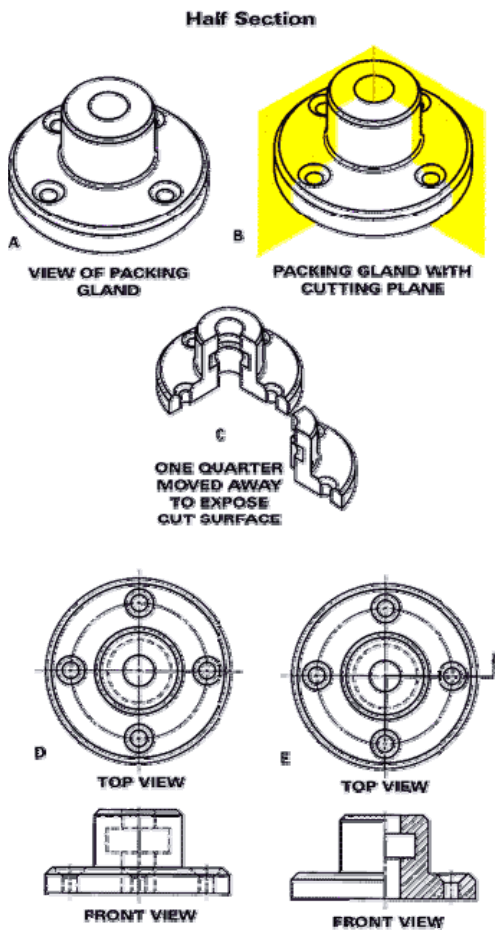


The cutting-plane line represents the edge view of the cutting plane.

Types of Sections

We will review **Full, Half, Offset Section, Broken-Out, Revolved, and Removed Sections**.

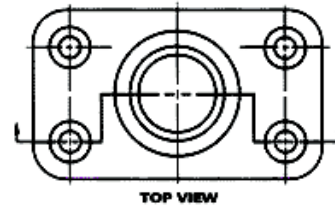
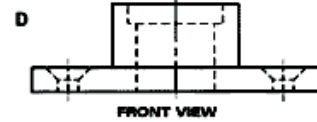
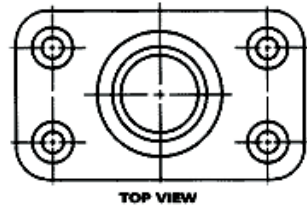
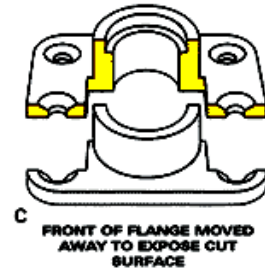
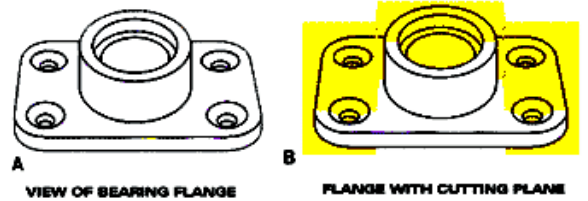
- ⊗ **Full Section:** A sectional view that shows the object as if it were cut completely apart from one end to the other.
- ⊗ **Half Section:** A section that is **one half of a full section**. A half section looks as if one quarter of the original object has been cut away.



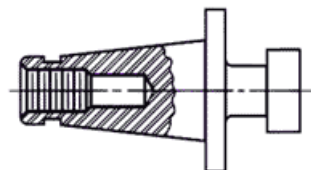
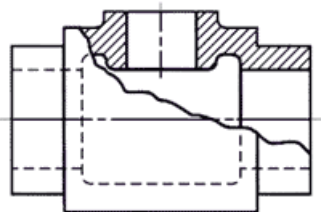
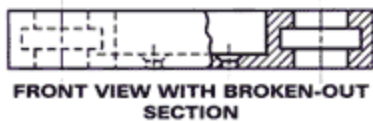
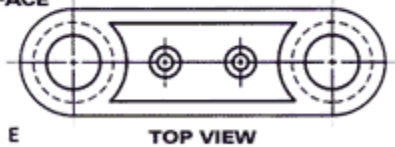
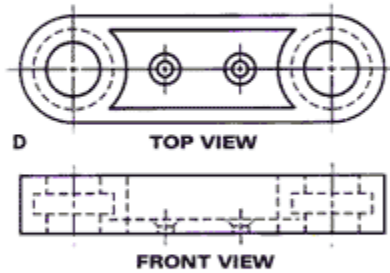
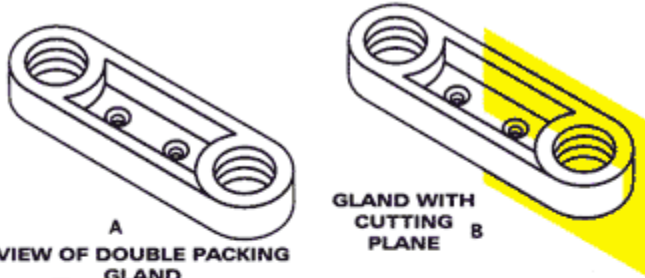
⊗ **Offset Section:** In sections, the cutting plane is usually taken straight through the object. But it can also be offset, or shifted, at one or more places to show a detail or to miss a part.

⊗ **Broken-Out Section:** A view with a broken-out section shows an object as it would look if a portion of it were cut partly away from the rest by a cutting plane and then "broken off" to reveal the cut surface and insides.

OFFSET SECTION

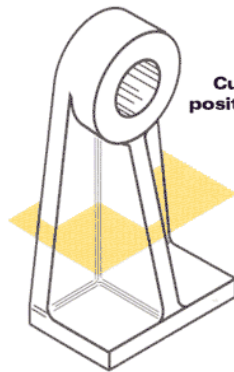


BROKEN-OUT SECTION

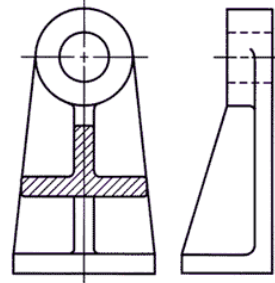


Two additional examples of broken-out sections.

- ⊗ **Revolved Section:** Think of cutting plane passing through an object as shown in the first figure below. You then take the section that is created by that line as revolve it, or rotate it up, so that its shape can be clearly seen.

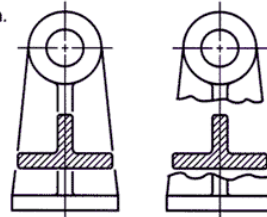


Cutting plane in position for revolved section.

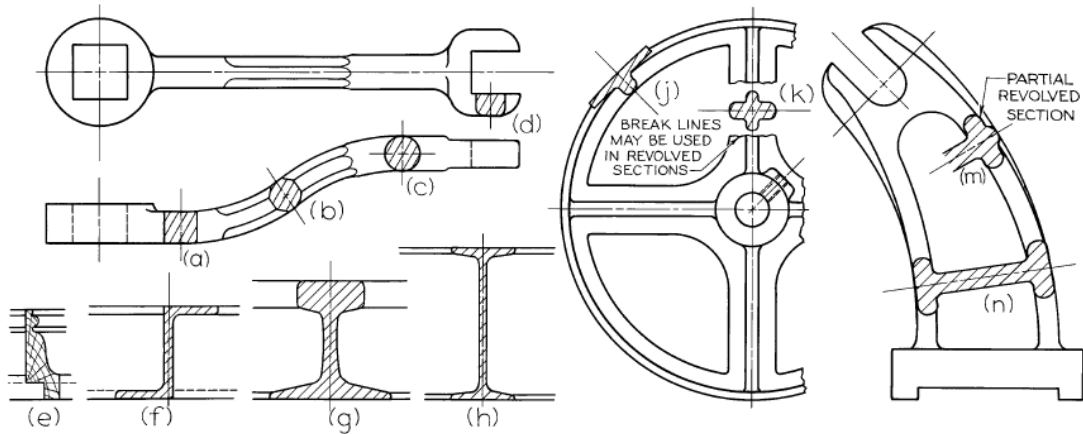


MOST COMMON METHOD

Revolved section.

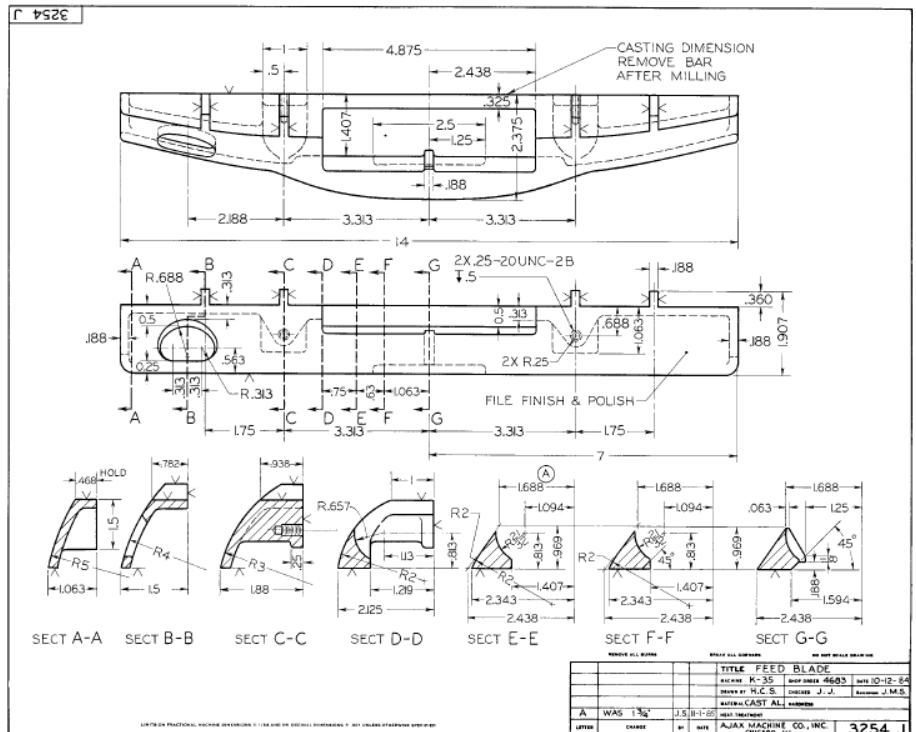


OTHER ACCEPTABLE METHODS



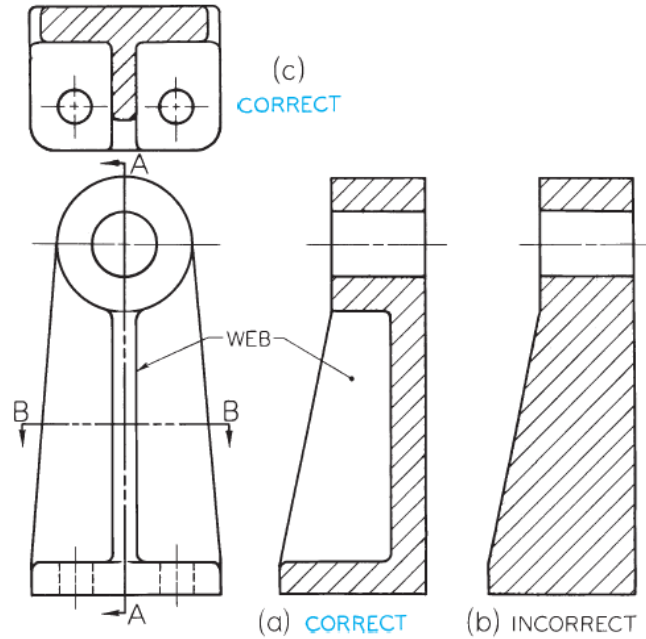
- ⊗ **Removed Section:** When a sectional view is taken from its normal place on the view and **moved** somewhere else on the drawing sheet, the result is a removed section.

Remember, however, that the removed section will be easier to understand if it is positioned **to look just as it would if it were in its normal place on the view**. In other words, do not rotate it in just any direction. The figure to the right shows correct and incorrect ways to position removed sections. Use bold letters to identify a removed section and its corresponding cutting plane on the regular view, as shown to the right.



Ribs and Webs In Sections

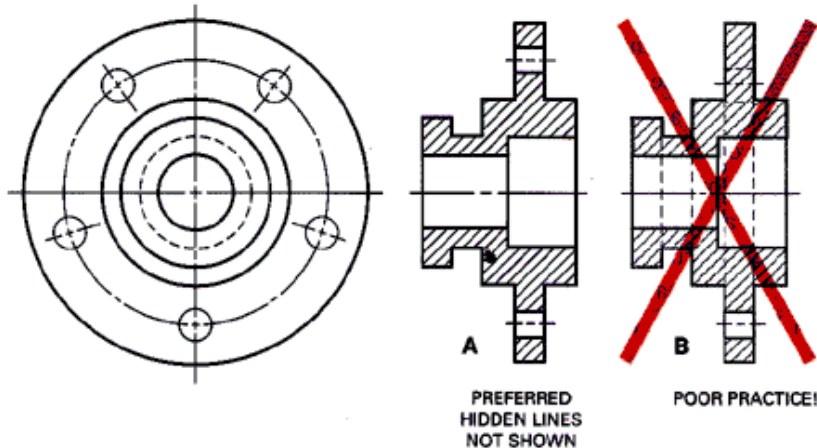
Ribs and webs are thin, flat parts of an object that are used to brace or strengthen another part of the object. Often, a true section of an object that contains ribs or a web structure does not appear to show a true description of the part. For example, the **Figure (b)** section shown to the right would give the idea of a very heavy, solid piece. This would not be a true description of the part. Therefore, when a cutting plane passes through a rib or web parallel to the flat side, **do not draw section lining for that part.** Instead, draw the part as shown in **Figure (a)**. Think of the cutting plane passing **just in front of the rib.**



Hidden and Visible Lines

Do not draw **hidden lines** on sectional views unless they are needed for **dimensioning** or for **clearly describing the shape**. In Figure A below, a hub is described clearly using no hidden lines. Compare it with the incorrectly drawn section in Figure B below.

Omit hidden lines when not needed for clarity.



Normally, in a sectional view, include all the lines that would be **visible on or beyond the plane of the section**. In the figure below, for example, the section drawing in part A correctly includes the numbered lines, which match the lines on the drawing in part B. A drawing without these lines, as shown in part C, would have little value.

