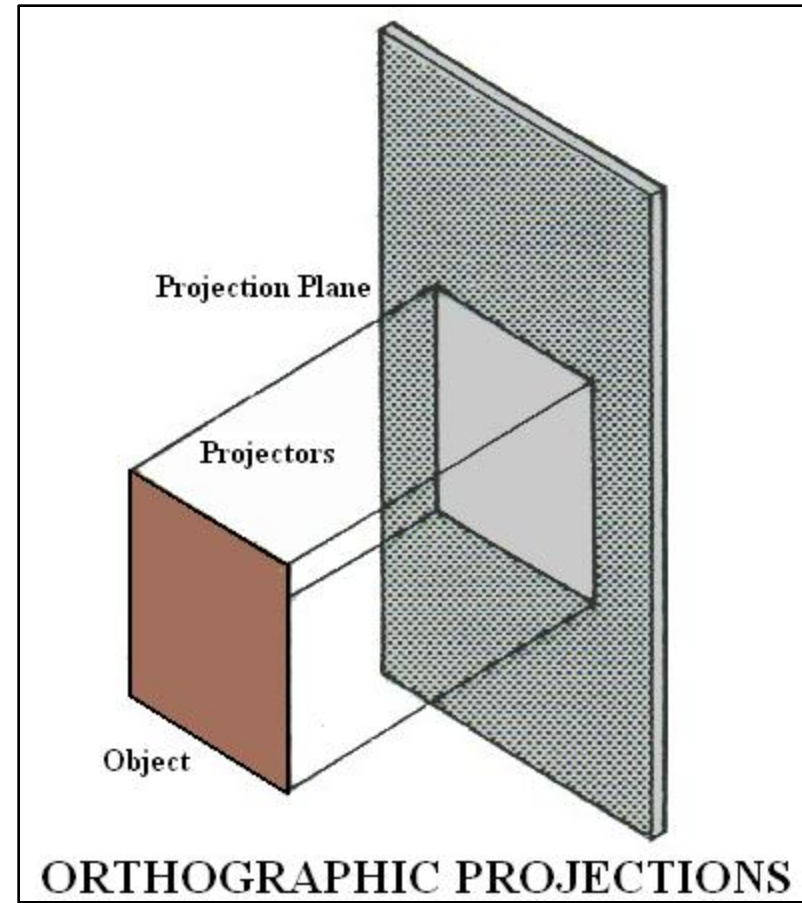


Section B

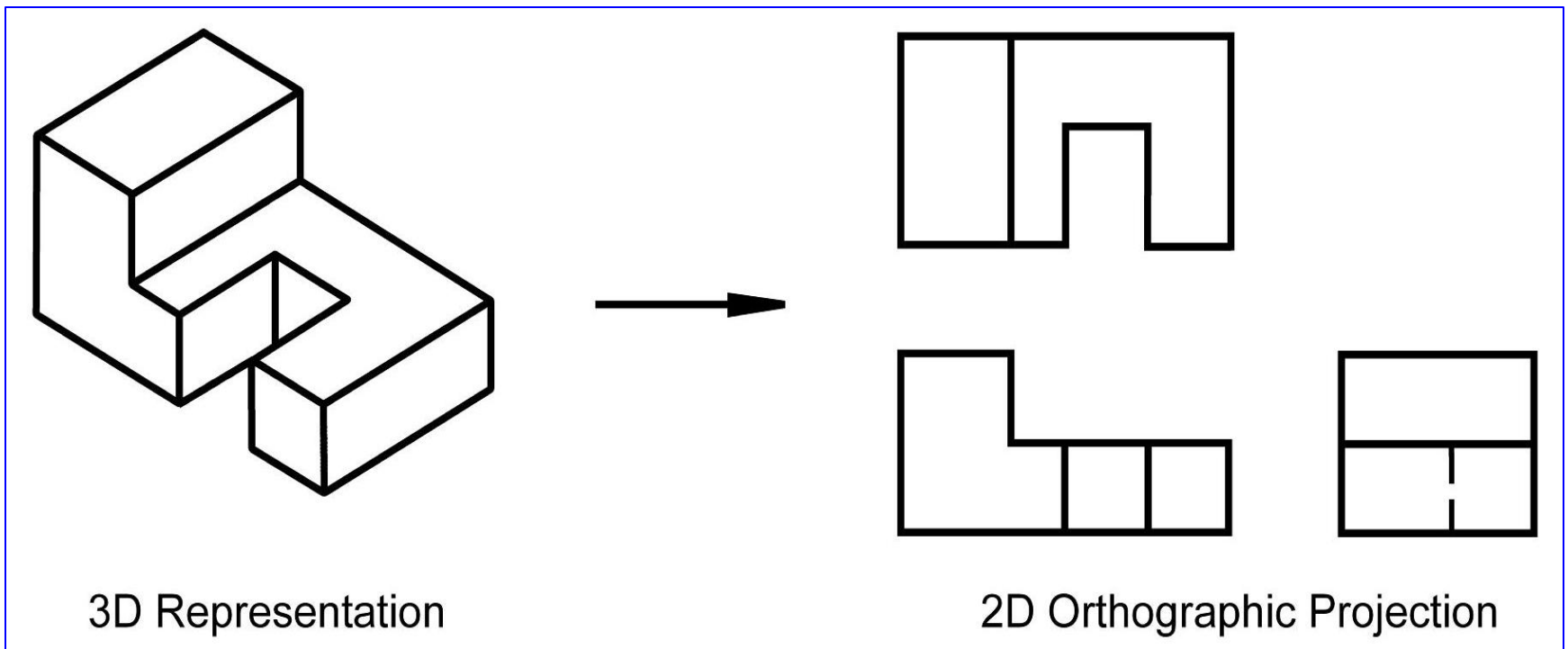
- Orthographic projections: principle of first and third angle projection, orthographic views from isometric views of machine parts / components.
- Drawing of sectional views:- Coupling, Crankshaft, Pulley, Piston and Connecting rod, Cotter and Knuckle joint. Riveted Joint and Welded Joint.

Orthographic Projections

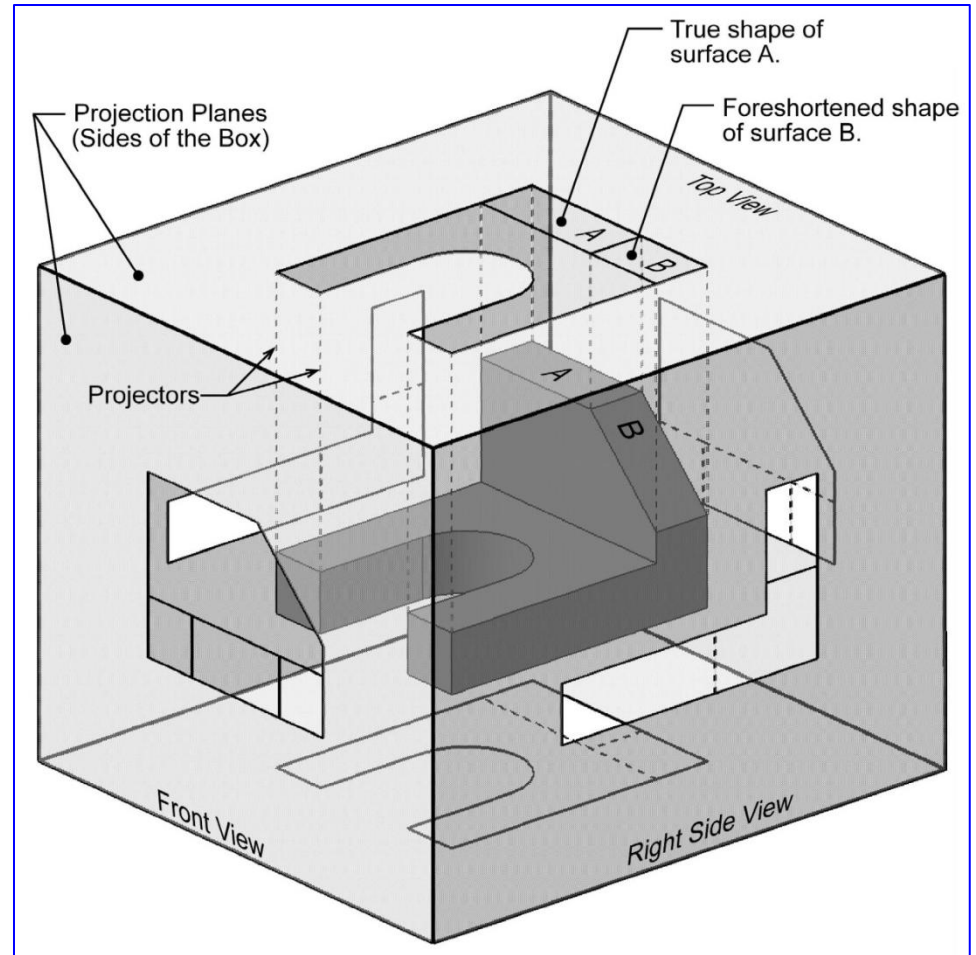
- Orthographic projections are drawings where the projectors, the observer or station point remain parallel to each other and perpendicular to the plane of projection.
- Orthographic projections are further subdivided into axonometric projections and multi-view projections.
- Effective in technical representation of objects



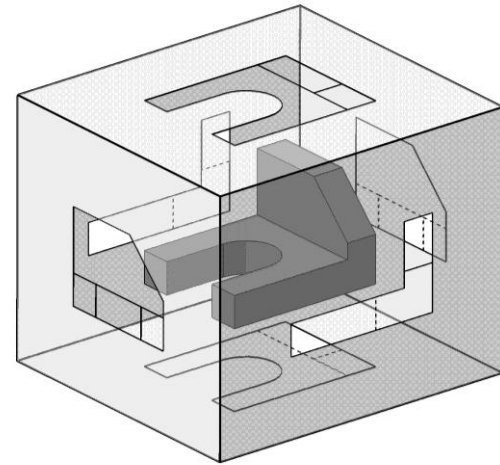
- Orthographic projection = 2-D representation of a 3-D object.



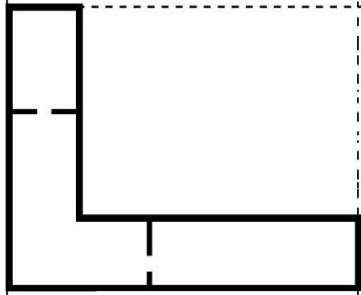
- Things to notice!
 - The projection planes.
 - The projectors.
 - How surfaces A and B are projected.



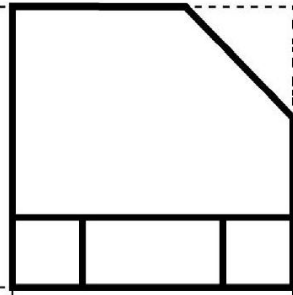
Name each view.



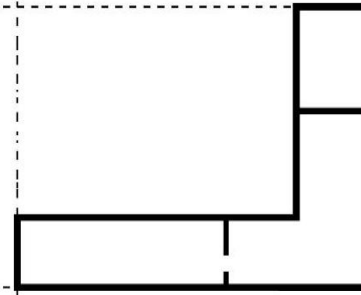
Top



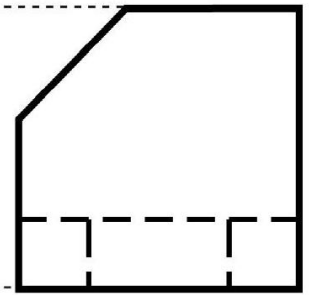
Left Side



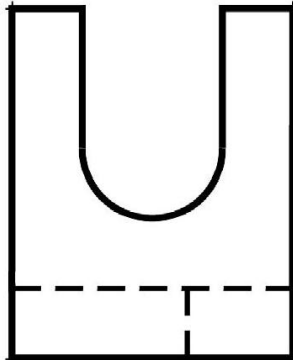
Front View



Right Side



Rear



Bottom

Standard Views

- When constructing an orthographic projection, we need to include enough views to completely describe the true shape of the part.
 - Complex part = more views
 - Simple part = less views
- The standard views used in an orthographic projection are;
 - Front view
 - Top view
 - Right side view
- The remaining 3 views usually don't add any new information.

Line Type and Weight

- There are four commonly used line types;
 - continuous
 - hidden
 - center
 - phantom
- Some lines are more important than others. Importance is indicated by line weight or thickness.
 - The thicker the line, the more important it is.

Line Type and Weight

- Visible lines:
 - Visible lines represent visible edges and boundaries.
 - **Continuous** and **thick** (0.5 - 0.6 mm).
- Hidden lines:
 - Hidden lines represent edges and boundaries that cannot be seen.
 - **Dashed** and **medium thick** (0.35 - 0.45 mm).

Line Type and Weight

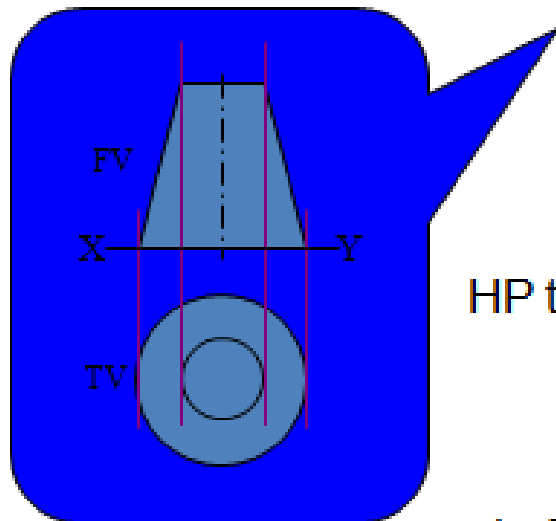
- Center lines:
 - Represent axes of symmetry.
 - **Long dash – short dash** and **thin** (0.3 mm).
- Phantom line:
 - Phantom lines are used to indicate imaginary features.
 - alternate positions of moving parts
 - adjacent positions of related parts
 - The line type is **long dash – short dash – short dash** and the line weight is usually **thin** (0.3 mm).

Methods of Drawing Orthographic Projections

First Angle Projections Method

Here views are drawn
by placing object
in 1st Quadrant

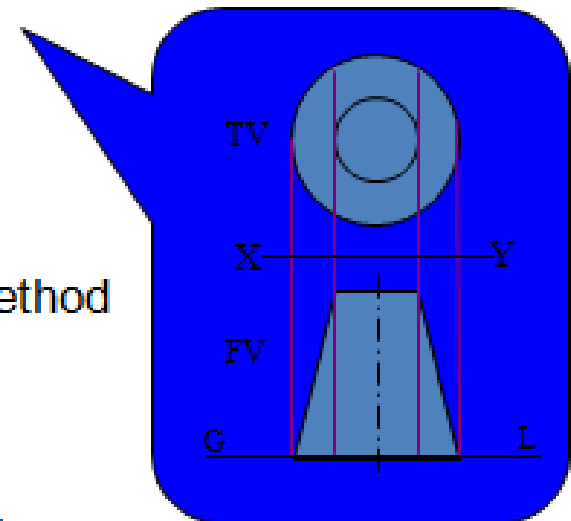
(Fv above X-y, Tv below X-y)



Third Angle Projections Method

Here views are drawn
by placing object
in 3rd Quadrant.

(Tv above X-y, Fv below X-y)



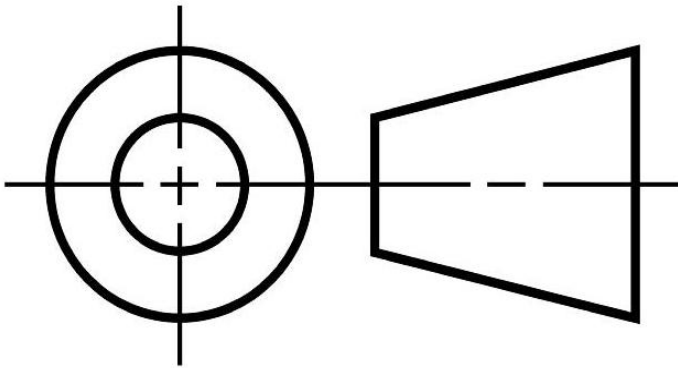
SYMBOLIC
PRESENTATION
OF BOTH METHODS
WITH AN OBJECT
STANDING ON HP (GROUND)
ON IT'S BASE.

NOTE:-

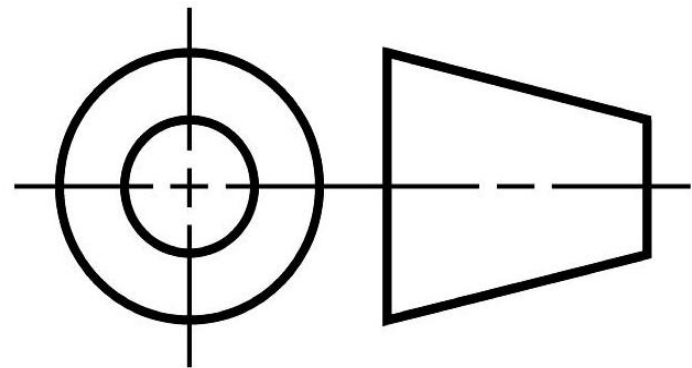
HP term is used in 1st Angle method
&
For the same
Ground term is used
in 3rd Angle method of projections

Projection Symbol

- United States = 3rd angle projection
- Europe = 1st angle projection

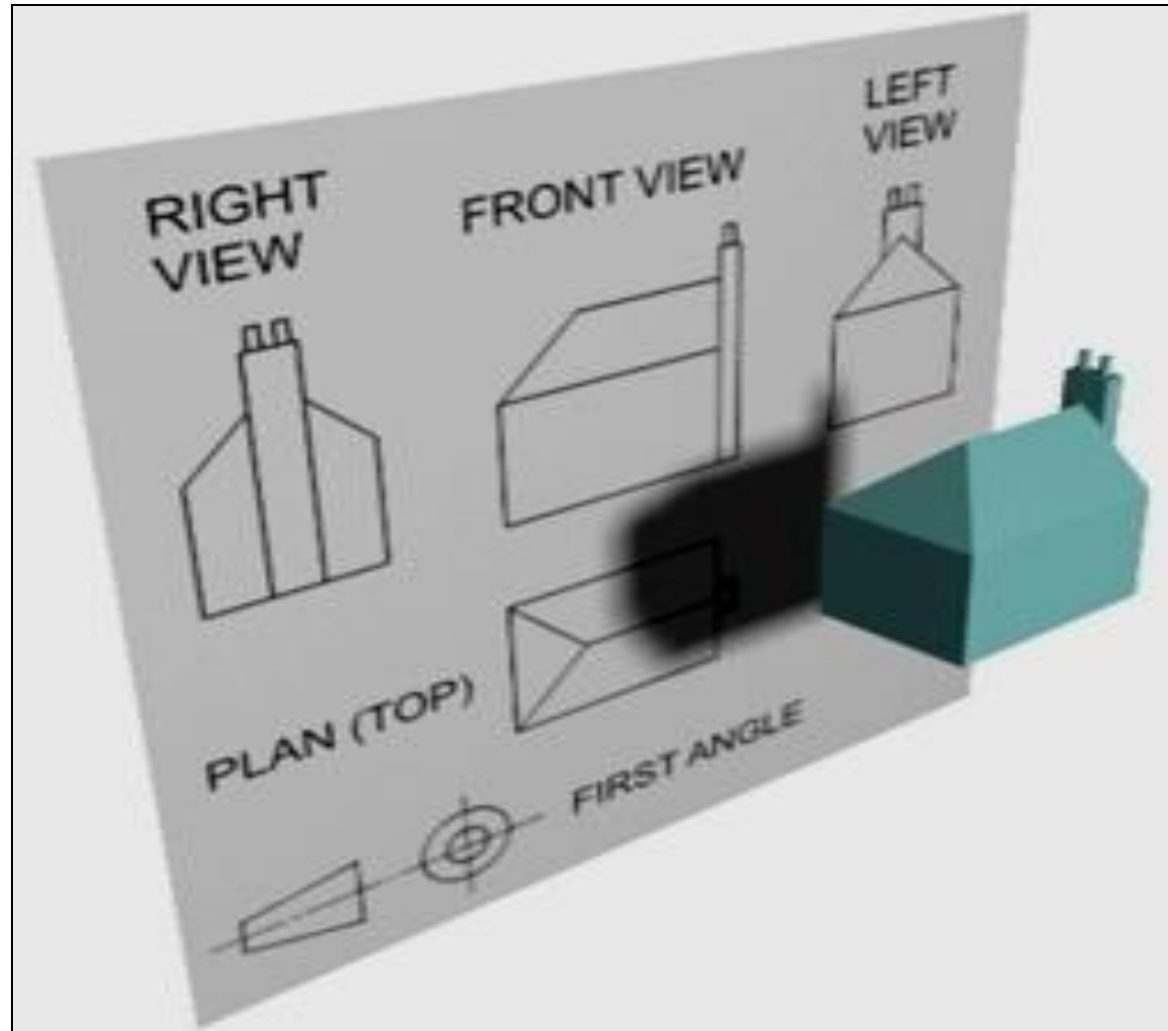


Third Angle Projection Symbol
(Our national standard)

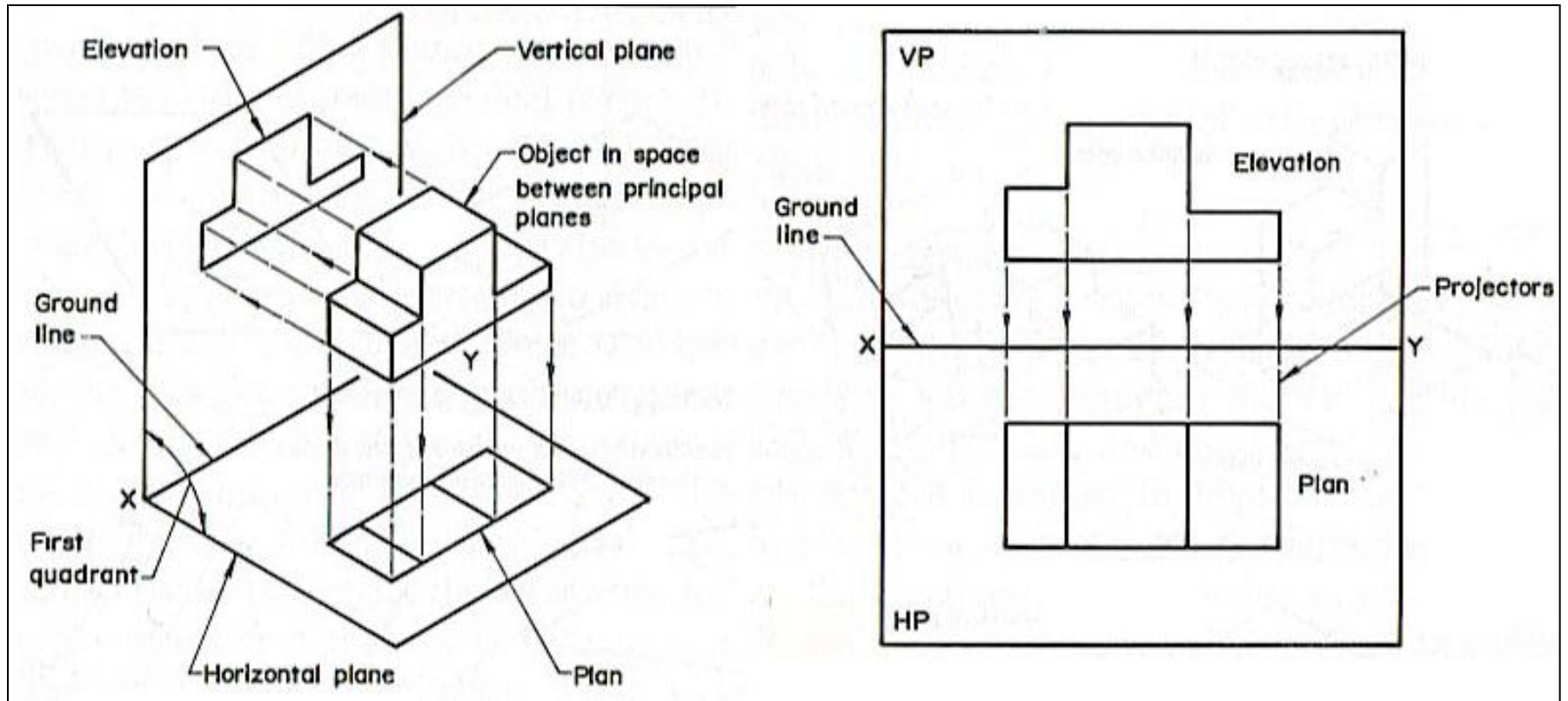


First Angle Projection Symbol

First Angle Projection



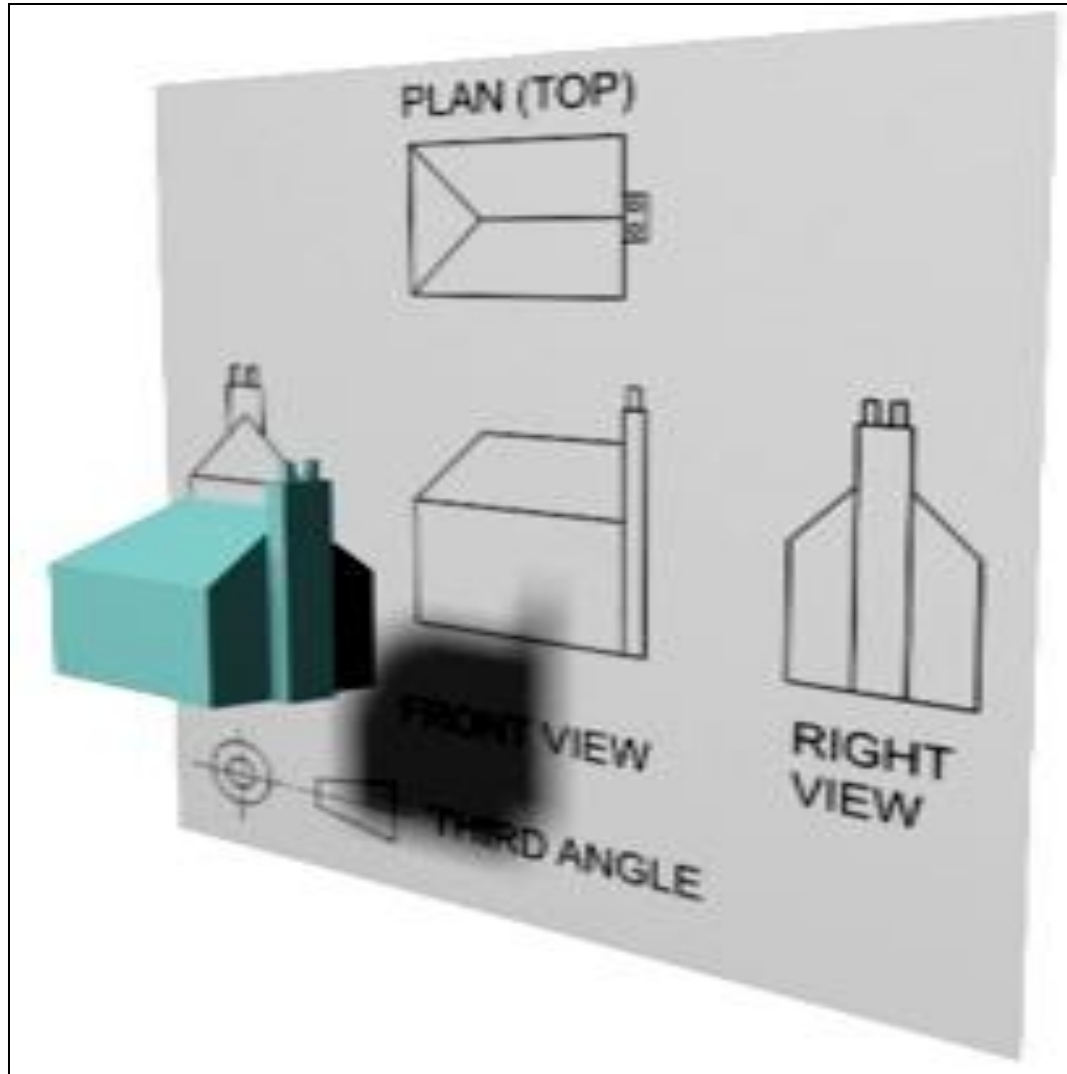
How to draw plan and elevation?



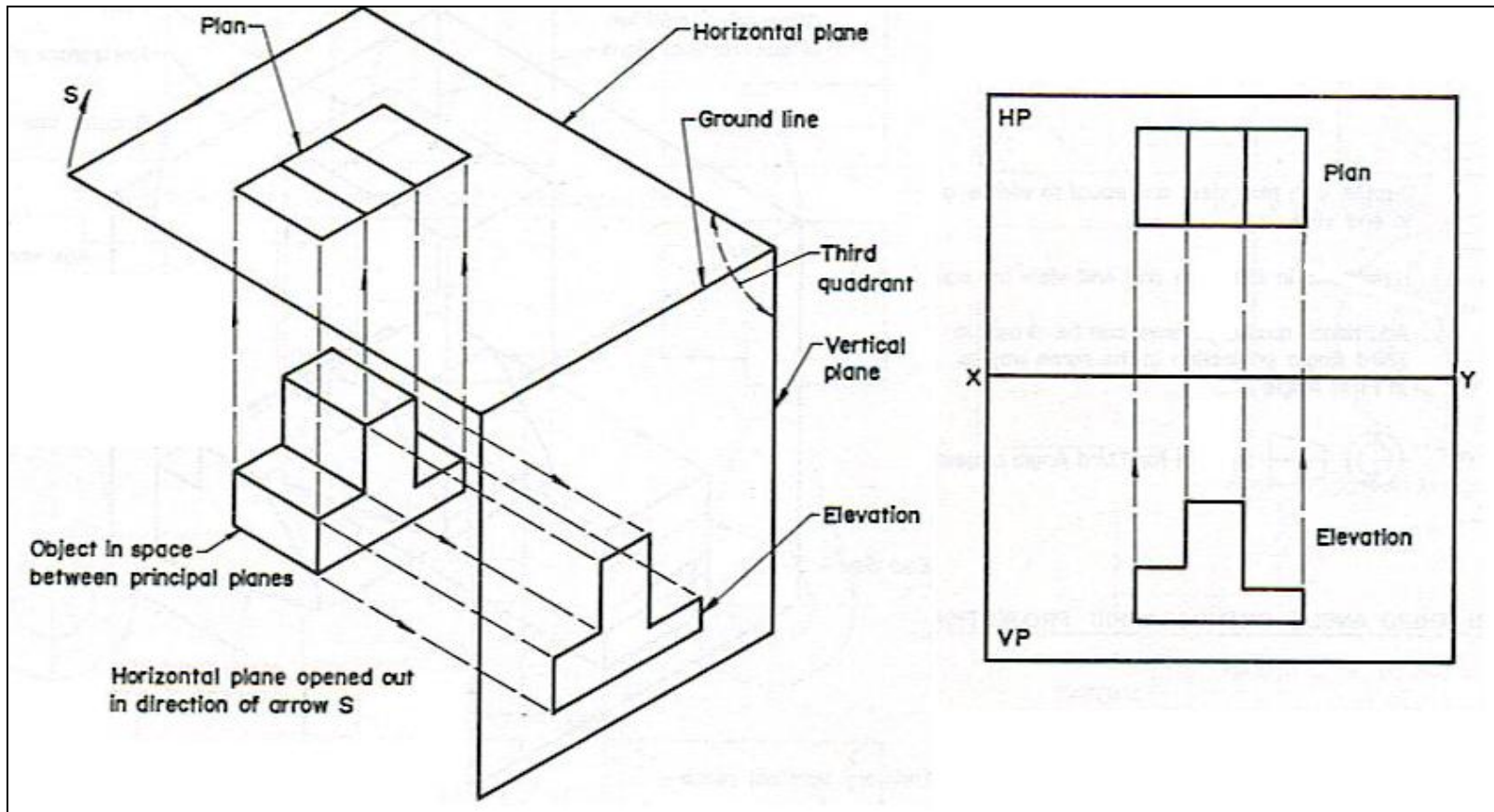
Points to remember:

- The 'front view' (or elevation) is the view with maximum information.
- The 'plan' is **below** the 'elevation' (in projection).
- The 'end view' is placed on the **right** if **viewed from left side** of object and on the **left** if viewed from right side.
- 'End view' and plan face **inwards** from 'elevation'.

Third Angle Projection



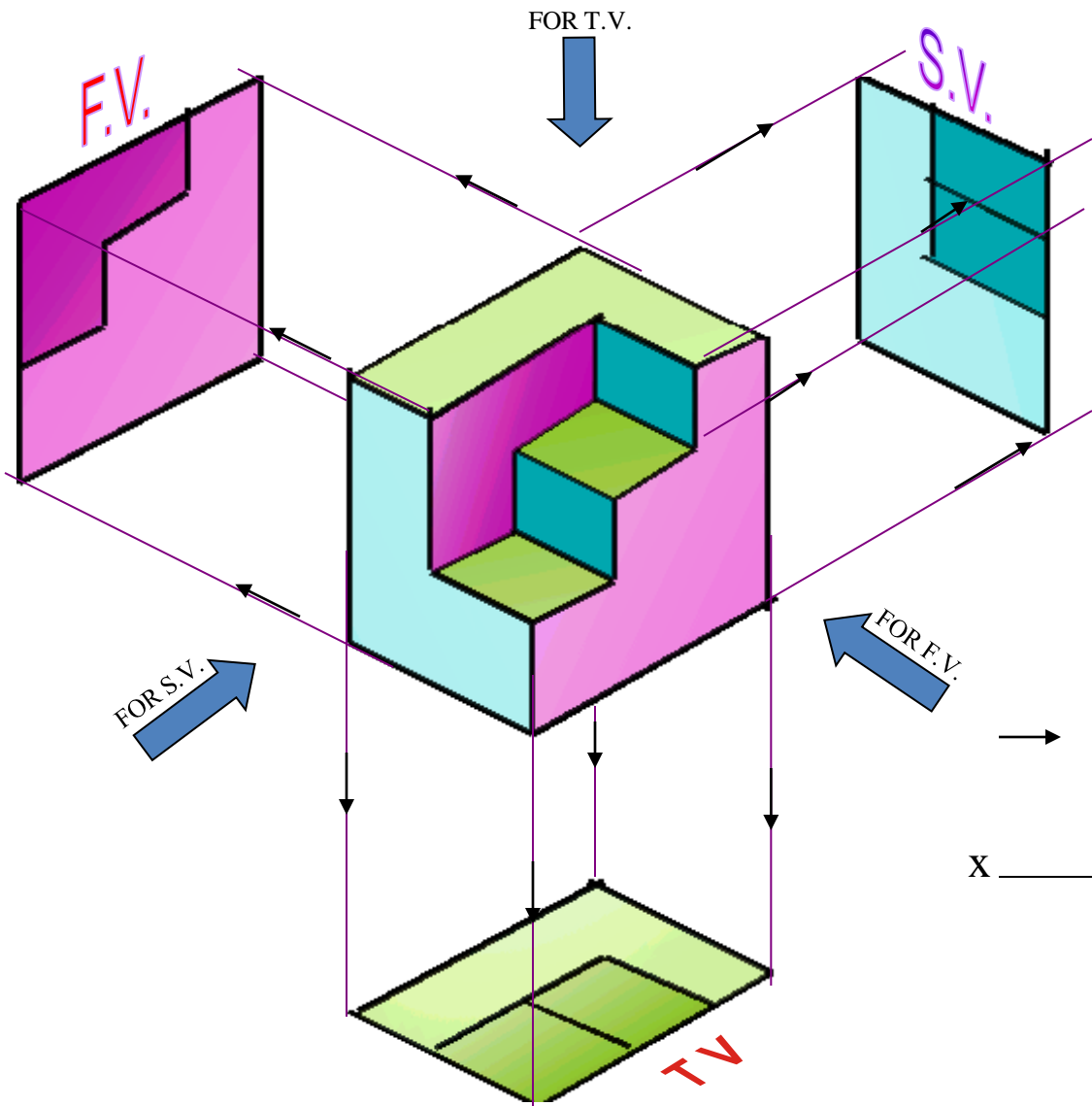
How to draw plan and elevation?



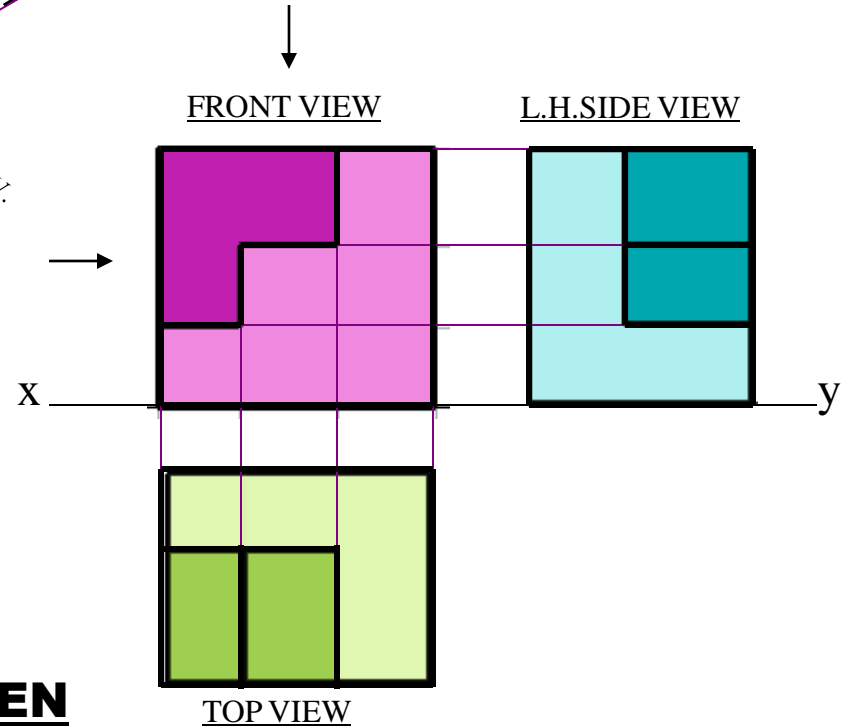
In 3rd angle projection planes are transparent and objects are viewed through them

Points to remember:

- The 'front view' (or elevation) is the view with maximum information.
- The 'plan' is **above** the 'elevation' (in projection).
- The 'end view' is placed on the **right if viewed from right side** of object and on the **left if viewed from left side**.
- 'End view' and plan face **outwards** from 'elevation'.

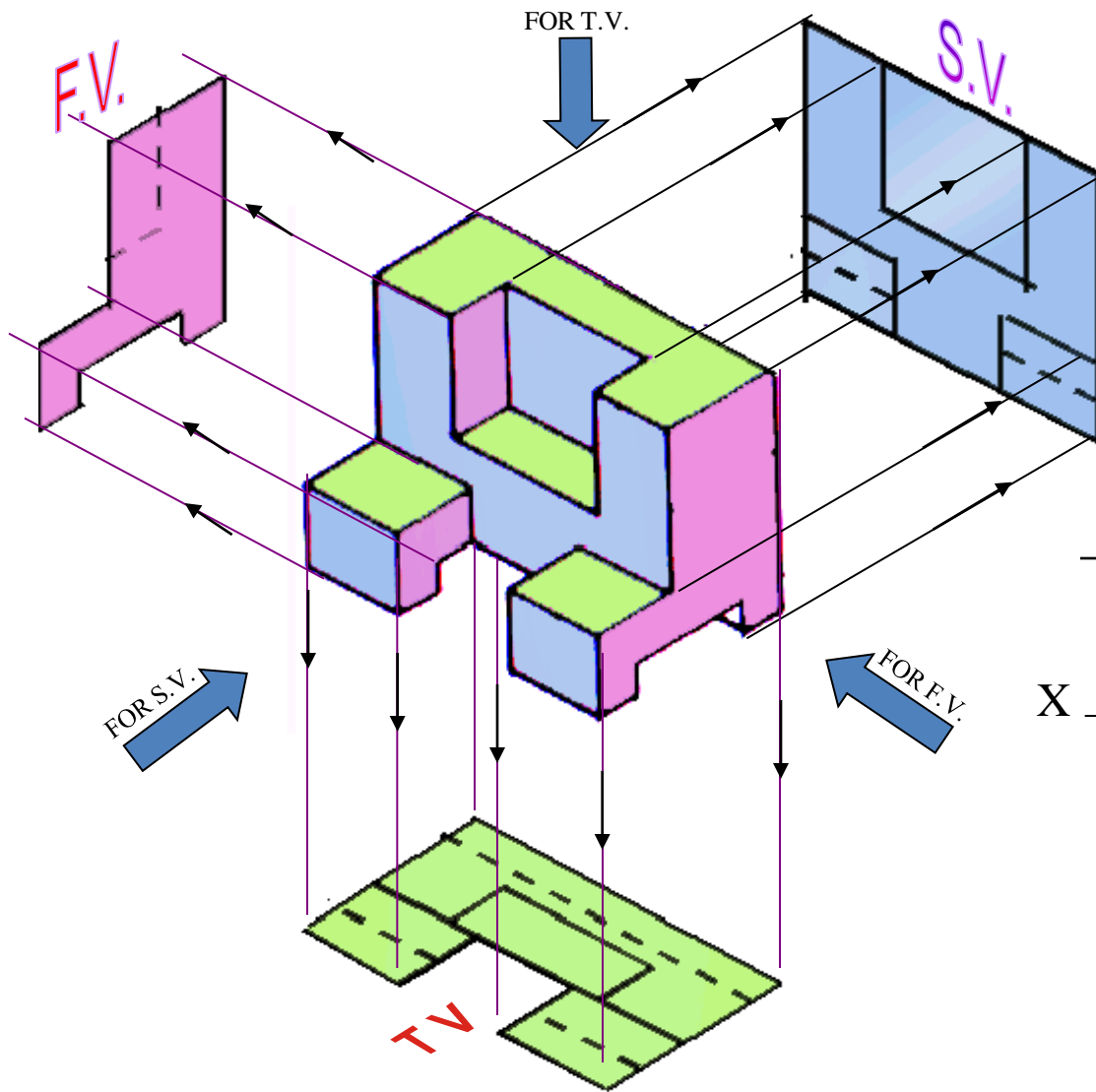


ORTHOGRAPHIC PROJECTIONS

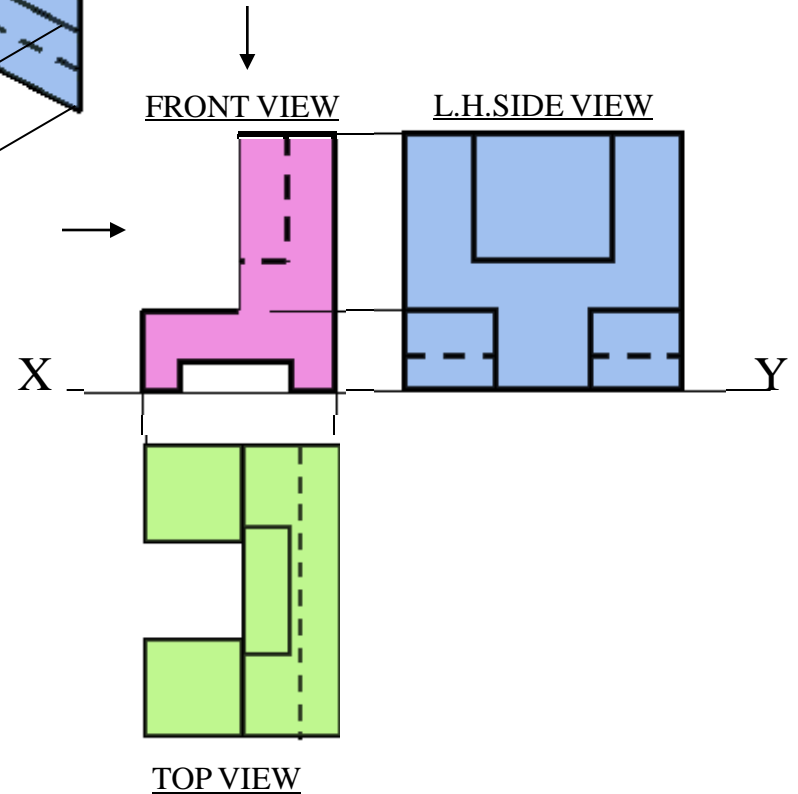


PICTORIAL PRESENTATION IS GIVEN

**DRAW THREE VIEWS OF THIS OBJECT
BY FIRST ANGLE PROJECTION METHOD**

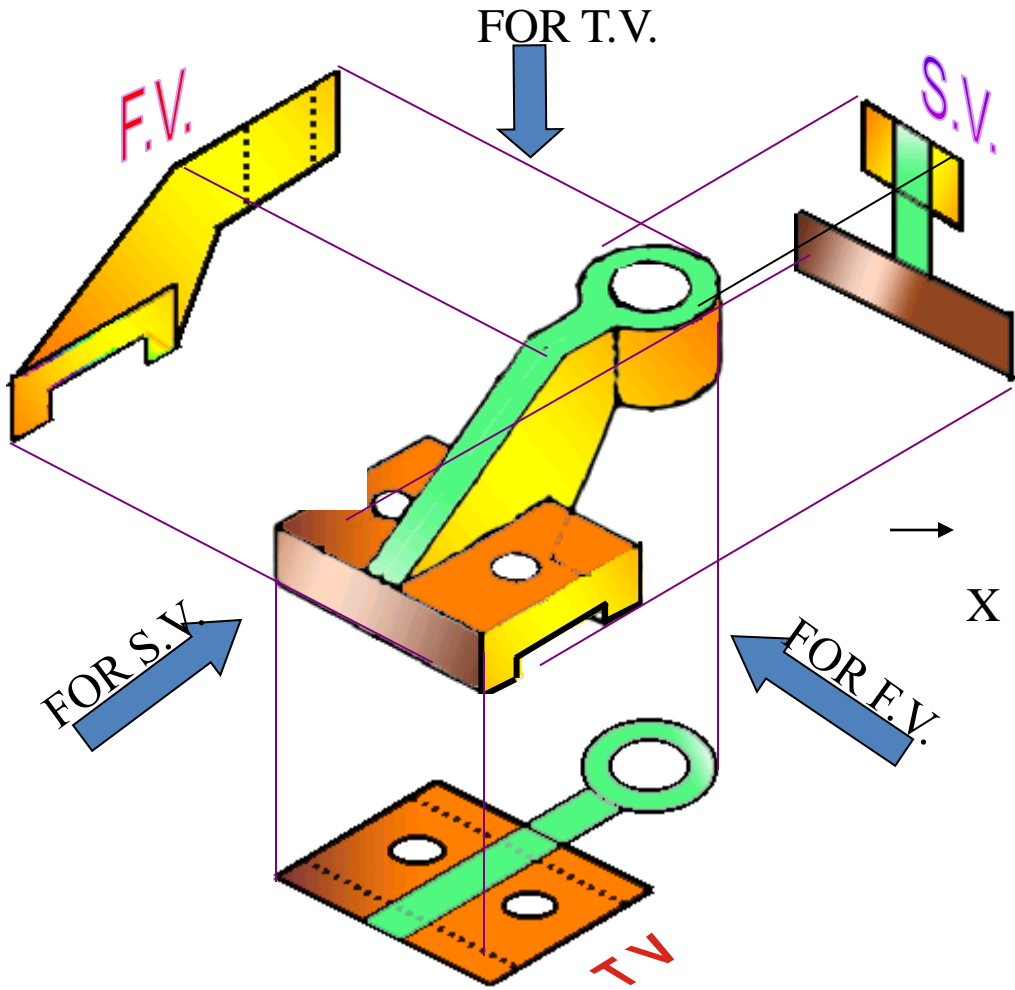


ORTHOGRAPHIC PROJECTIONS

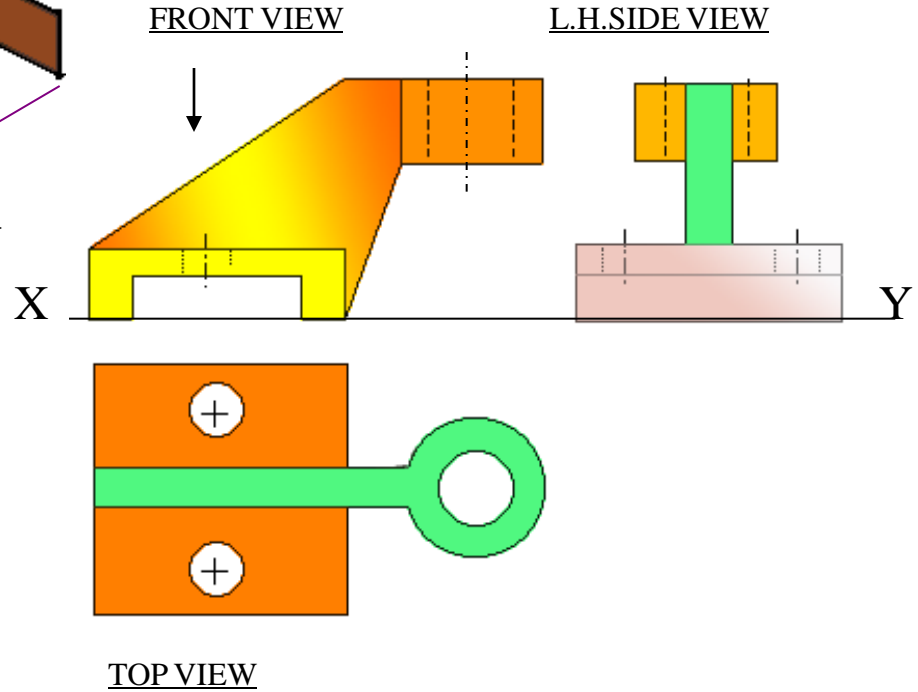


PICTORIAL PRESENTATION IS GIVEN

**DRAW THREE VIEWS OF THIS OBJECT
BY FIRST ANGLE PROJECTION METHOD**



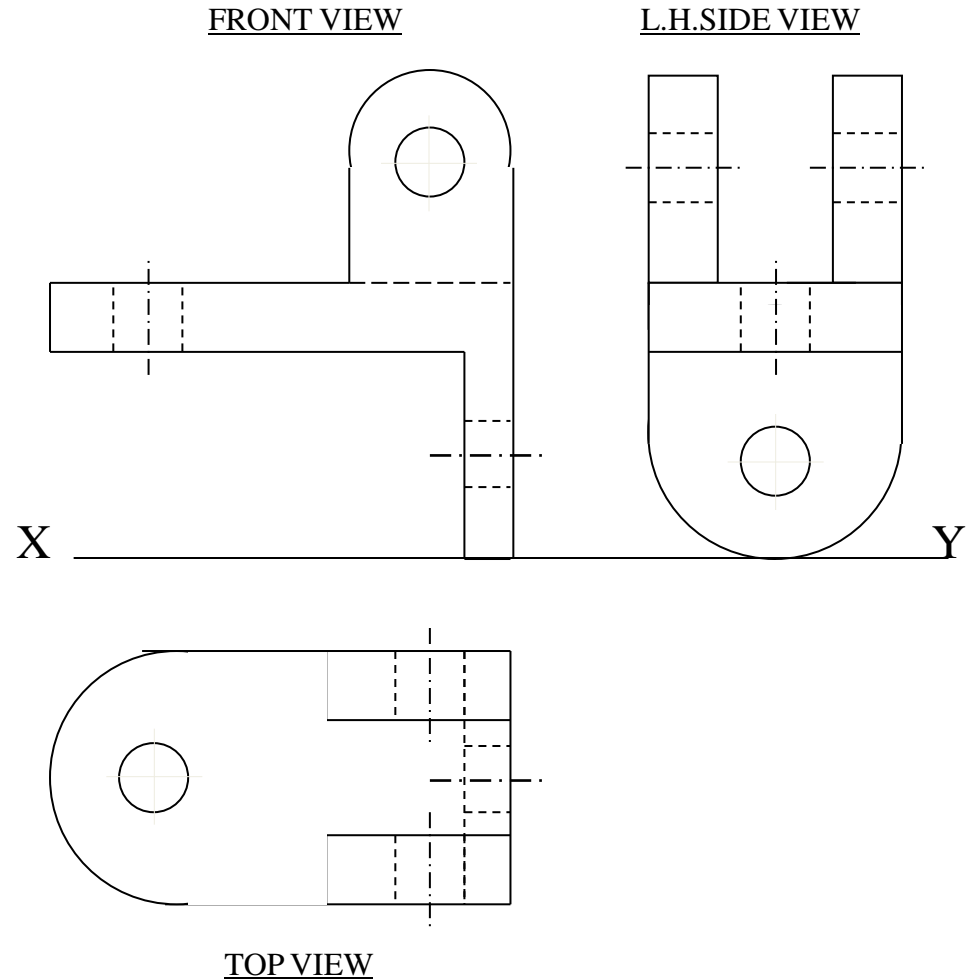
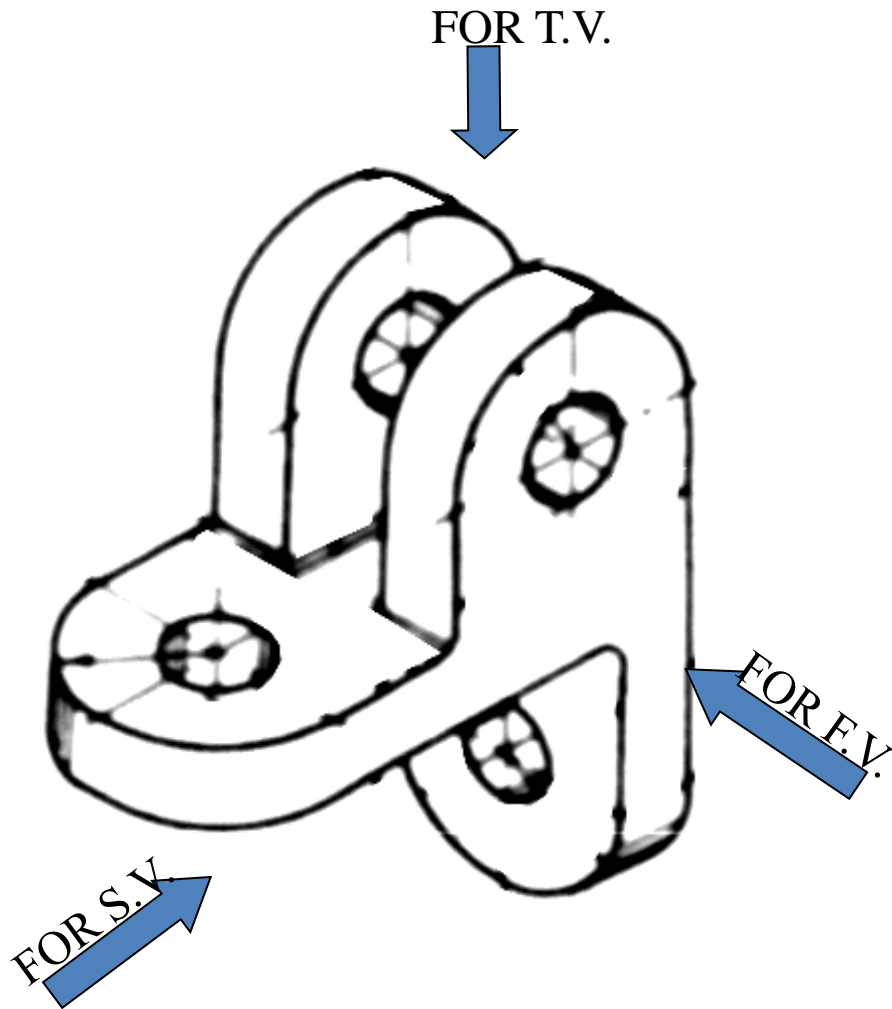
ORTHOGRAPHIC PROJECTIONS



PICTORIAL PRESENTATION IS GIVEN

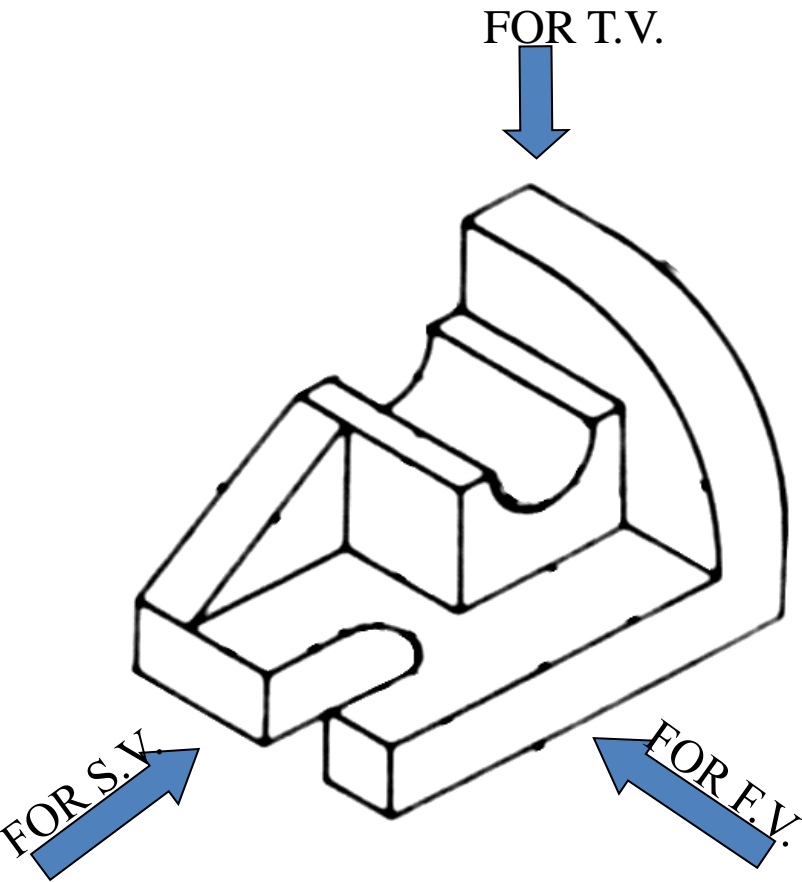
DRAW THREE VIEWS OF THIS OBJECT BY FIRST ANGLE PROJECTION METHOD

ORTHOGRAPHIC PROJECTIONS

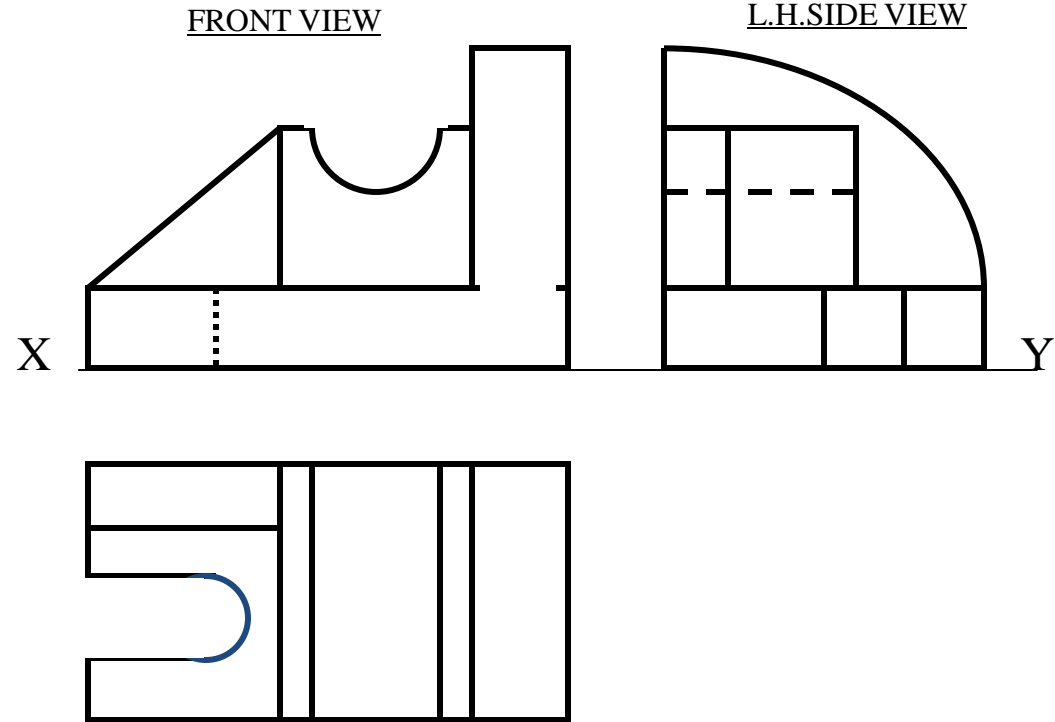


PICTORIAL PRESENTATION IS GIVEN

**DRAW THREE VIEWS OF THIS OBJECT
BY FIRST ANGLE PROJECTION METHOD**



ORTHOGRAPHIC PROJECTIONS



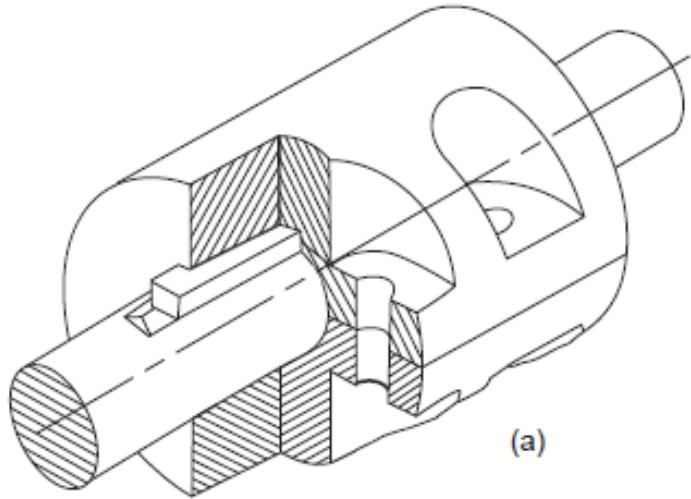
PICTORIAL PRESENTATION IS GIVEN

**DRAW THREE VIEWS OF THIS OBJECT
BY FIRST ANGLE PROJECTION METHOD**

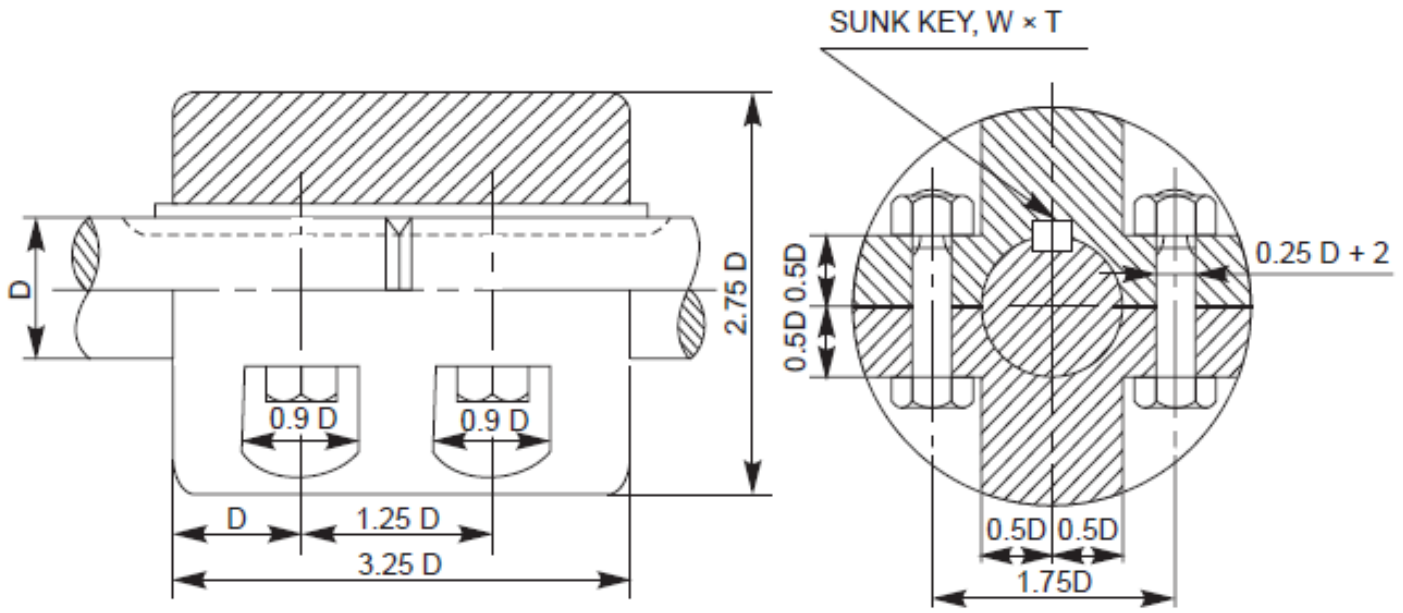
Drawing of sectional views

- Coupling,
- Crankshaft,
- Pulley,
- Piston and Connecting rod,
- Cotter and Knuckle joint,
- Riveted Joint,
- Welded Joint.

Sectional View of Split Muff Coupling

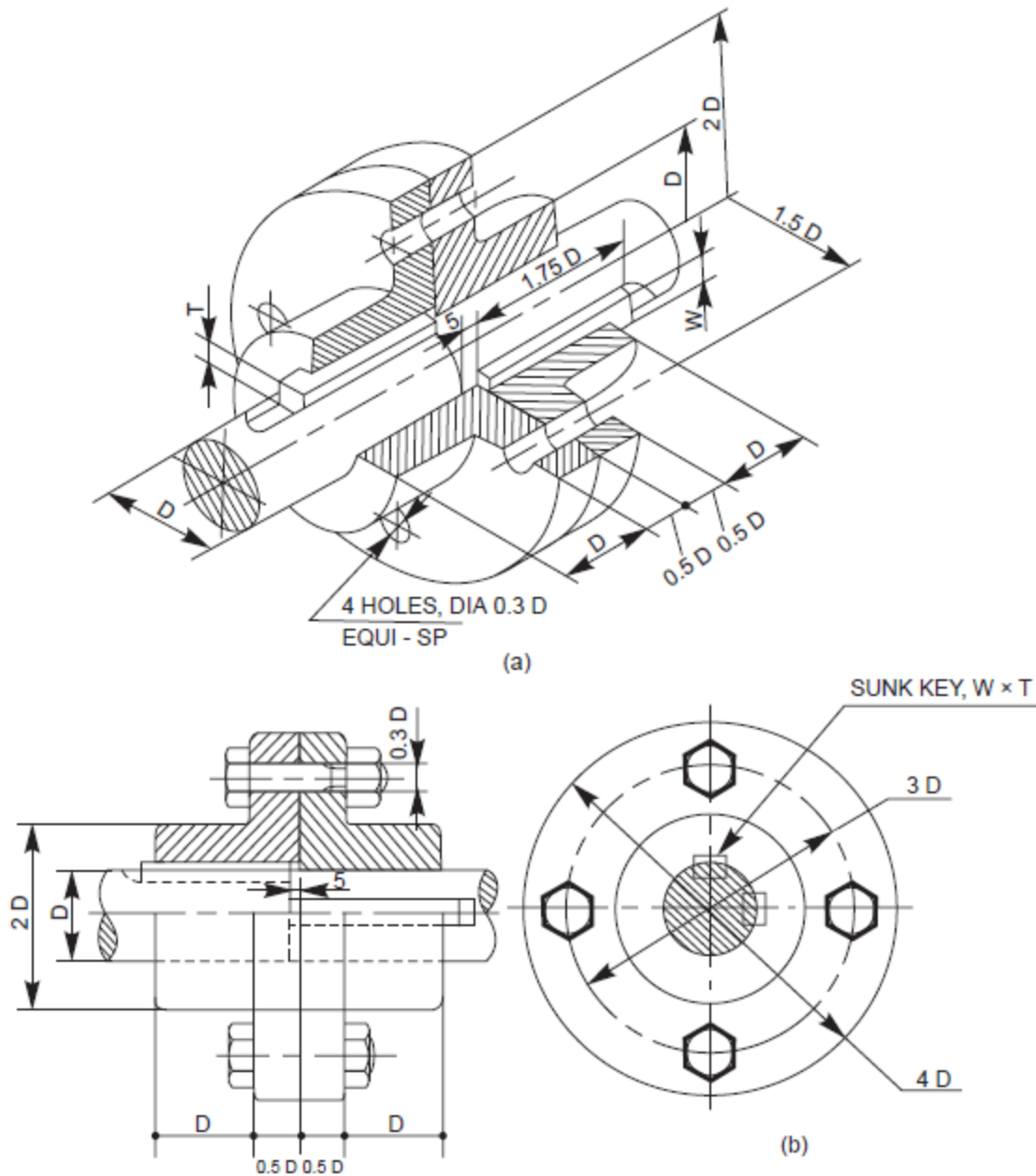


(a)

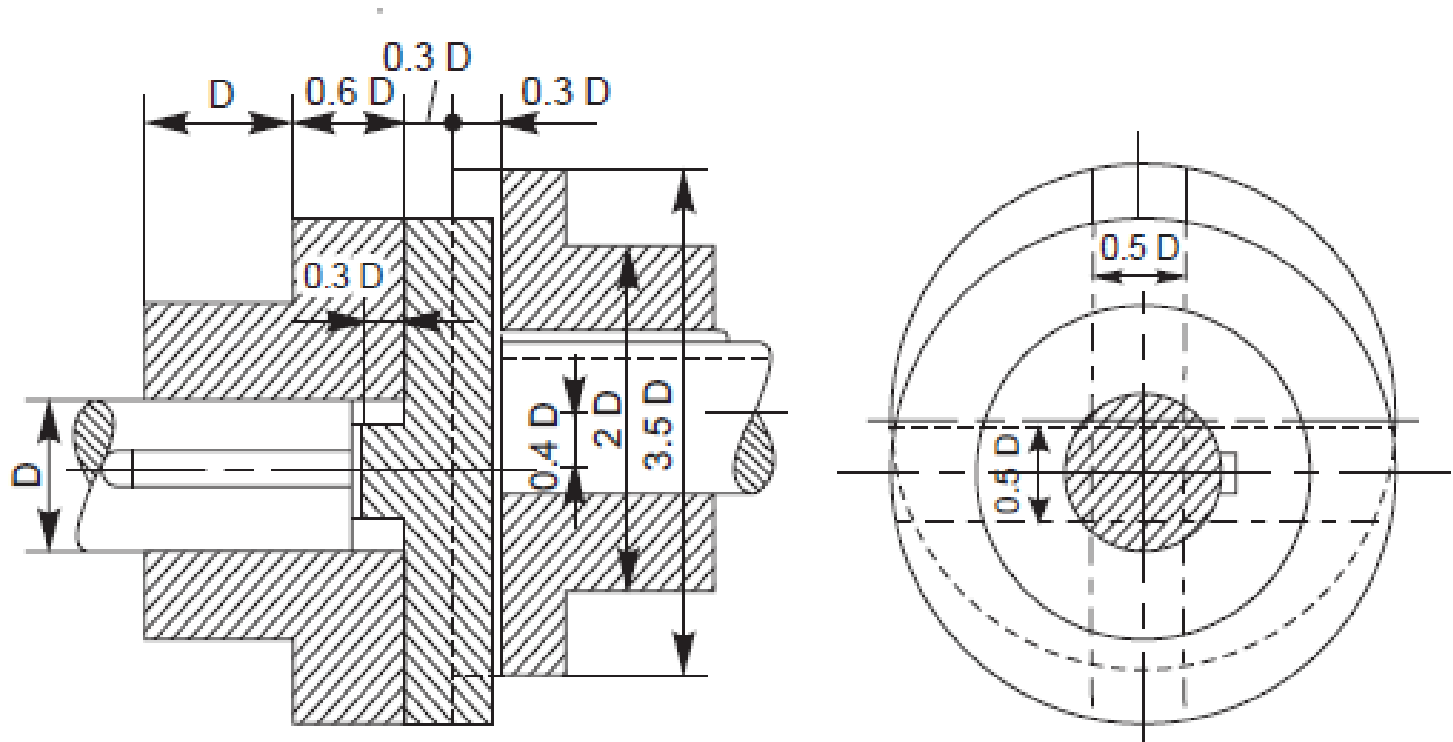


(b)

Sectional View of Flanged Coupling

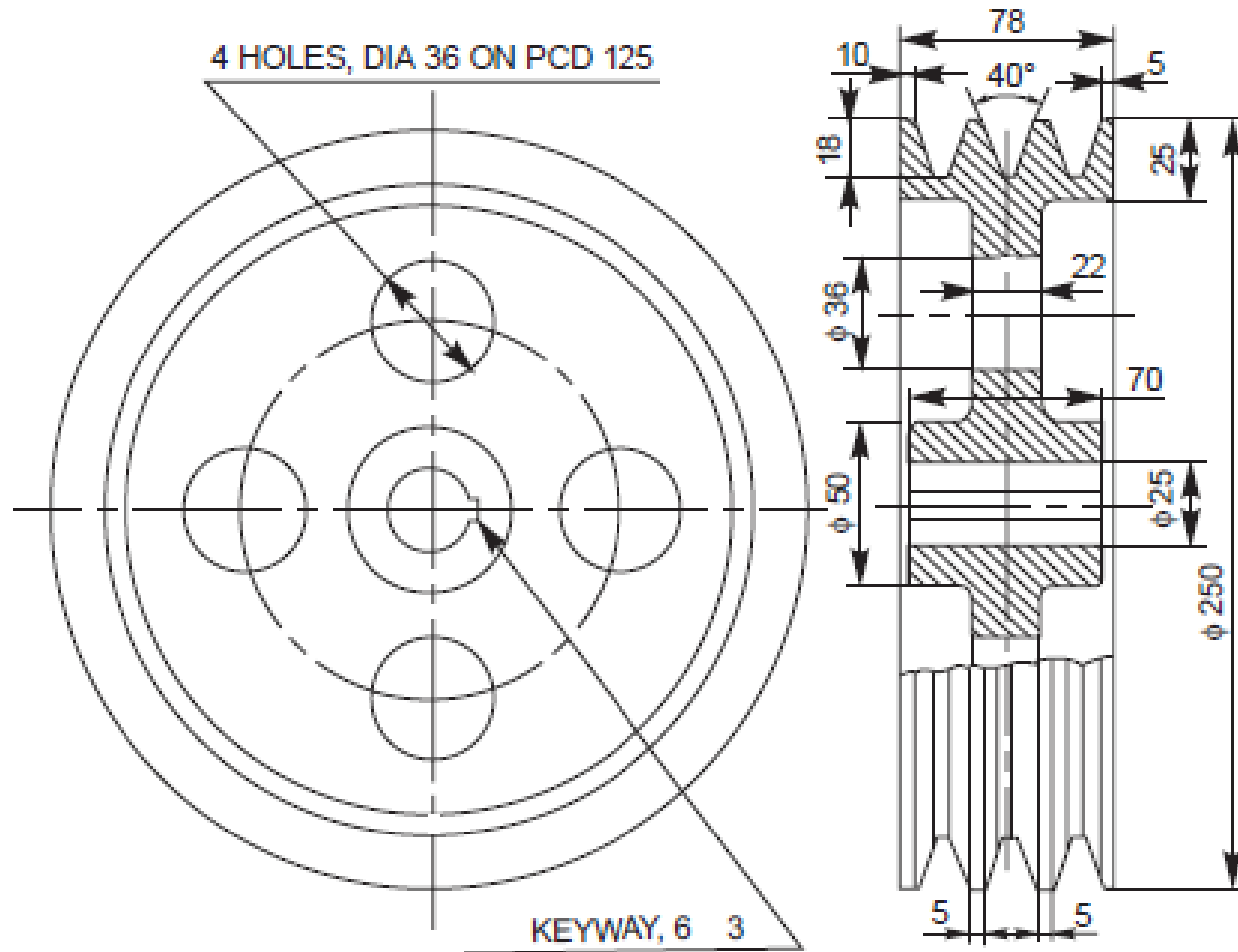


Sectional View of Oldham Coupling



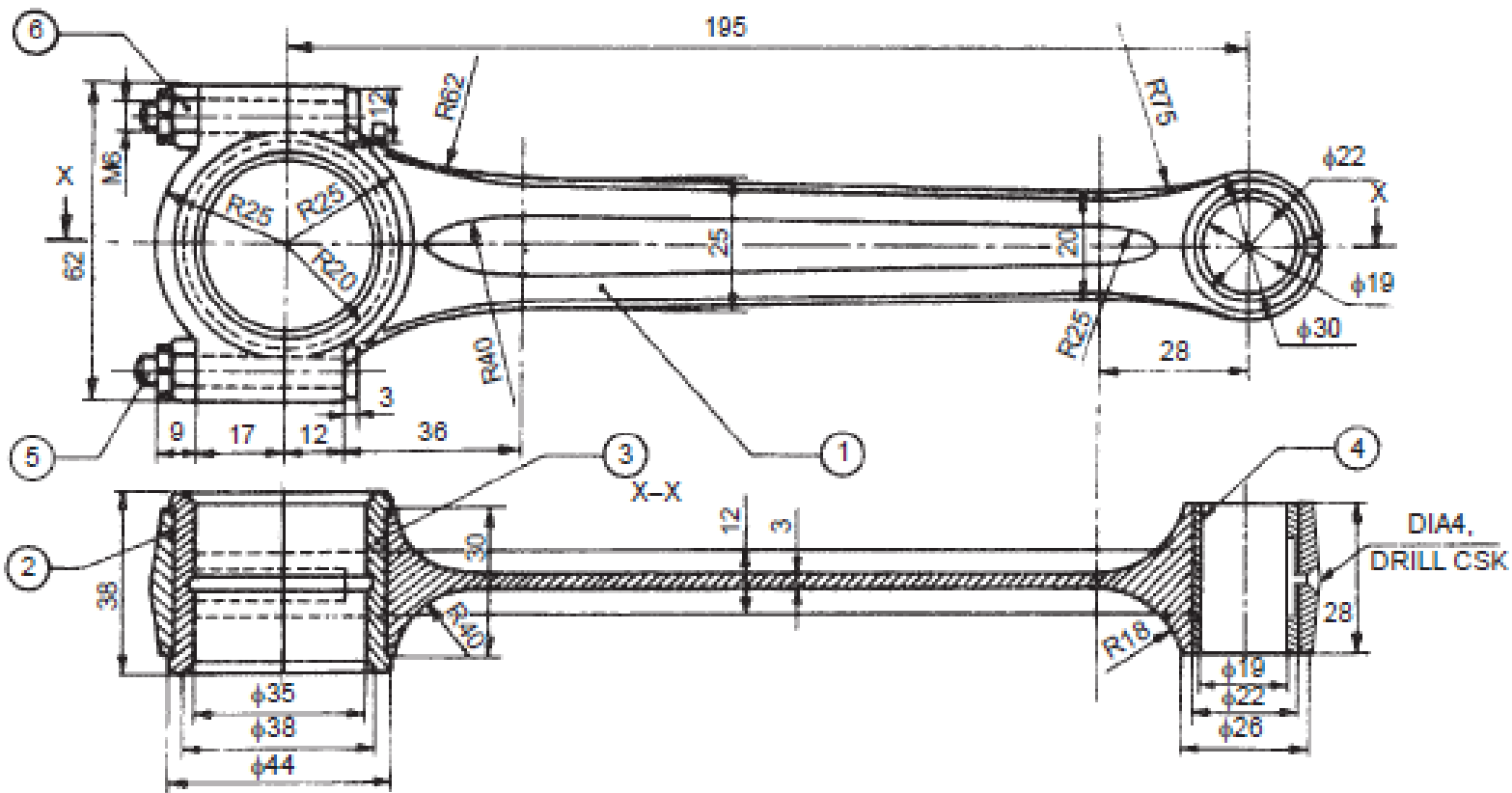
(b)

Sectional View of V-Belt Pulley



(b)

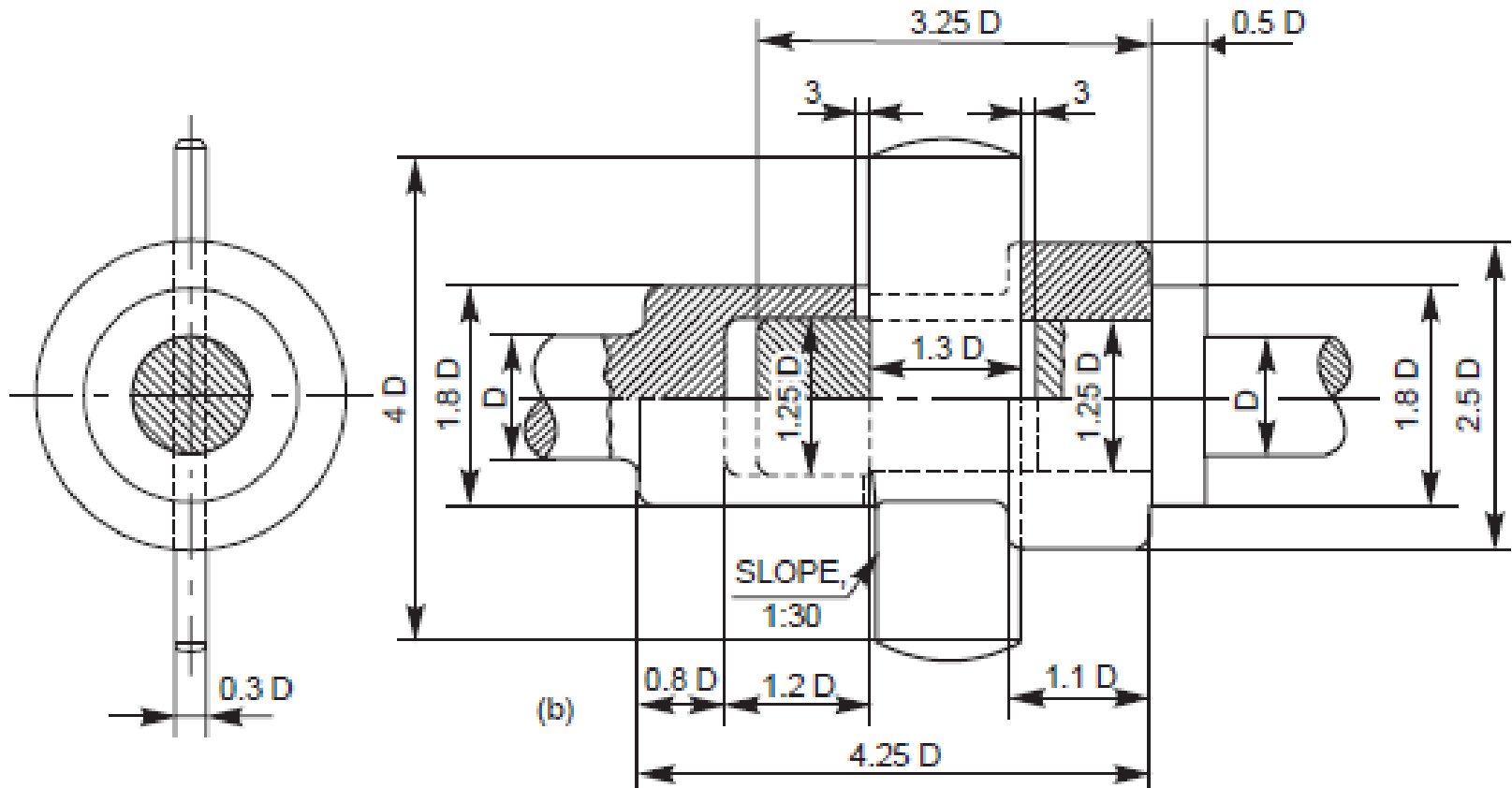
Petrol Engine Connecting Rod



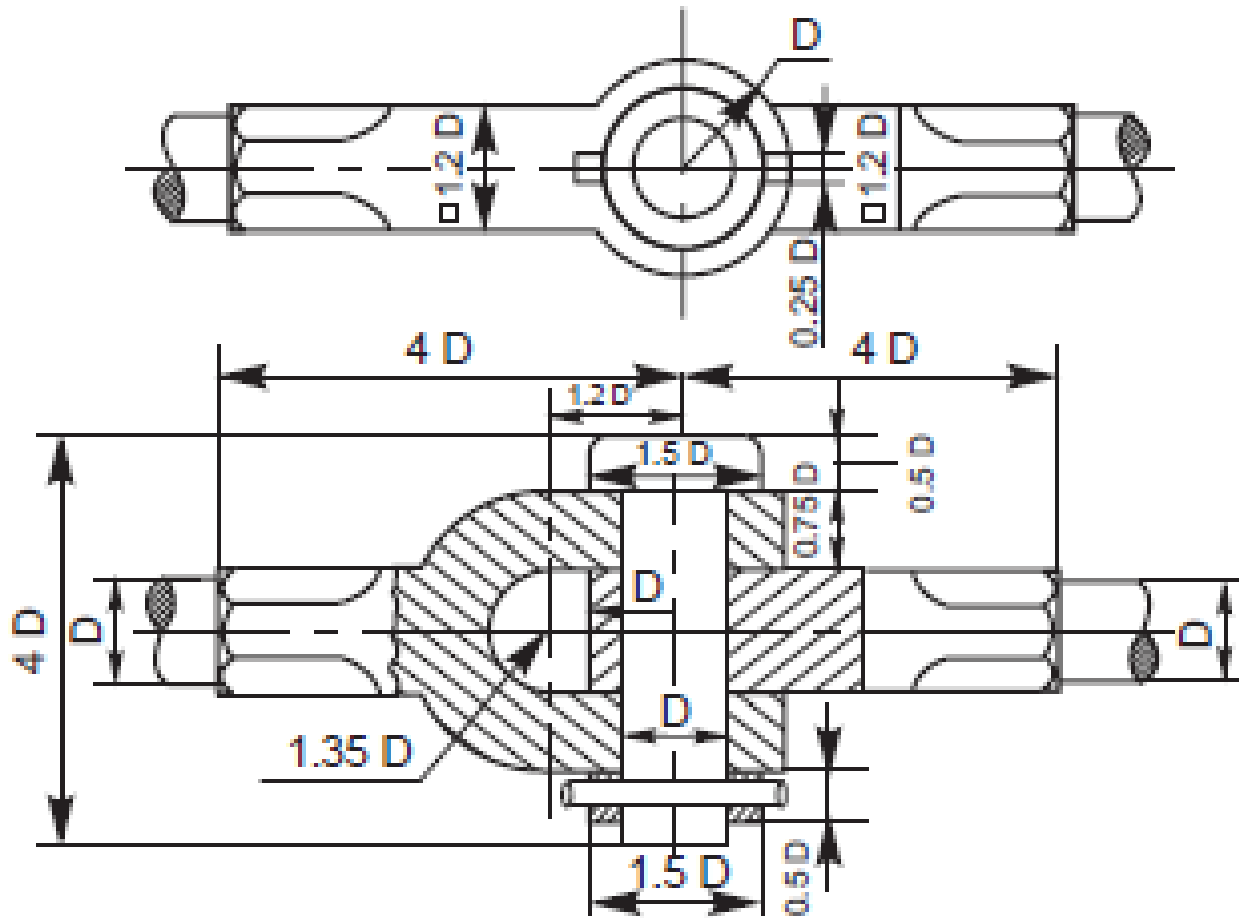
Parts list

Part No.	Name	Matl.	Qty.
1	Rod	FS	1
2	Cap	FS	1
3	Bearing brass	GM	2
4	Bearing bush	P Bronze	1
5	Bolt	MCS	2
6	Nut	MCS	2

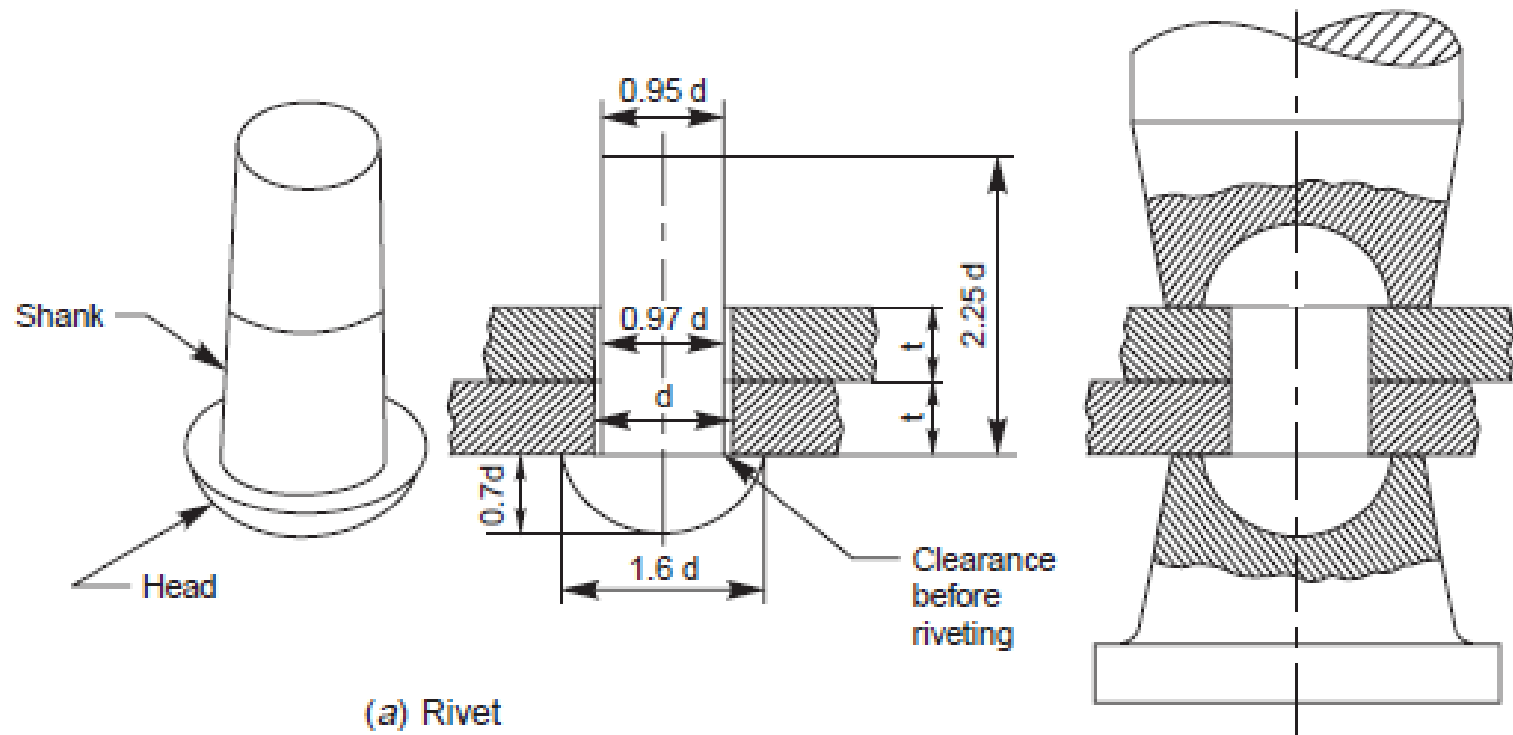
Cotter joint with socket and spigot ends



Knuckle joint



Rivet Joint



(a) Rivet

(b) Riveting

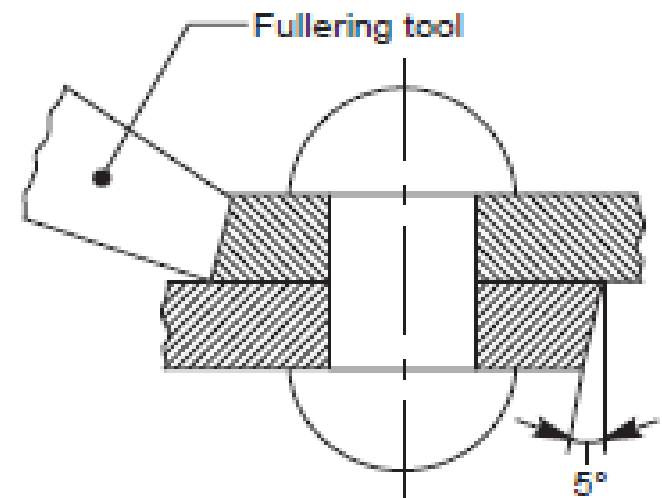
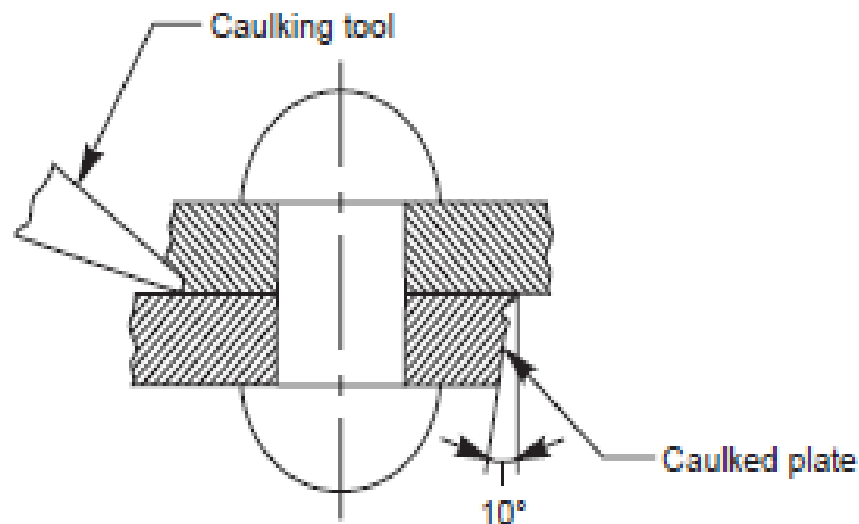
Caulking

The outer edges of the plates used in boiler and other pressure vessels are bevelled. To produce air tight riveted joints, these bevelled edges of the plates are caulked. Caulking is an operation in which the outer bevelled edges of the plates are hammered and driven-in by a caulking tool. The caulking tool is in the form of a blunt edged chisel

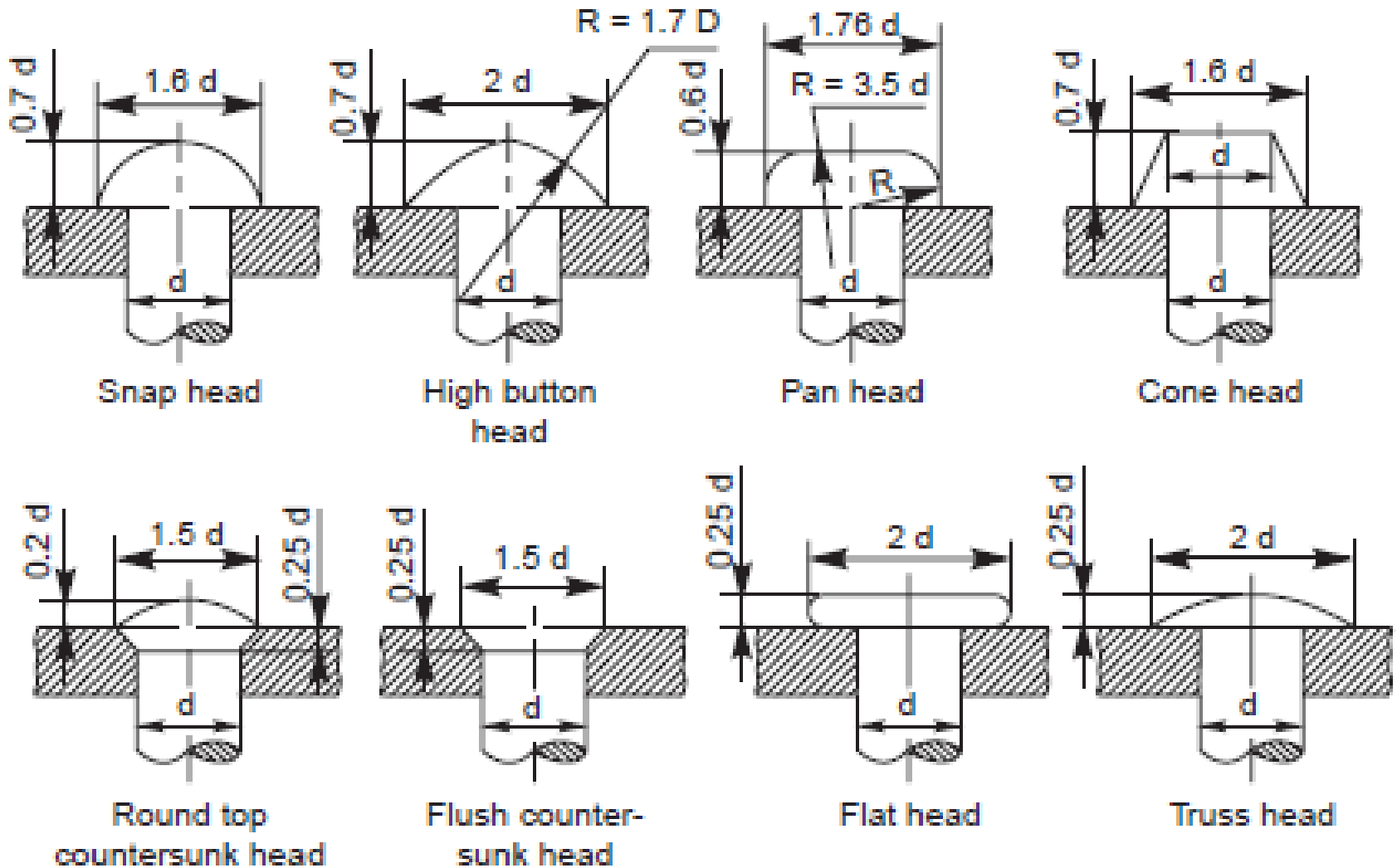
Fullering

Similar to caulking, fullering is also used to produce air tight joints. Unlike the caulking tool, the width of the fullering tool is equal to the width of the bevelled edges of the plates

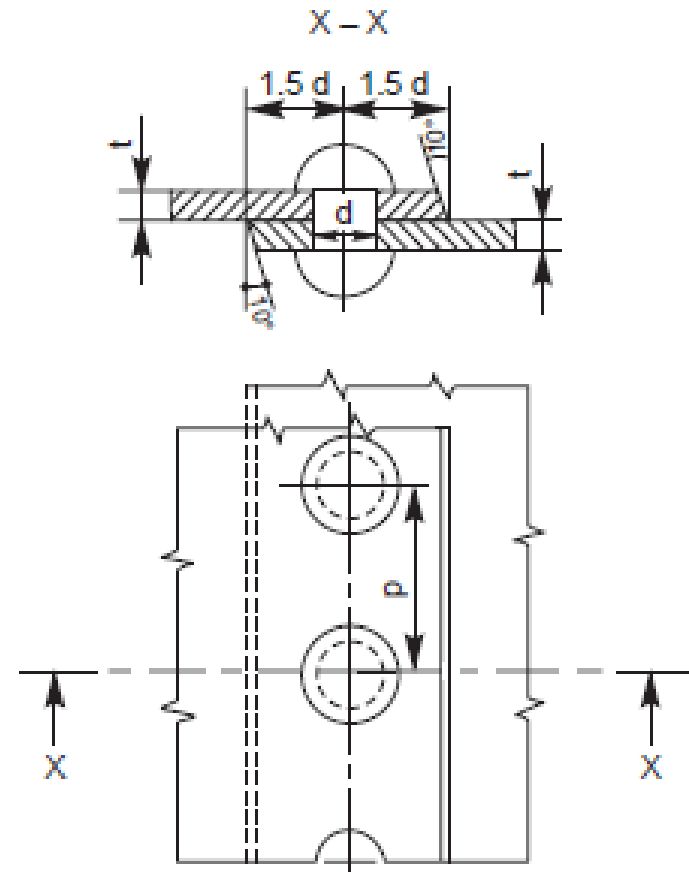
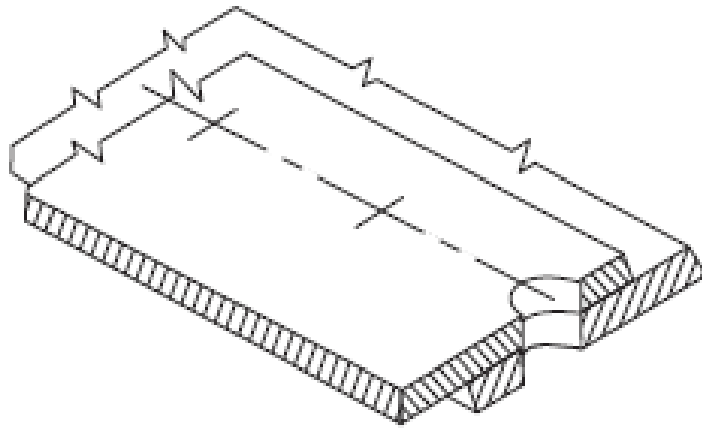
Caulking and fullering operations are carried out effectively by applying pneumatic pressure.



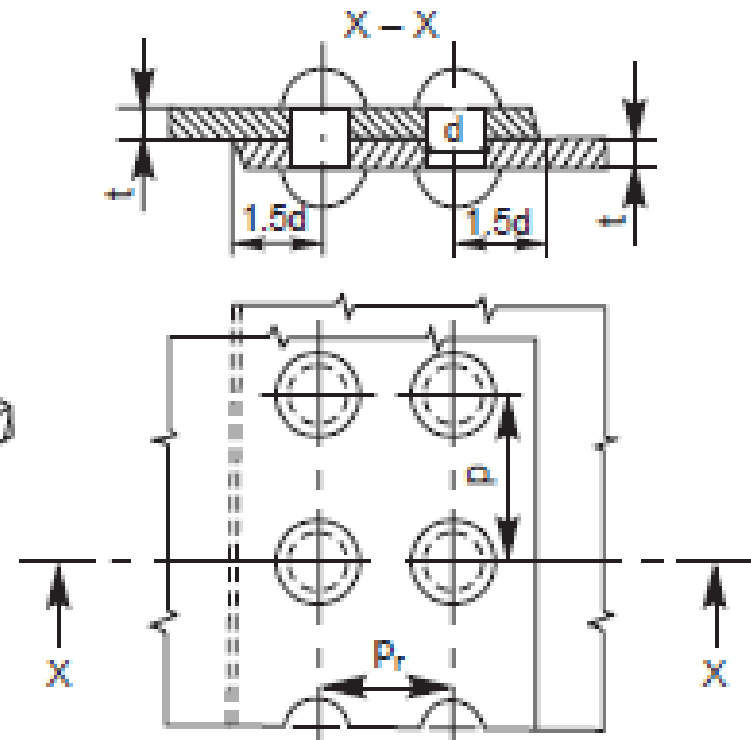
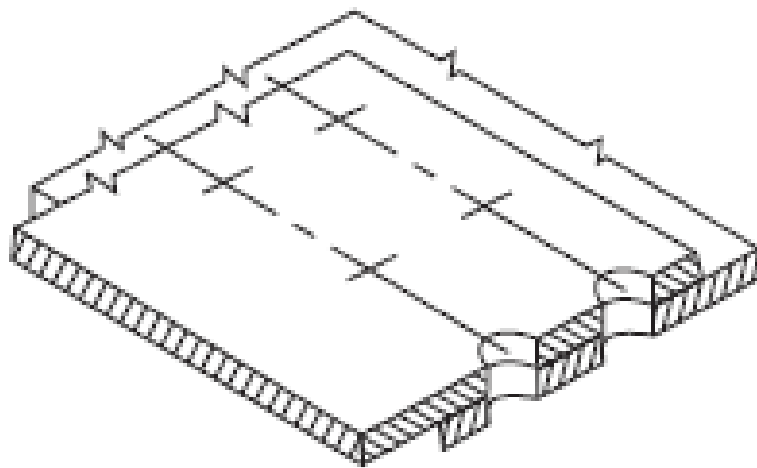
Types of Rivet Heads



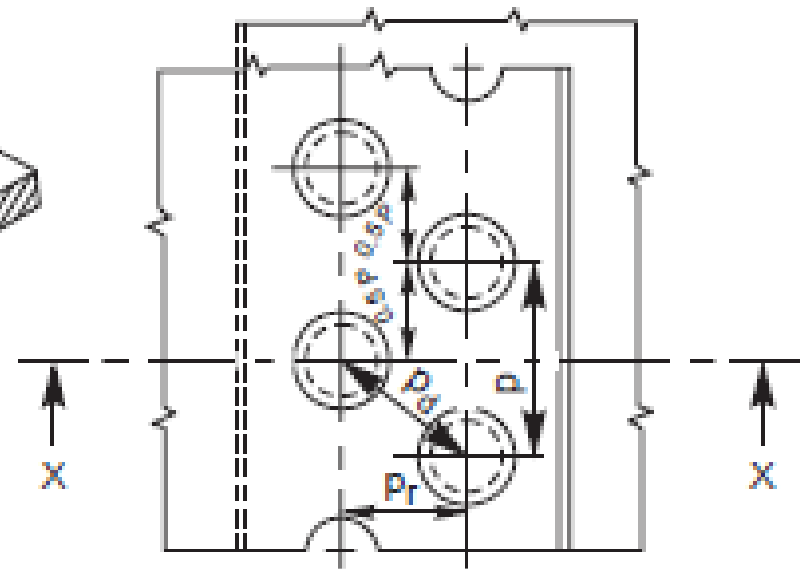
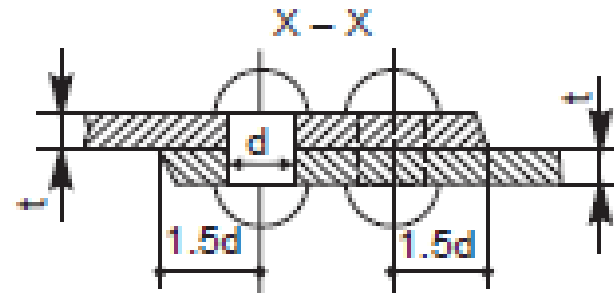
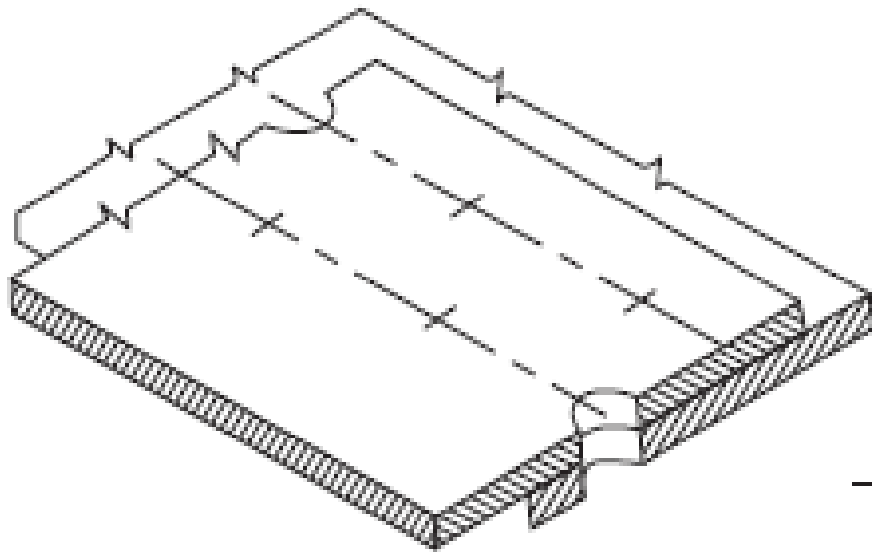
Single riveted lap joint



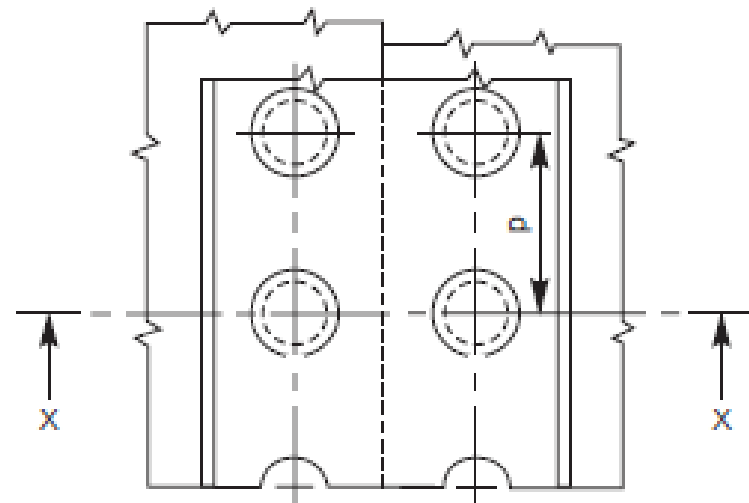
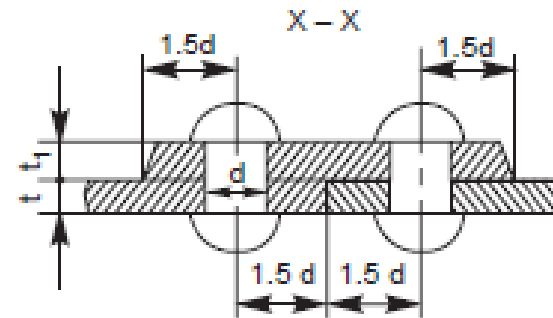
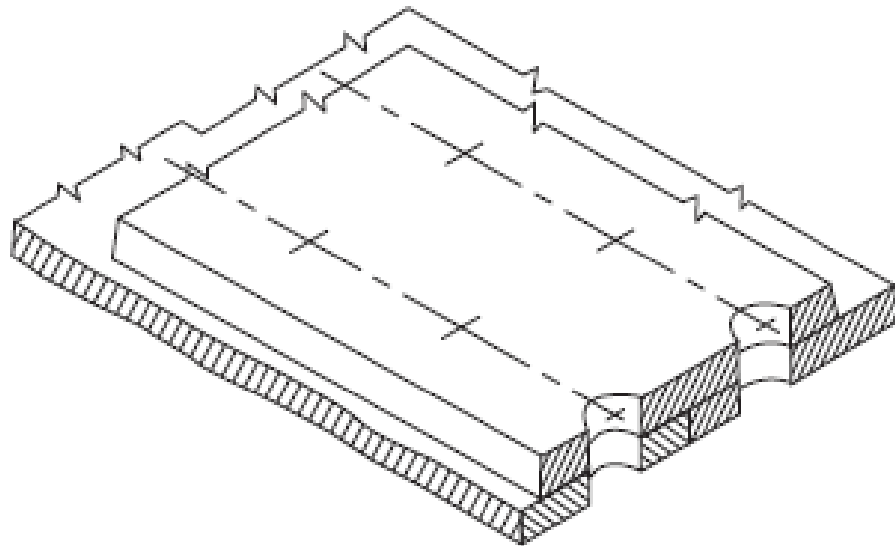
Double riveted chain lap joint



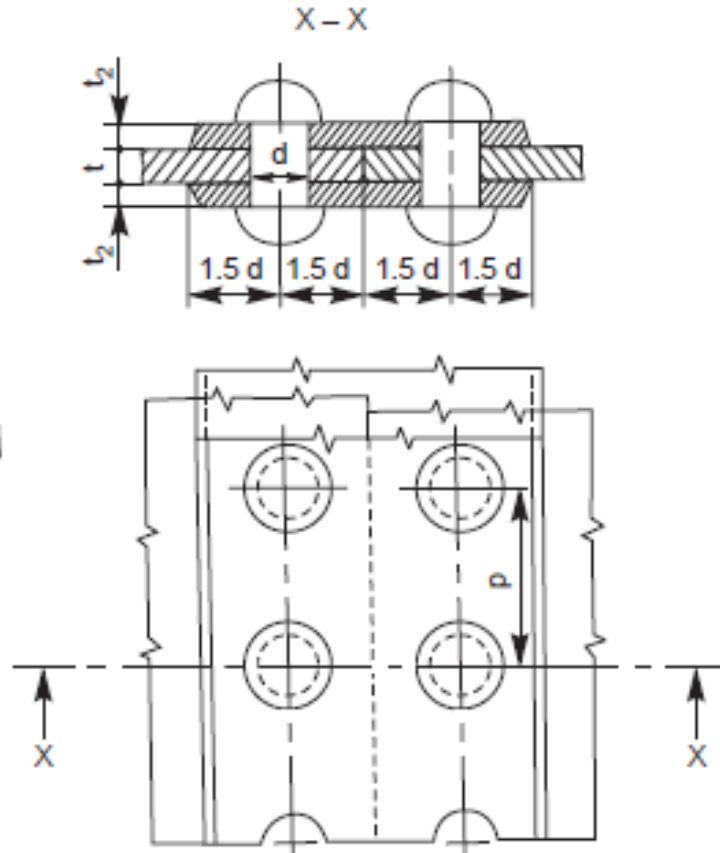
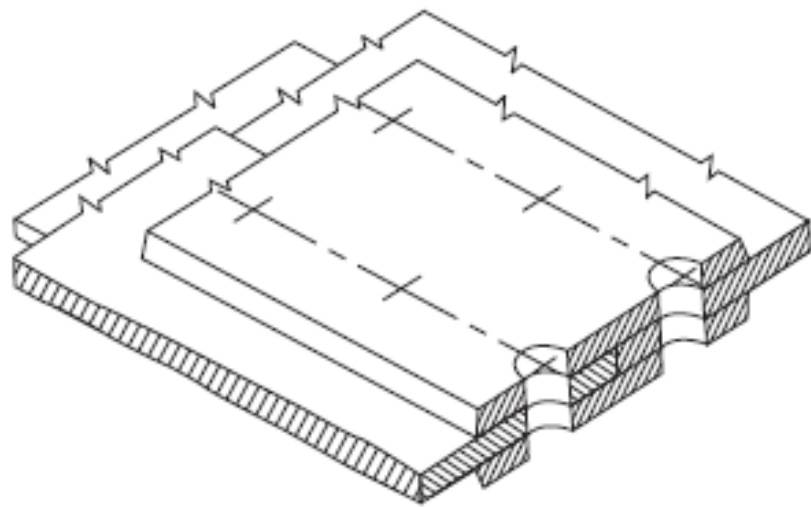
Double riveted zig-zag lap joint



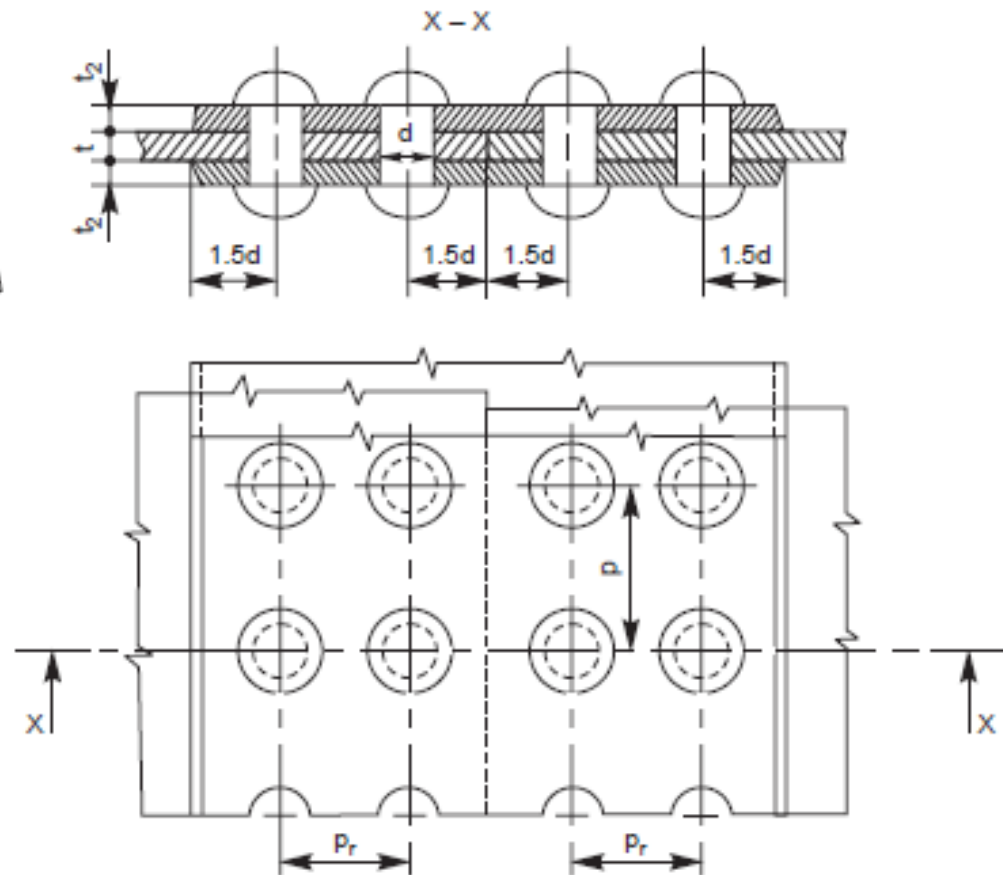
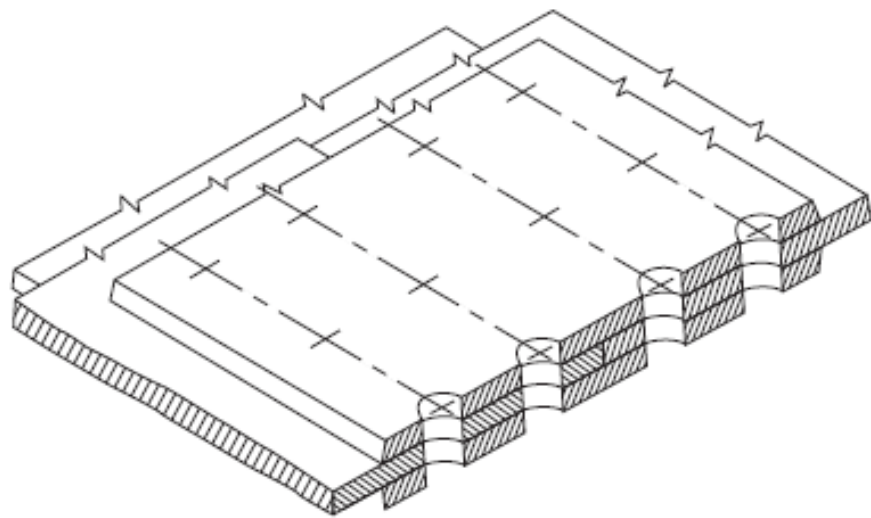
Single riveted, single strap butt joint



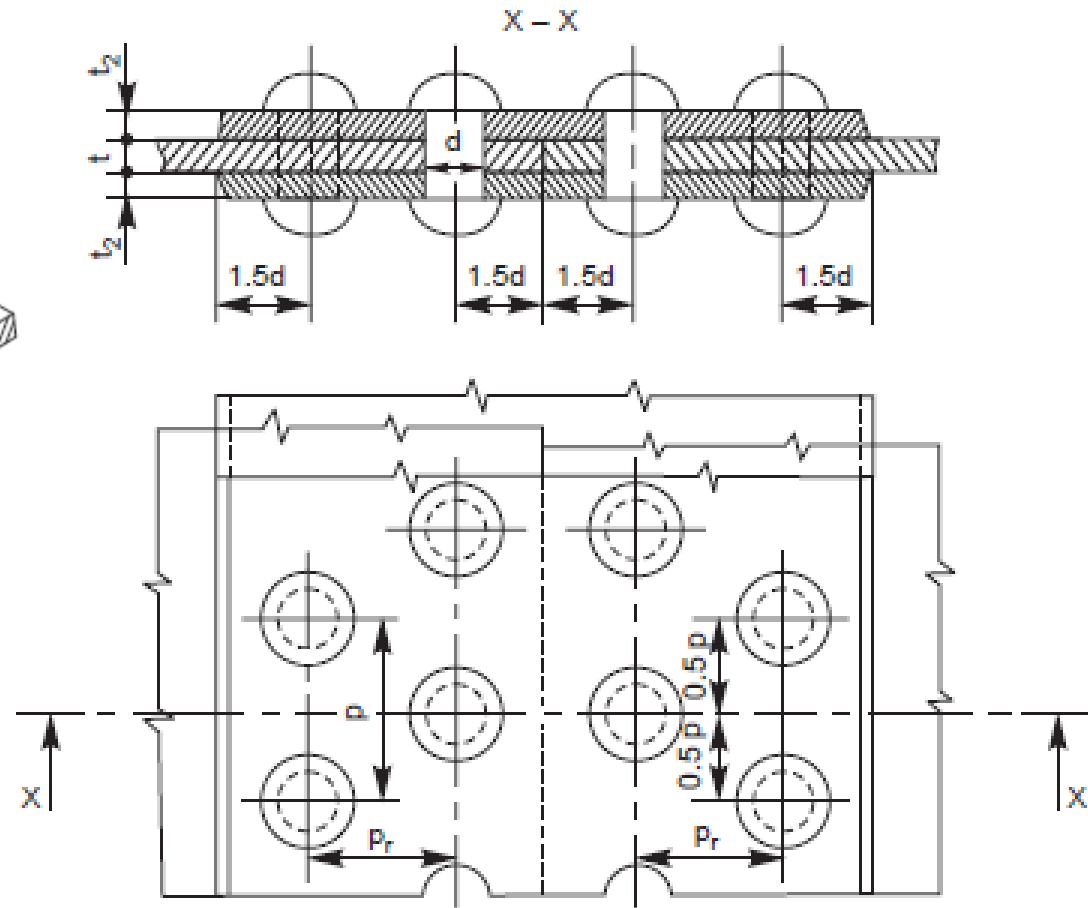
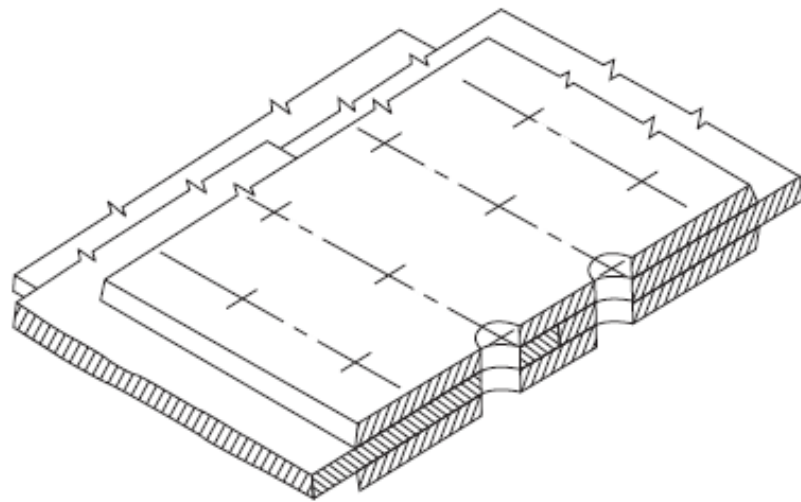
Single riveted, double strap butt joint



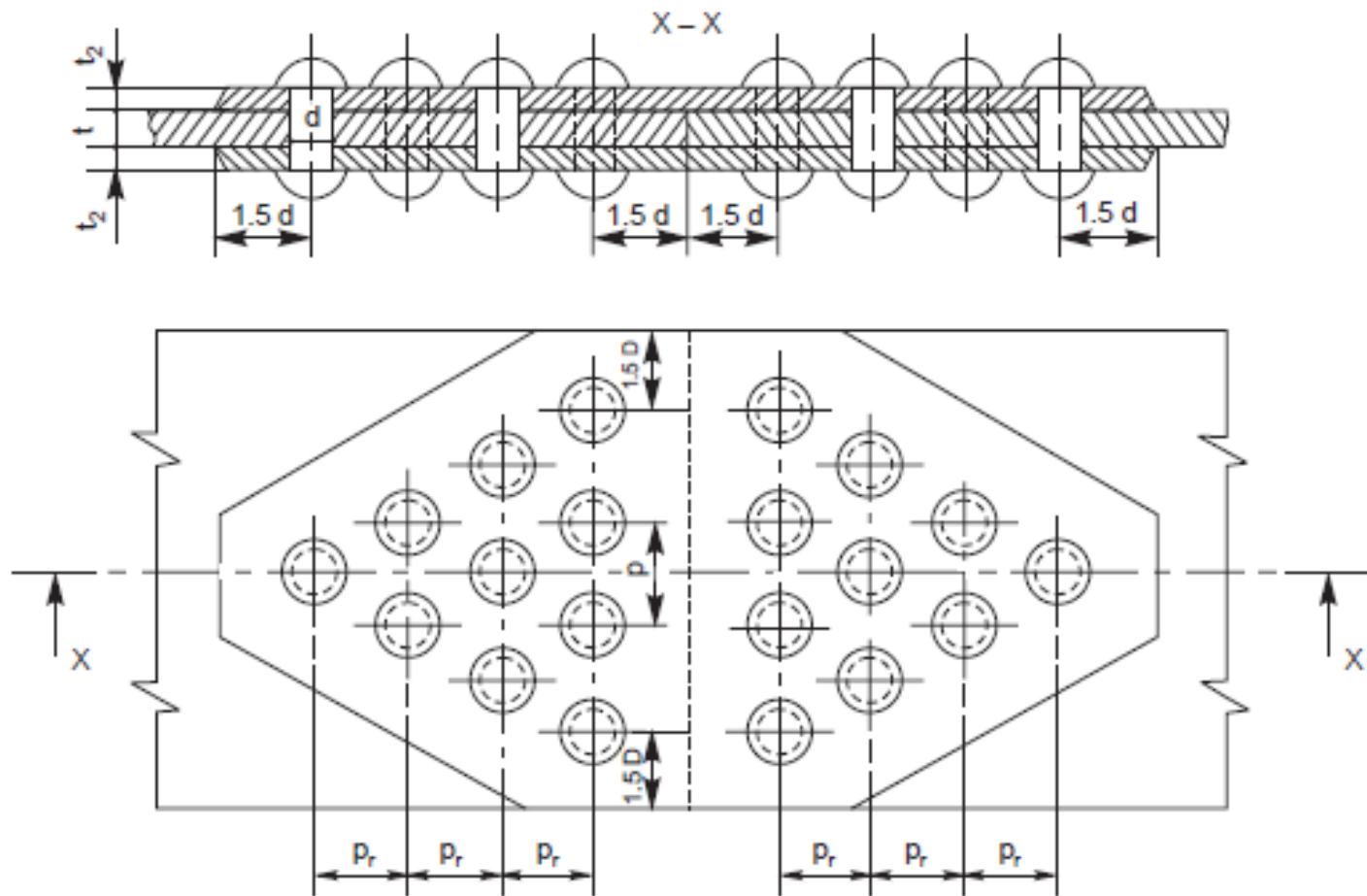
Double riveted, double strap butt joint



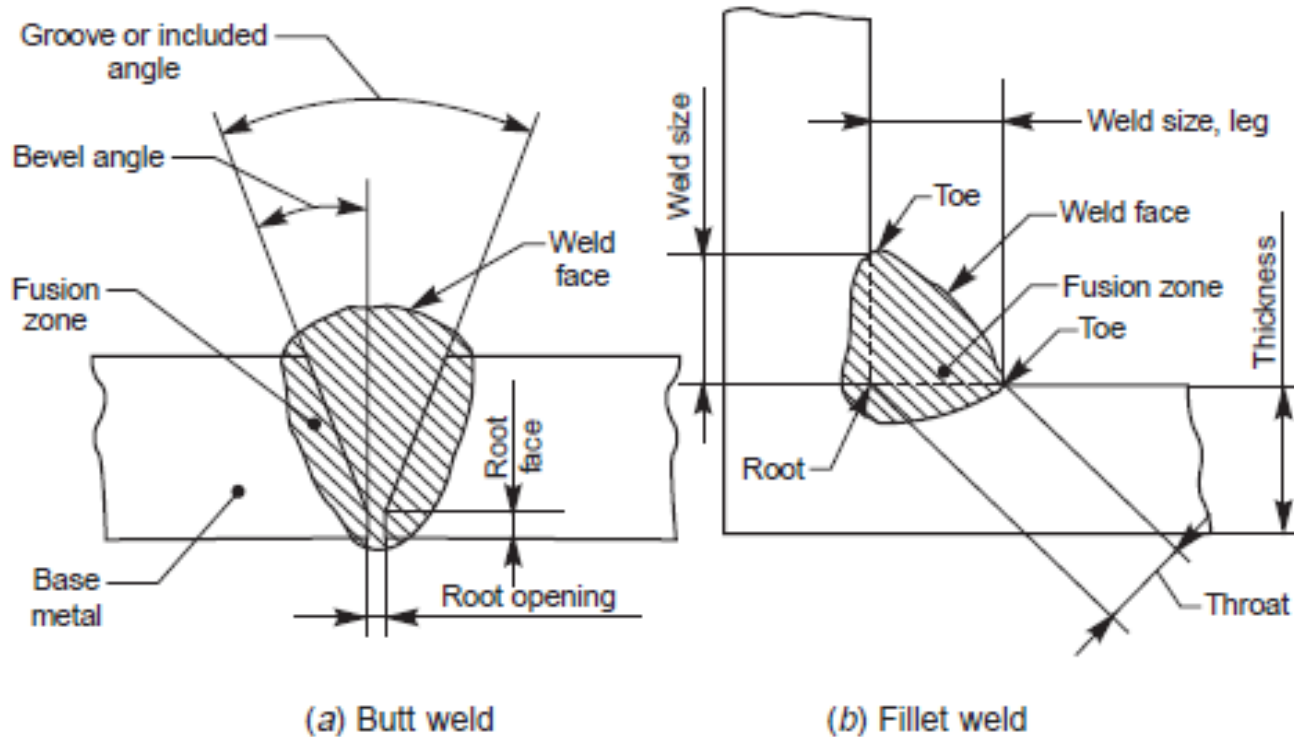
Double riveted, double strap zig-zag butt joint



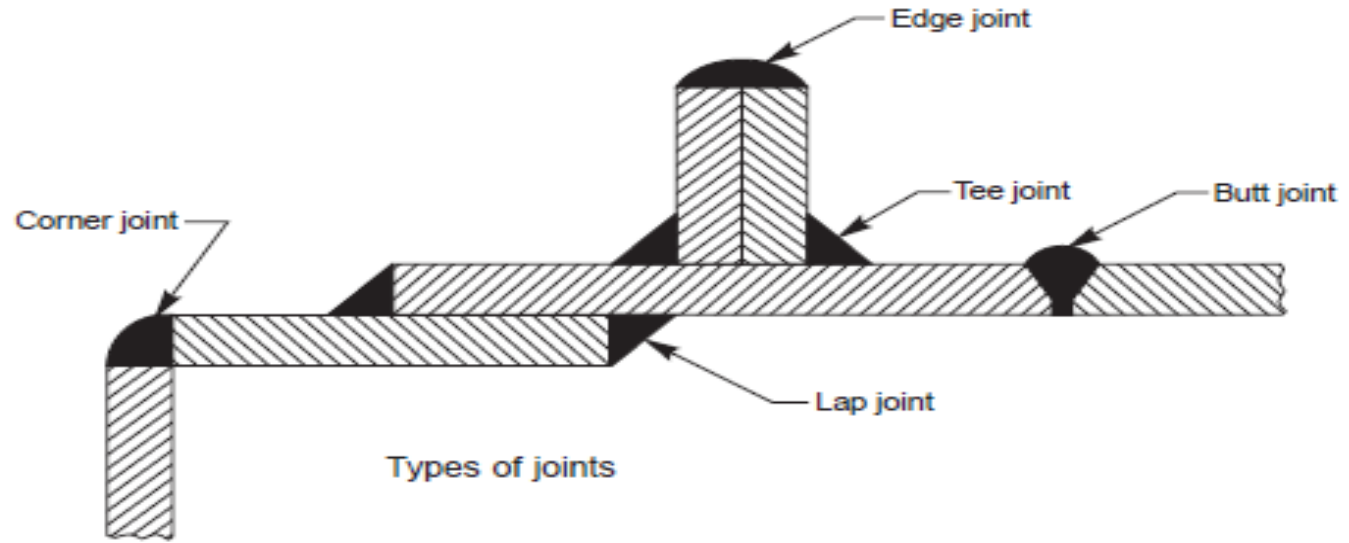
Double strap diamond butt joint



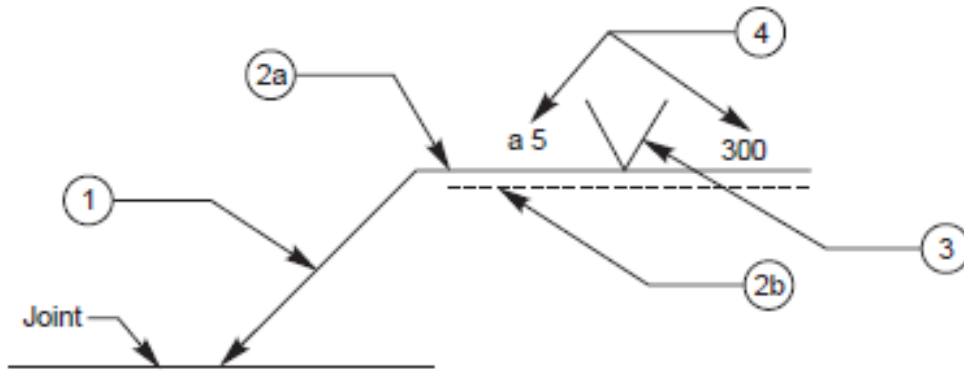
Basic terms of a welded joint



Types of welded Joint





















Position of weld symbol on drawing

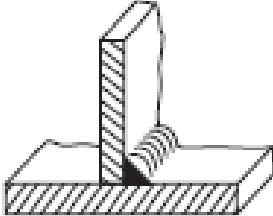



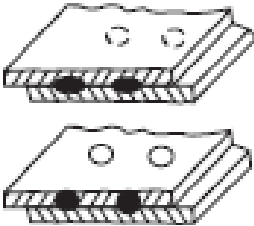



- (i) An arrow line (1) per joint,
- (ii) A dual reference line, consisting of two parallel lines; one continuous and one dashed (2a, 2b) and
- (iii) A certain number of dimensions (4) and conventional signs (3).

Elementary welding symbols

No.	<i>Designation</i>	<i>Illustration</i>	<i>Symbol</i>
1.	Butt weld between plates with raised edges (the raised edges being melted down completely)		
2.	Square butt weld		
3.	Single-V butt weld		
4.	Single-bevel butt weld		
5.	Single-V butt weld with broad root face		
6.	Single-bevel butt weld with broad root face		
7.	Single-U butt weld (parallel or sloping sides)		
8.	Single-U butt weld		
9.	Backing run; back or backing weld		

Elementary welding symbols

10.	Fillet weld		
11.	Plug weld; plug or slot weld		
12.	Spot weld		
13.	Seam weld	