TOPIC - 4 **Engineering Drawings, Diagrams and Standards**

TOPIC - 5 **Fits and Clearances**

ENGINEERING DRAWINGS

Universal language

Conventions (drawing grammar) simplify communication; your drawing is at risk if you defy

CAD packages make formal drawing easy...if you follow the conventions

The machinist will laugh at you behind your back if you show up with a non-standard drawing

METHODS OF DRAWING SOLID OBJECTS

Pictorial Projections

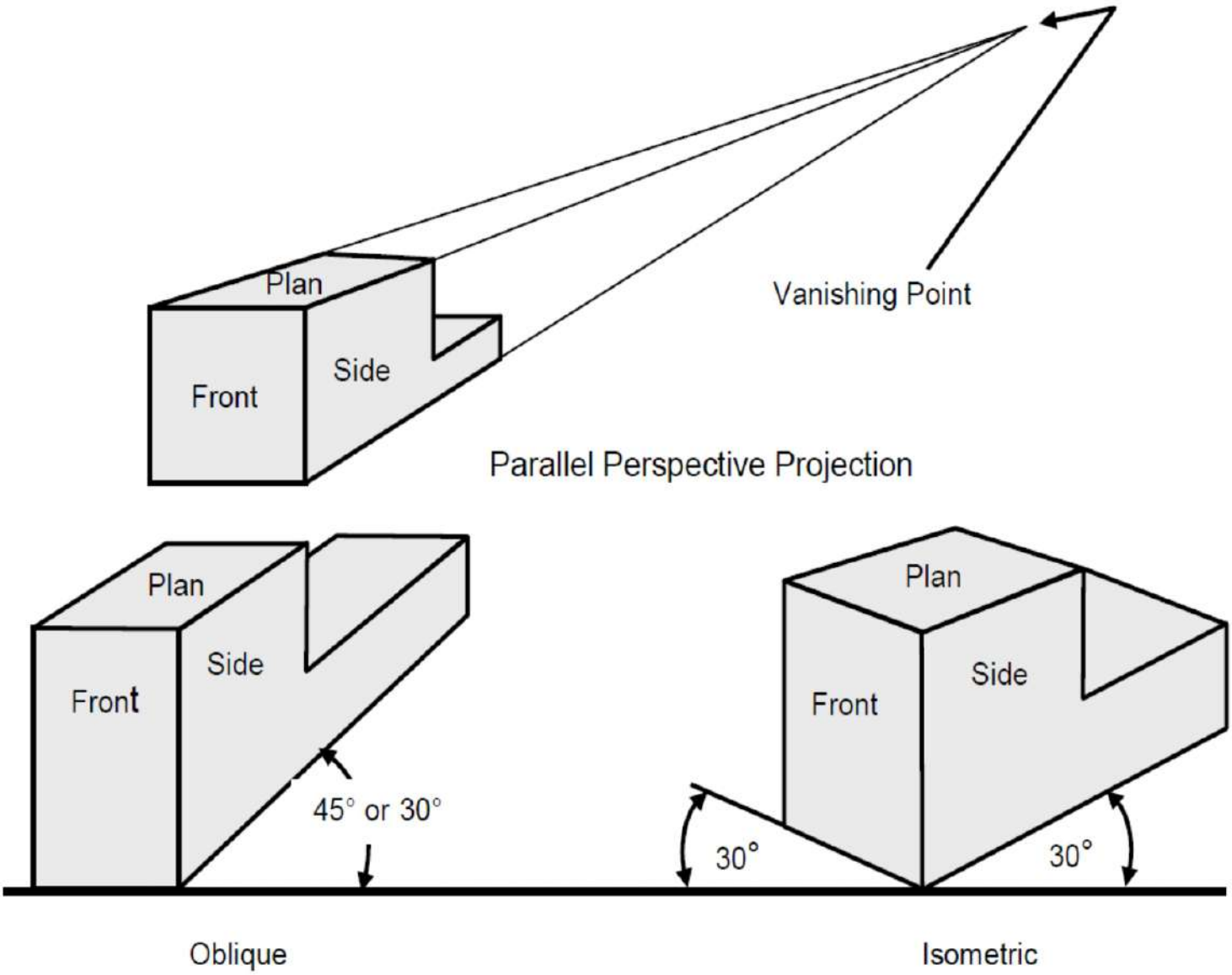
Orthographic Projections.

PICTORIAL PROJECTIONS

Pictorial Projections provide a three-dimensional, single image of the object, as if it were being viewed, in perspective, by eye (in a similar manner to a painting or a photograph).

The main types of pictorial projections may be considered as the

- **Perspective Projection** (Maintenance or Overhaul manuals)
- **Oblique Projection** (Maintenance or Overhaul manuals)
- **Isometric Projection** (sketches)


Plan
Front
Side
Vanishing Point
Parallel Perspective Projection
Plan
Front
Side
45° or 30°
Plan
Front
Side
30°
30°
Oblique
Isometric

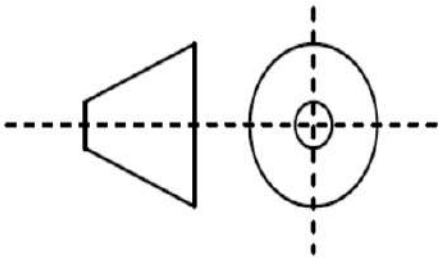
ORTHOGRAPHIC PROJECTIONS

Drawn as if the viewer is infinitely remote from the object and rays (or projectors) lead out from the object so that the projection lines of opposite sides appear to be parallel.

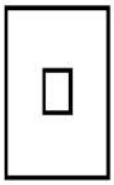
This method of projection provides a two-dimensional view of only one surface of the object.

There are two conventions

- **First Angle Projection**
- **Third Angle Projection**



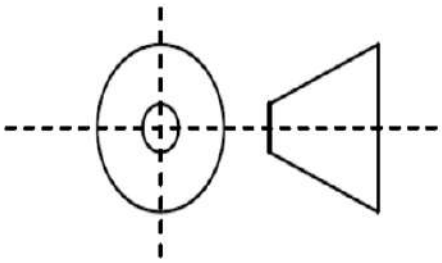
Side View

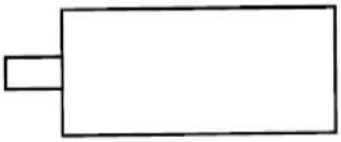


Front View

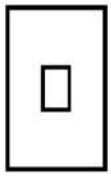
Plan View

FIRST ANGLE PROJECTION





Plan View

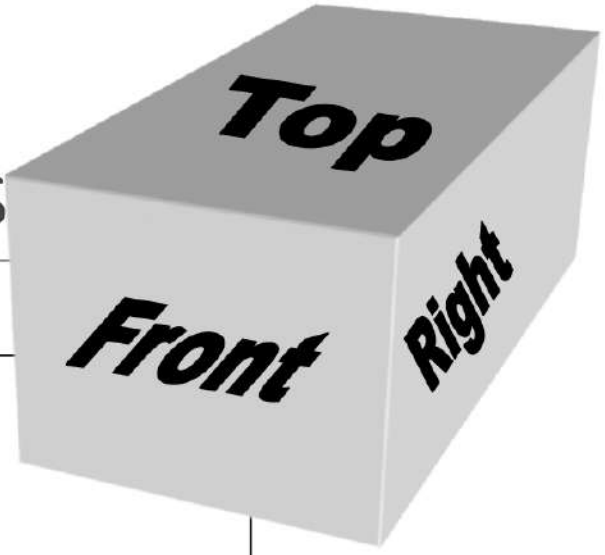


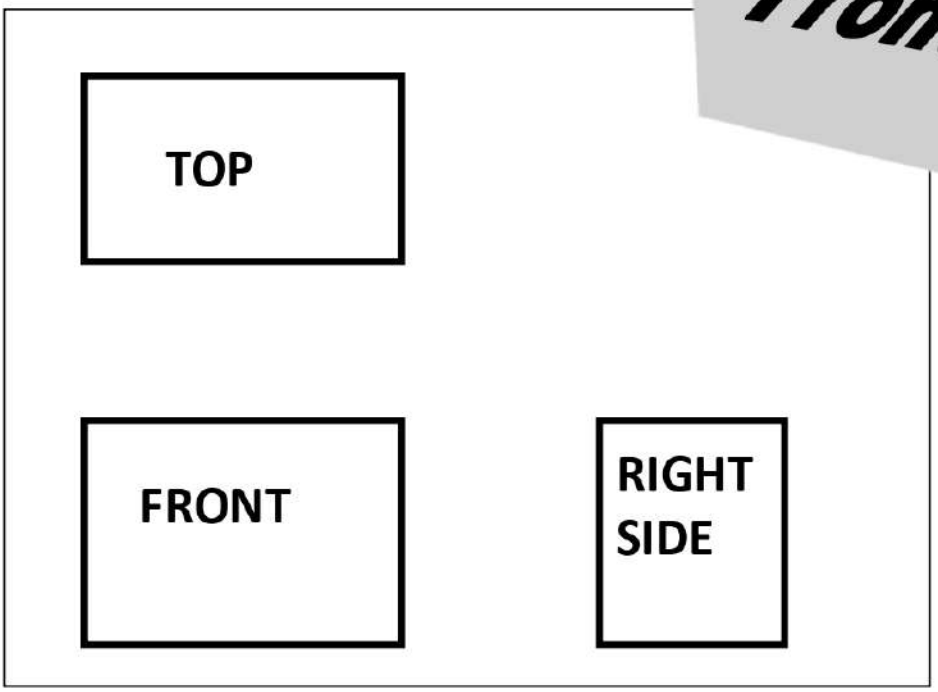
Front View

Side View

THIRD ANGLE PROJECTION

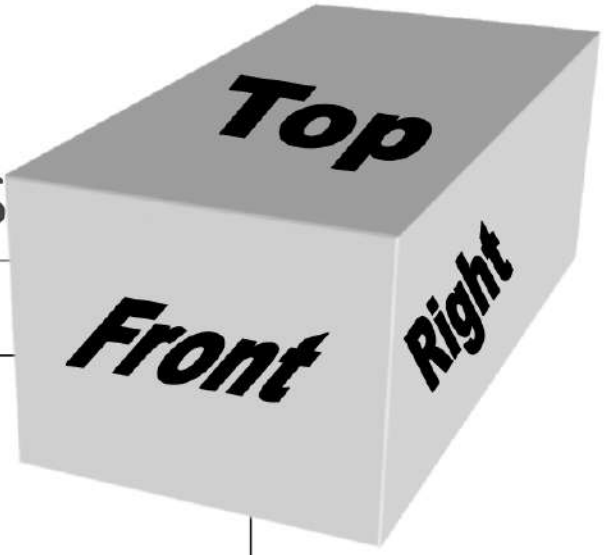
Multiview drawings

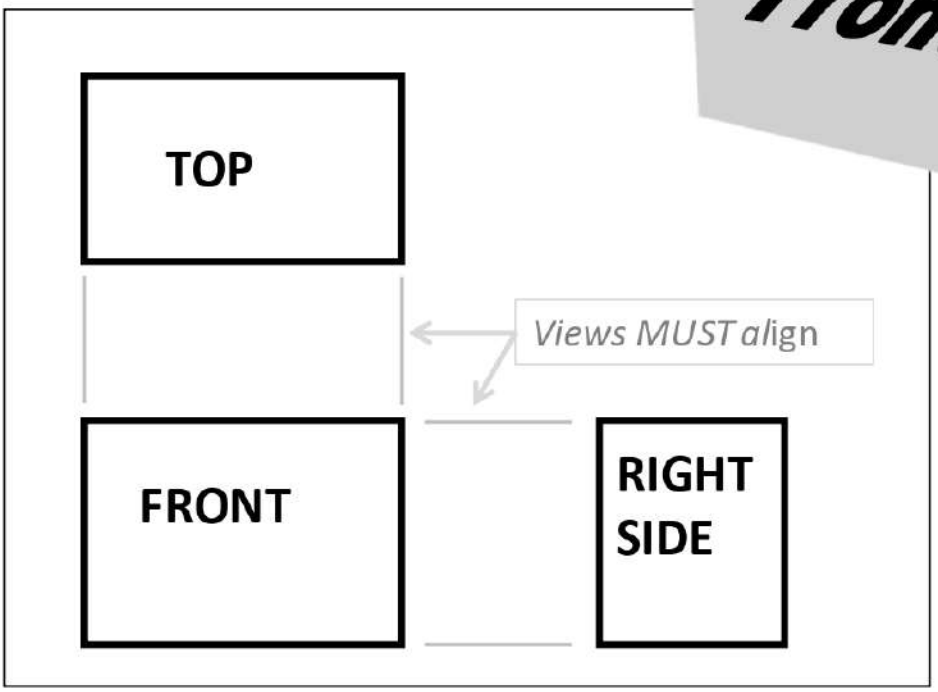




"3rd angle projection"

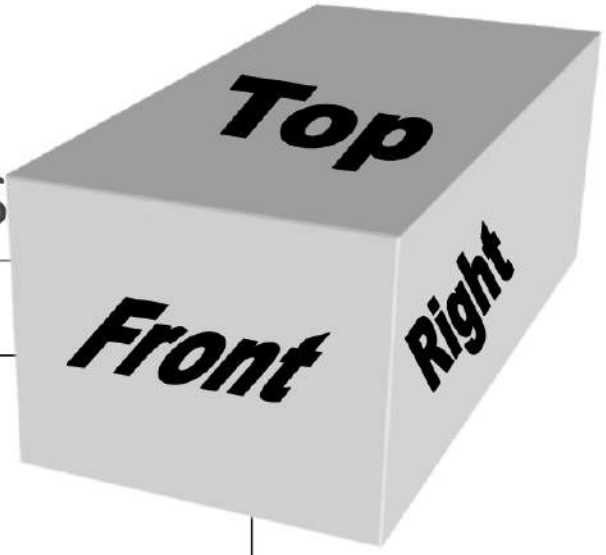
Multiview drawings

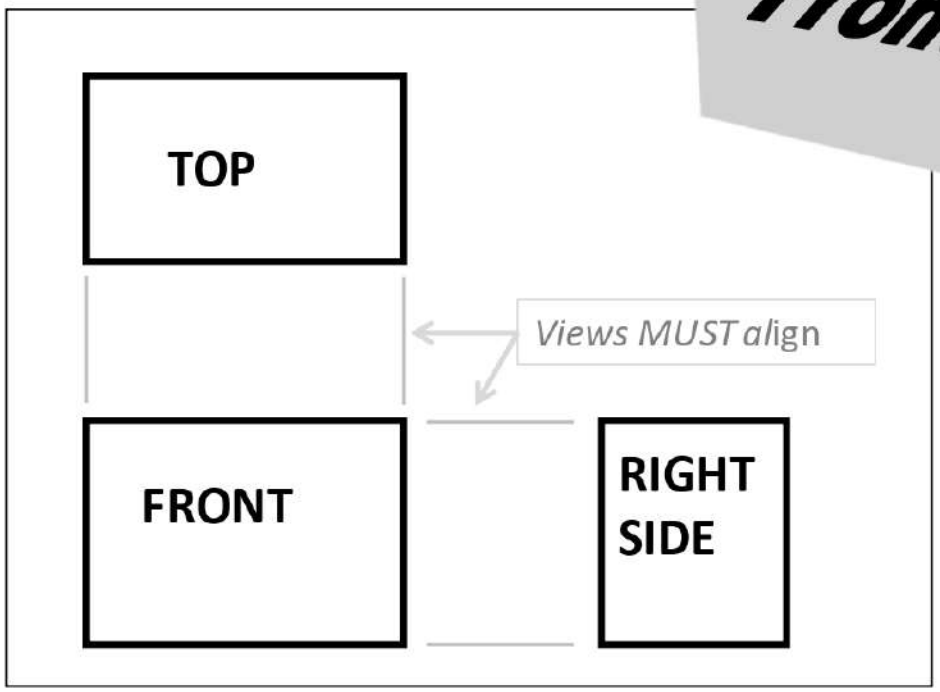


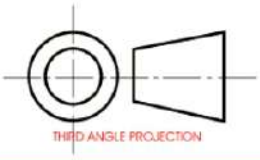


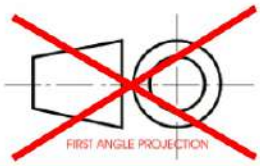
"3rd angle projection"

Multiview drawings







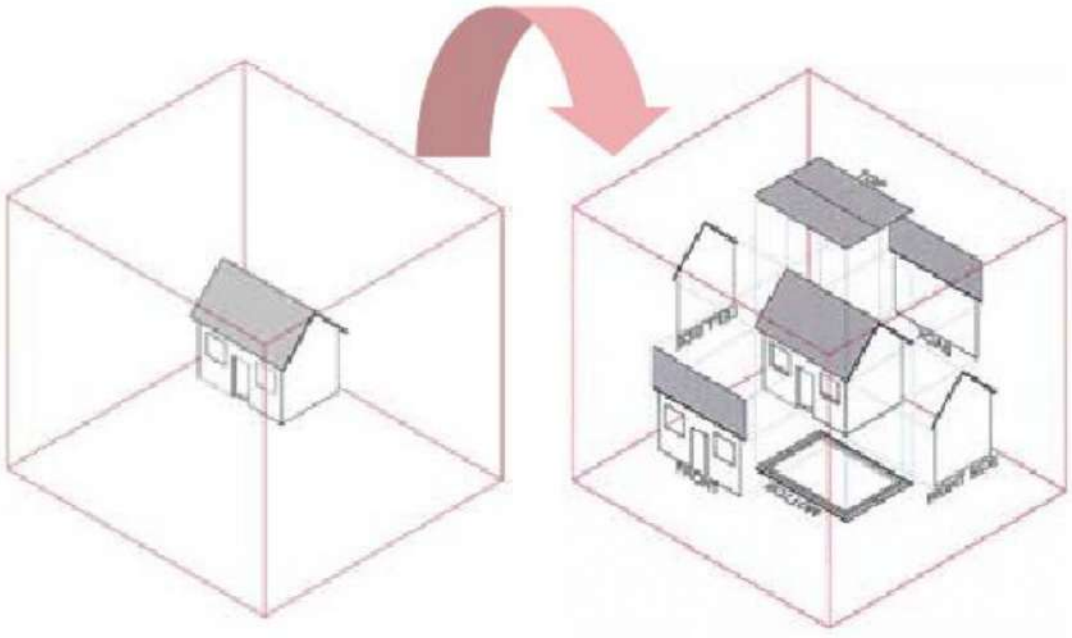


You walk around part to the right (US)

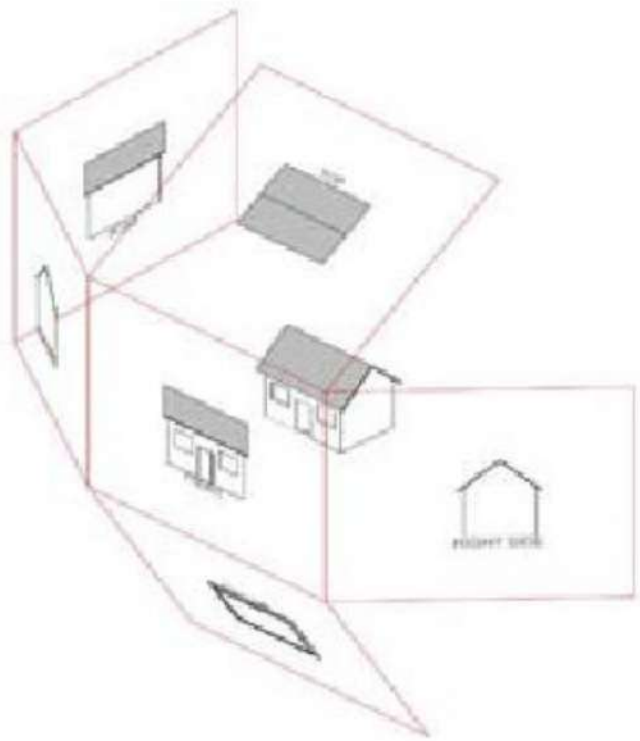
"3rd angle projection"

Rotate the part to the right (Europe)

The Glass Box:

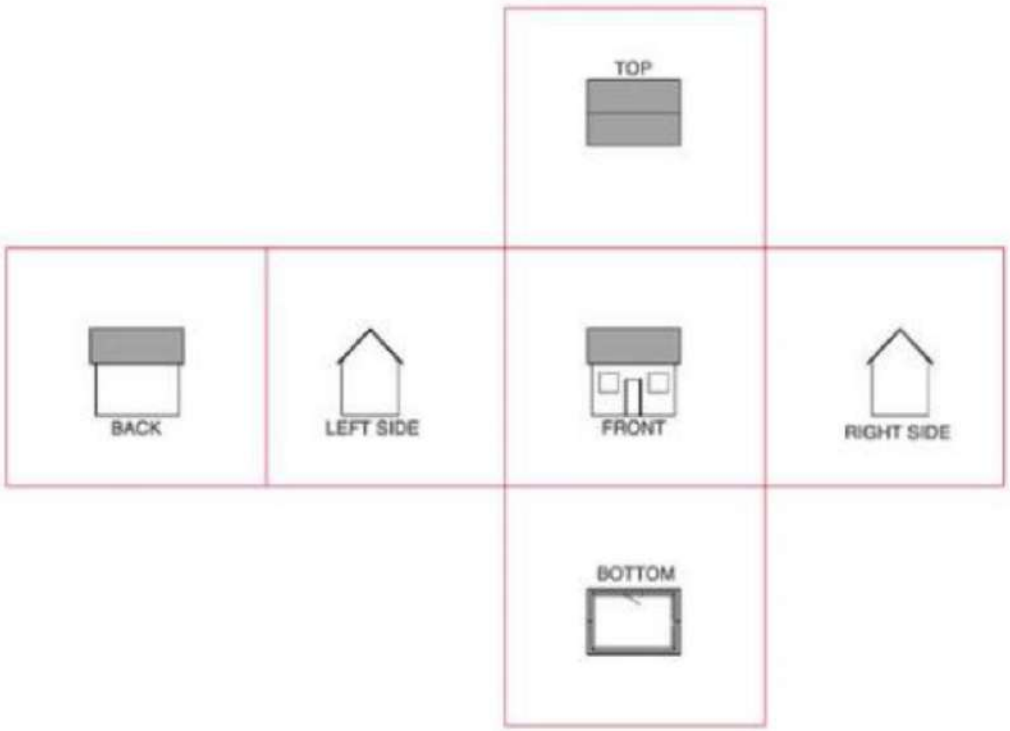


Alignment & Orientation are preserved…



Unfolding the "Glass Box"

Six Principle views: obey layout

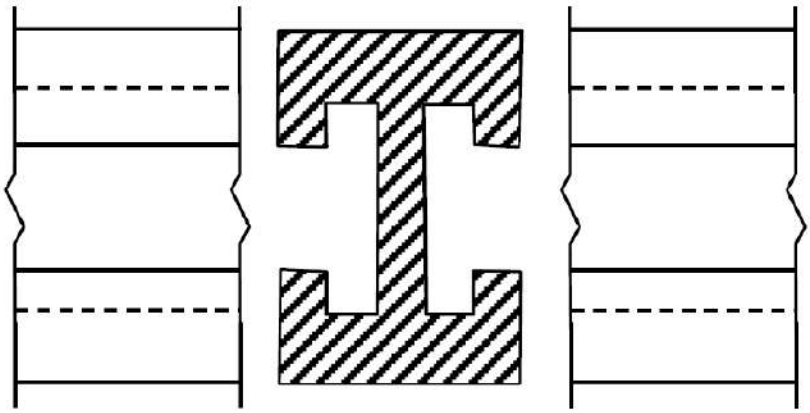


SECTIONAL VIEWS

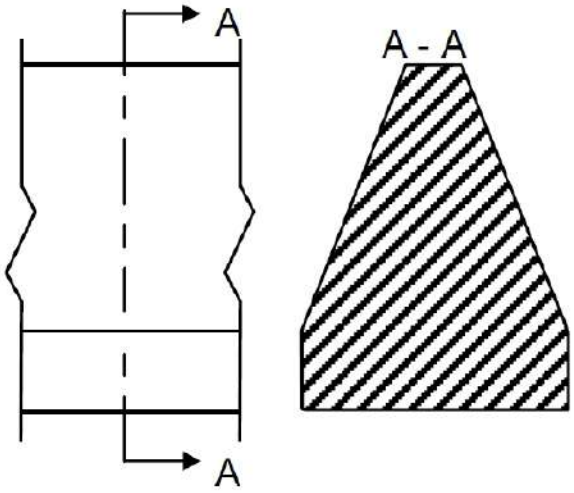
When it is necessary to show the internal construction or shape of a part sectional view is used.

- Revolved Section
- Removed Section
- Complete Section
- Half Section.

If only the shape of a part needs to be shown, it is drawn with either a revolved or with a removed section.



Revolved Section



Removed Section

- Section (or Hatching) lines drawn at 45° to the axis of the section.
- Dissimilar metals, other materials, or adjacent parts of similar materials, within the Section.
- Spacing not less than 4 mm
- Exception of small areas: usually not less than 1 mm apart.