

# Sketching in SciTech

What you need to know for  
graphic communication

# Sketching in your Logbook

- Use pencil
- Take up the **WHOLE PAGE**
- Label things

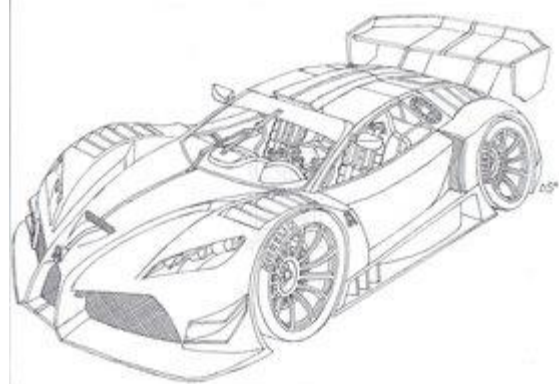
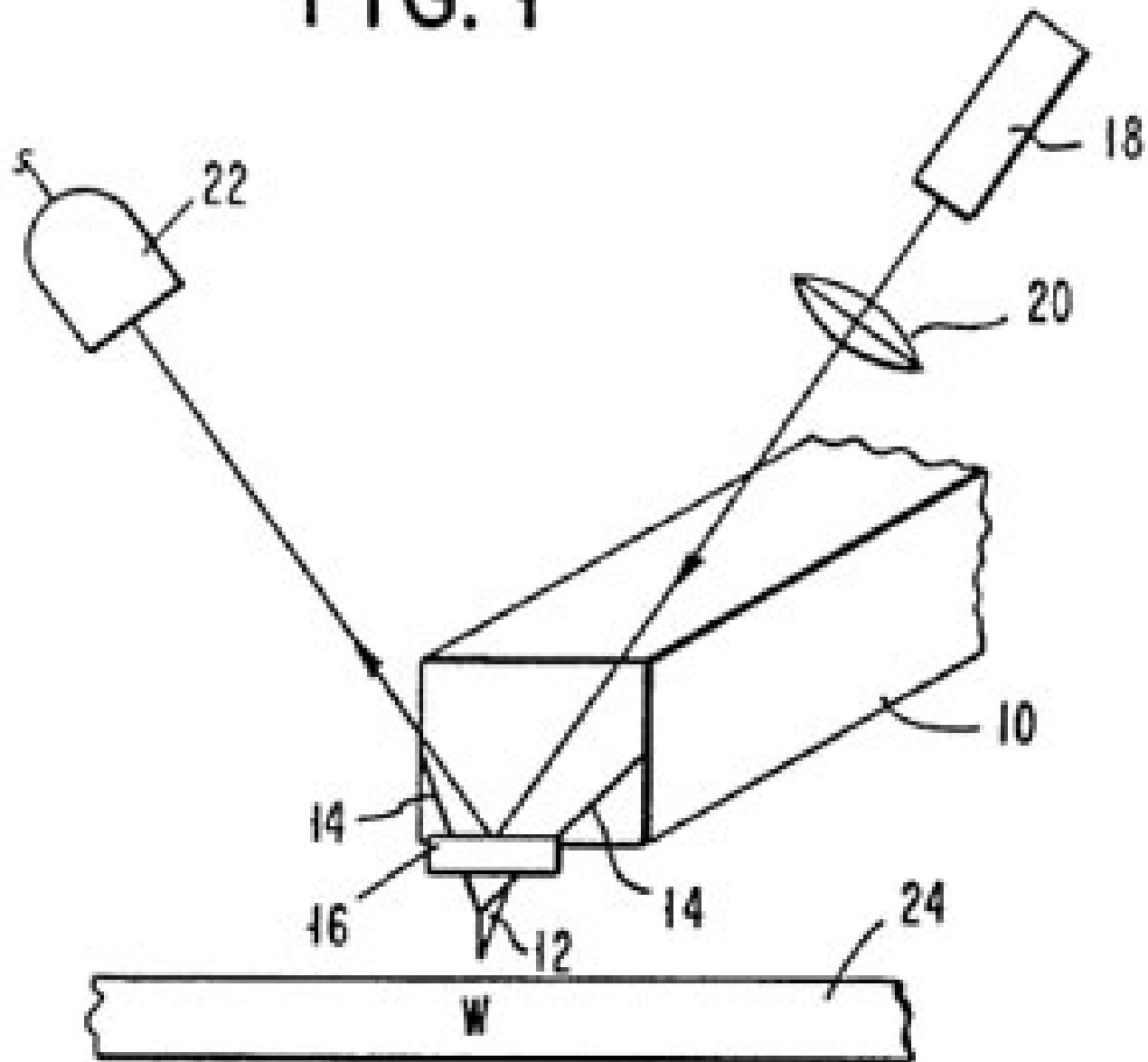


FIG. 1



# 1. Proportion

- Each part of the sketch is the right size, relative to all the other parts.



## 2. Scale

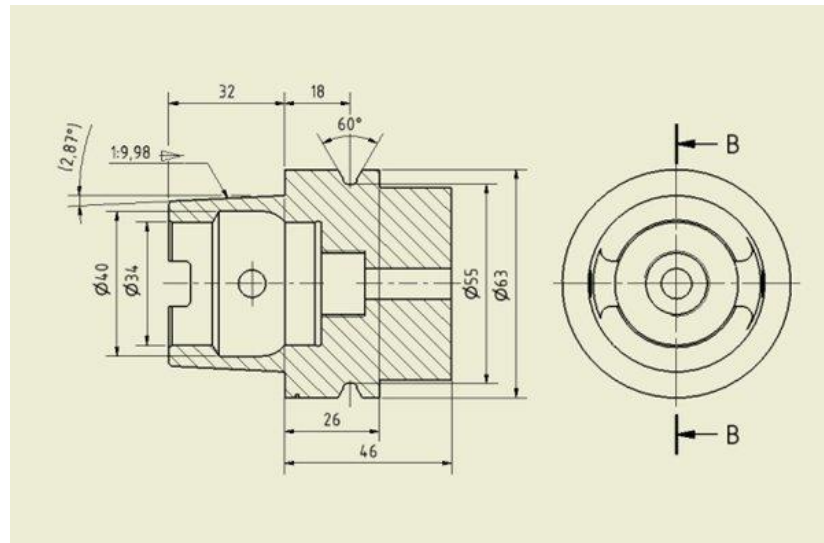
- The viewer is aware of the relative size of the drawing to the REAL LIFE version.

drawing: real life

4:1 ratio

1:1 ratio

1:100 ratio



# 3. Perspective

- The sketch clearly communicates *from what position* the view is drawn.



Front



R. Side

# Let's Sketch Something!

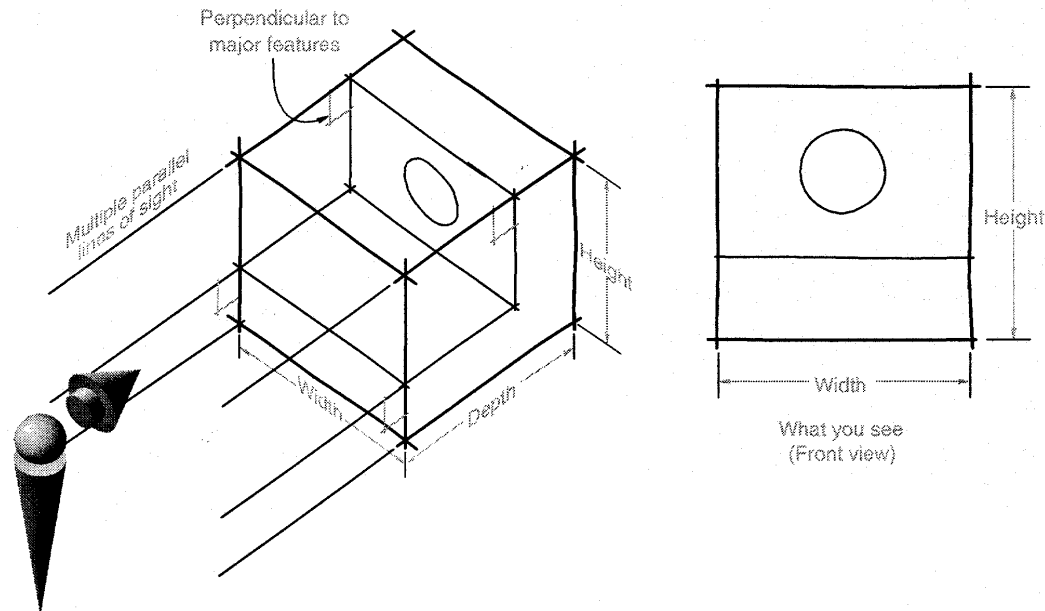
- Use your dominant eye
- Use your thumb/pencil for proportion
- 7 minutes!



SCI-TECH  
ORTHOGRAPHIC  
PROJECTION

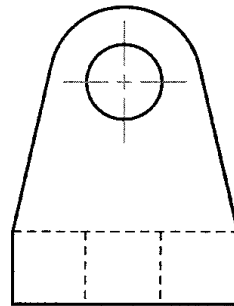
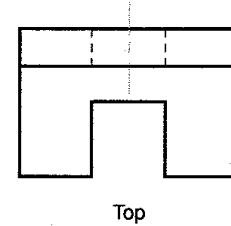
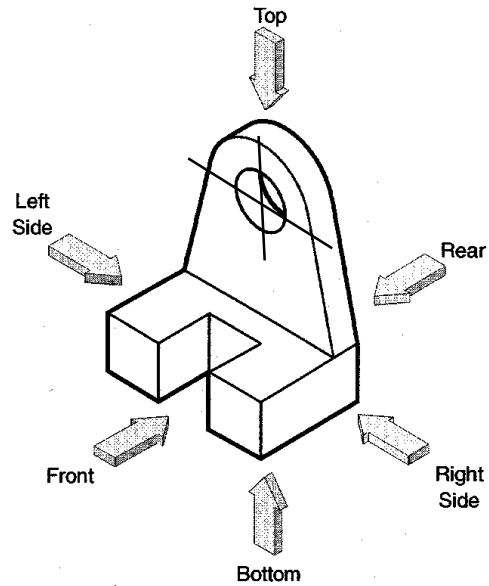
AN  
INTRODUCTION

# Orthographic Projections

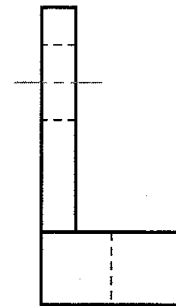


- Orthographic Projections are a collection of 2-D drawings that work together to give an accurate overall representation of an object.

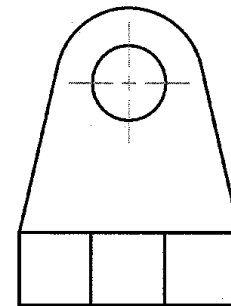
# Defining the Six Principal Views or Orthographic Views



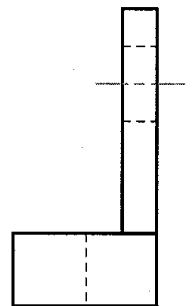
Rear



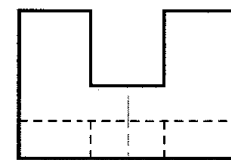
Left Side



Front



Right Side

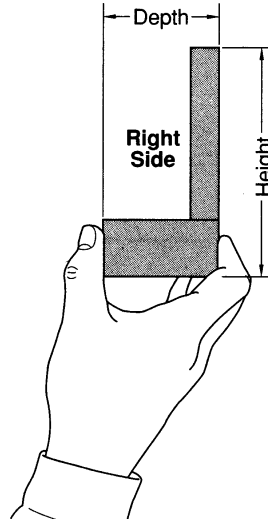
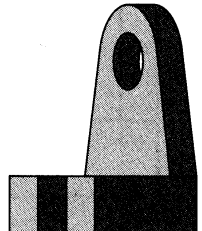
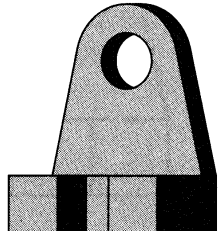
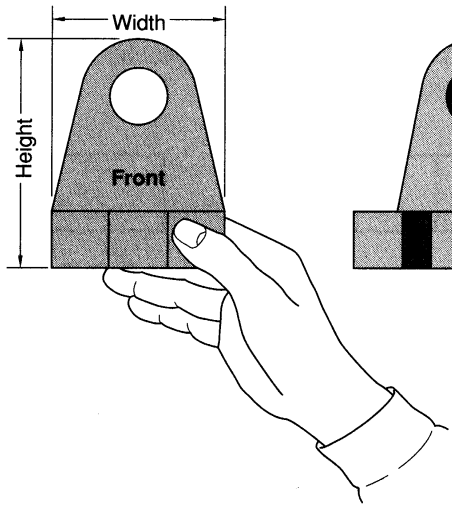
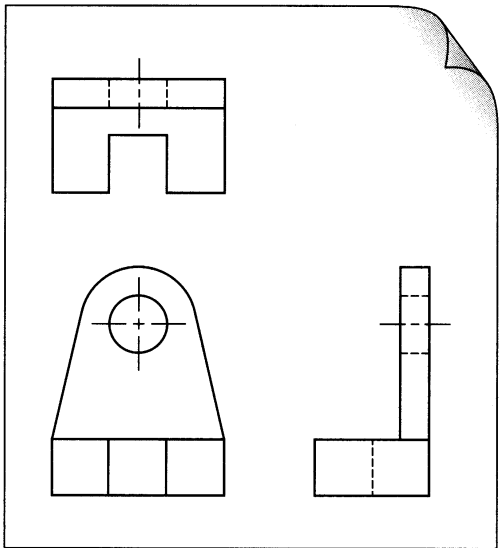
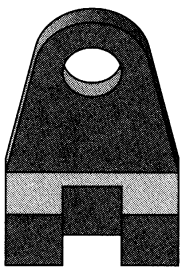
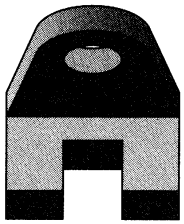
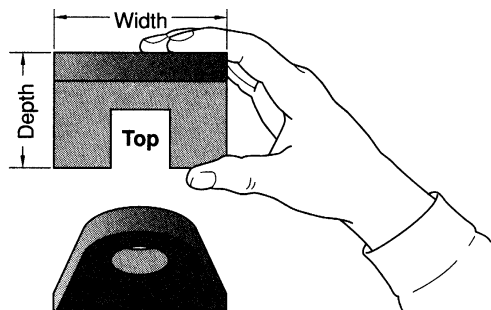


Bottom

# Which Views to Present?

## General Guidelines

- Pick a Front View that is most descriptive of object
- Most common combination of views is to use:
  - **Front, Top, and Side View**

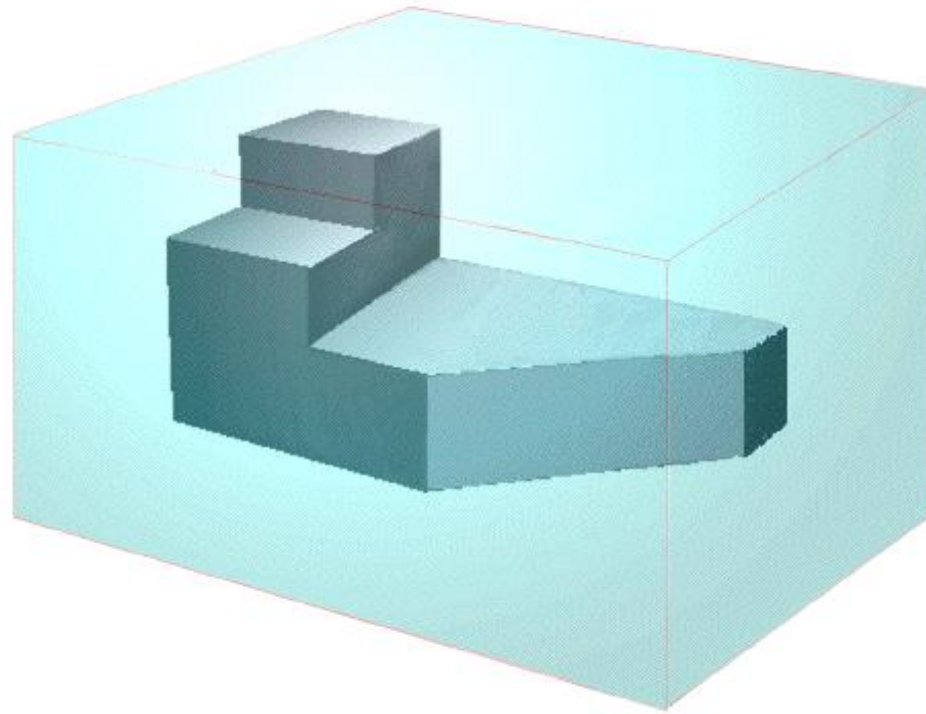


# Glass Box Approach

- Place the object in a glass box
- Freeze the view from each direction (each of the six sides of the box) and unfold the box

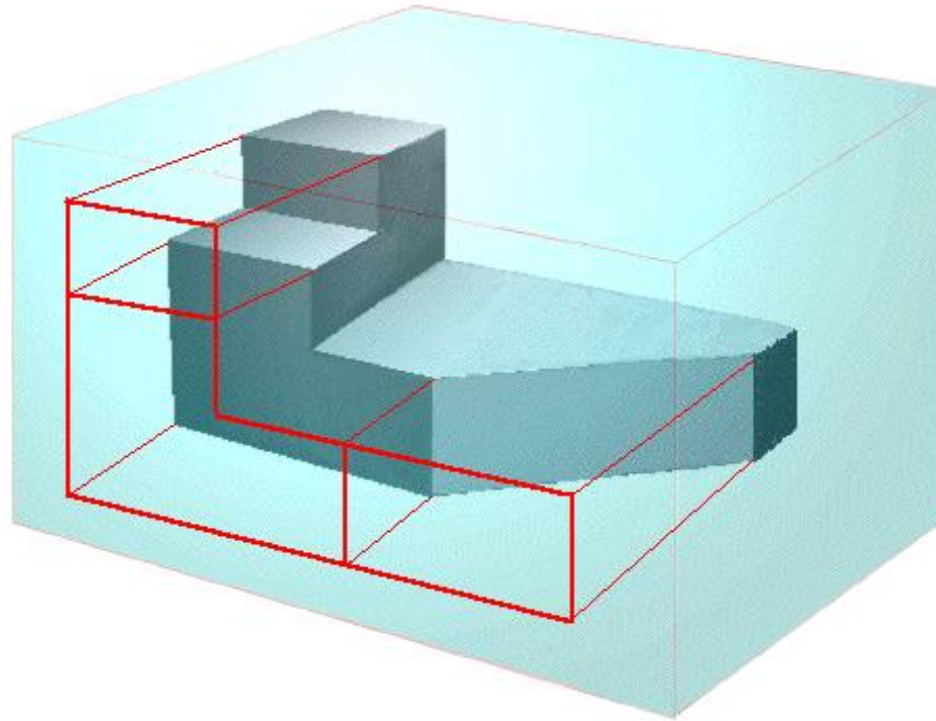
# Glass Box Approach

Projection of points to the three views



# Glass Box Approach

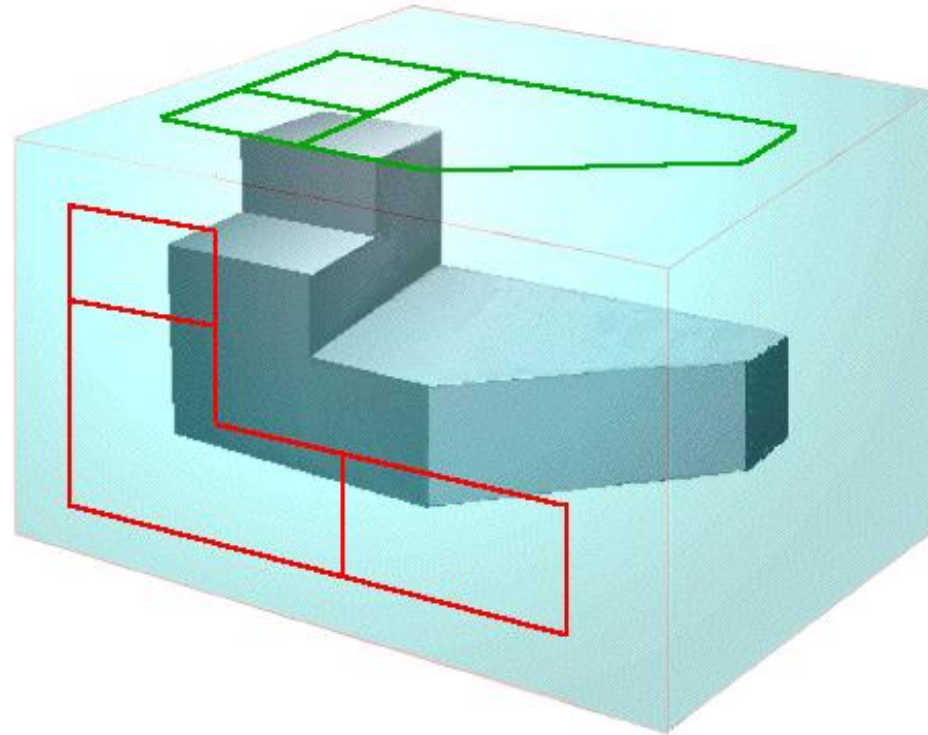
**Projection of points to FRONT VIEW**





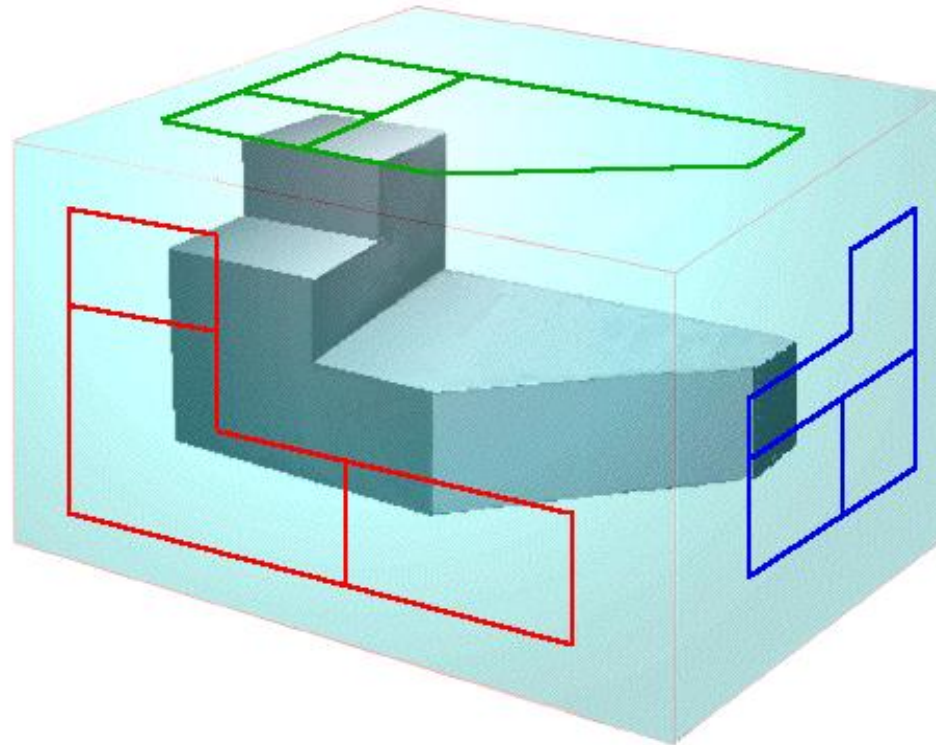
# Glass Box Approach

Projection of points to TOP VIEW



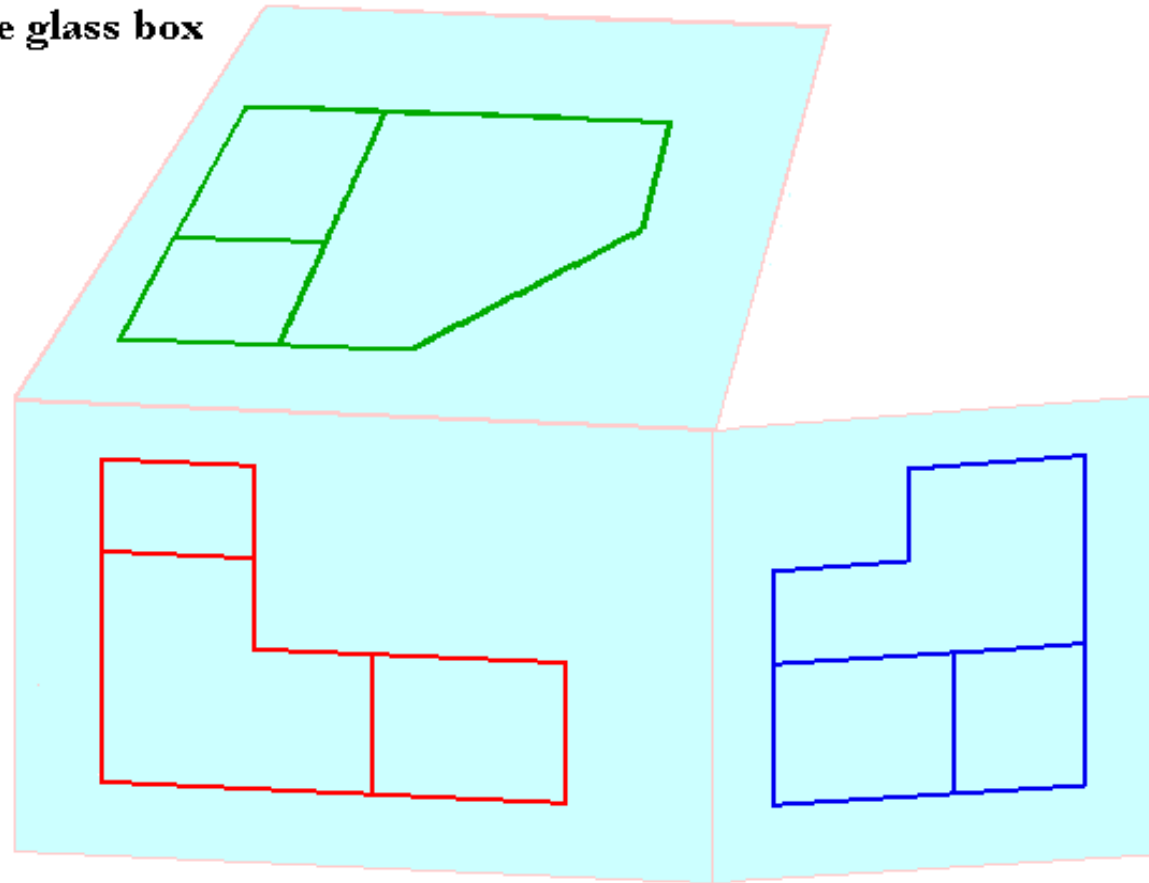
# Glass Box Approach

Projection of points to RIGHT SIDE VIEW



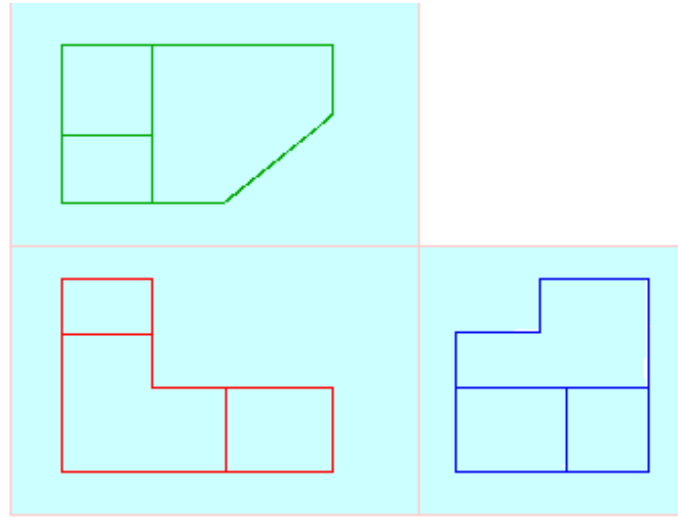
# Glass Box Approach

**Unfold the glass box**

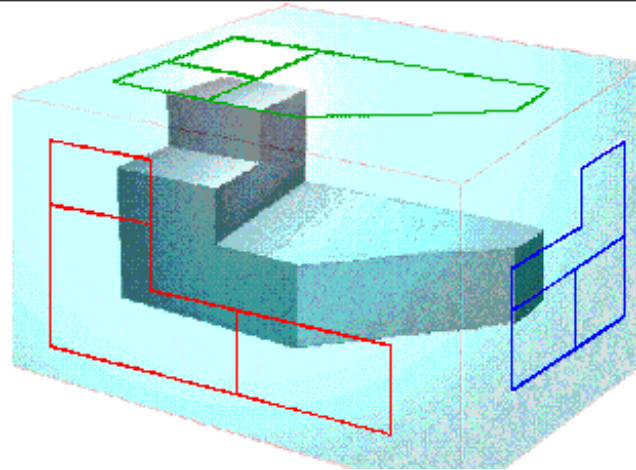


# Glass Box Approach

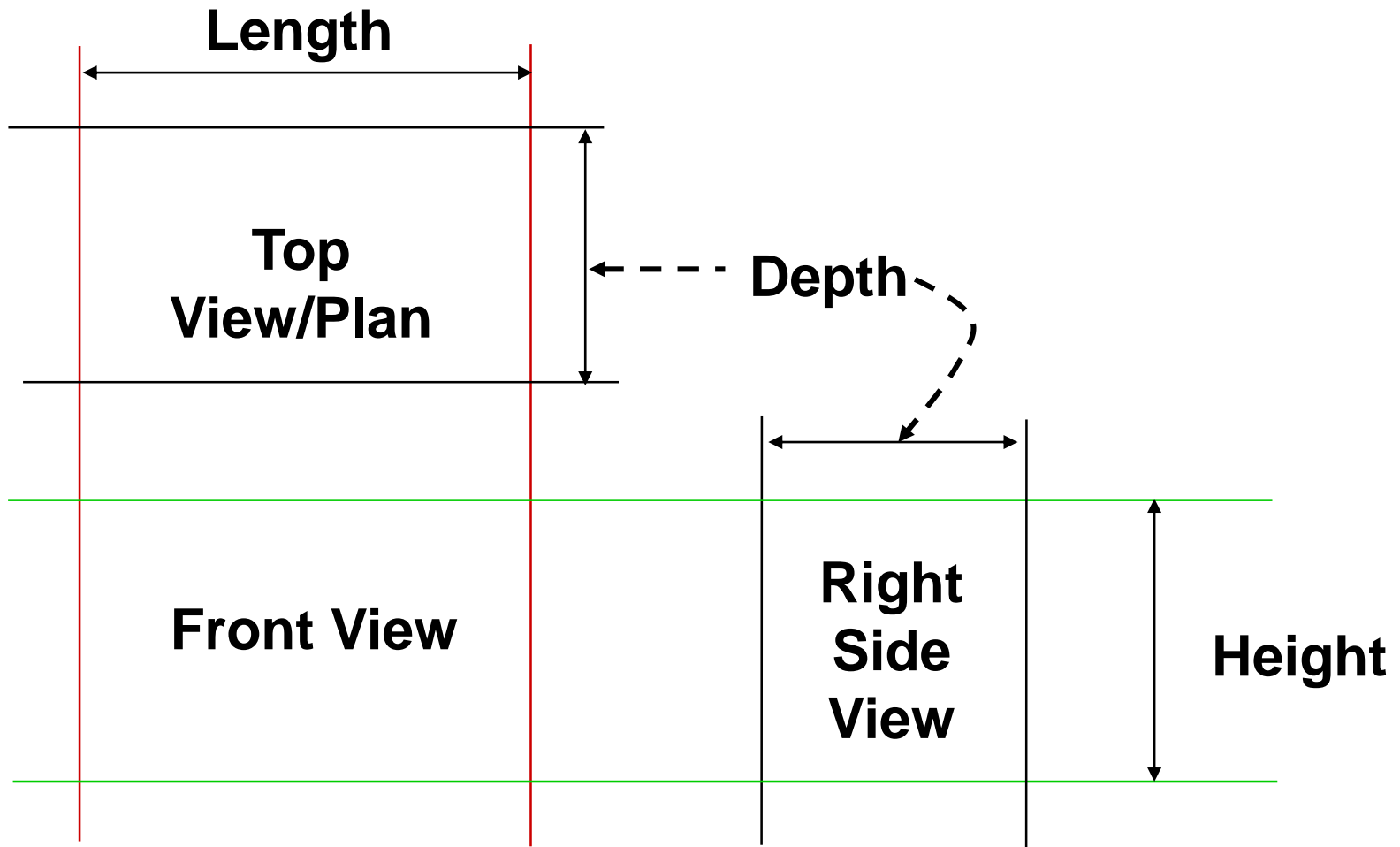
**Unfolded  
glass-box**



**Object in the  
glass-box**



# Conventional Orthographic Views



# Line Styles

Line styles used to clarify important features on drawings are:



**Edge Line:** A thick continuous line is used for visible edges and outlines.

**Guide Line:** A thin line is used for hatching, leader lines, short centre lines, dimensions and projections.

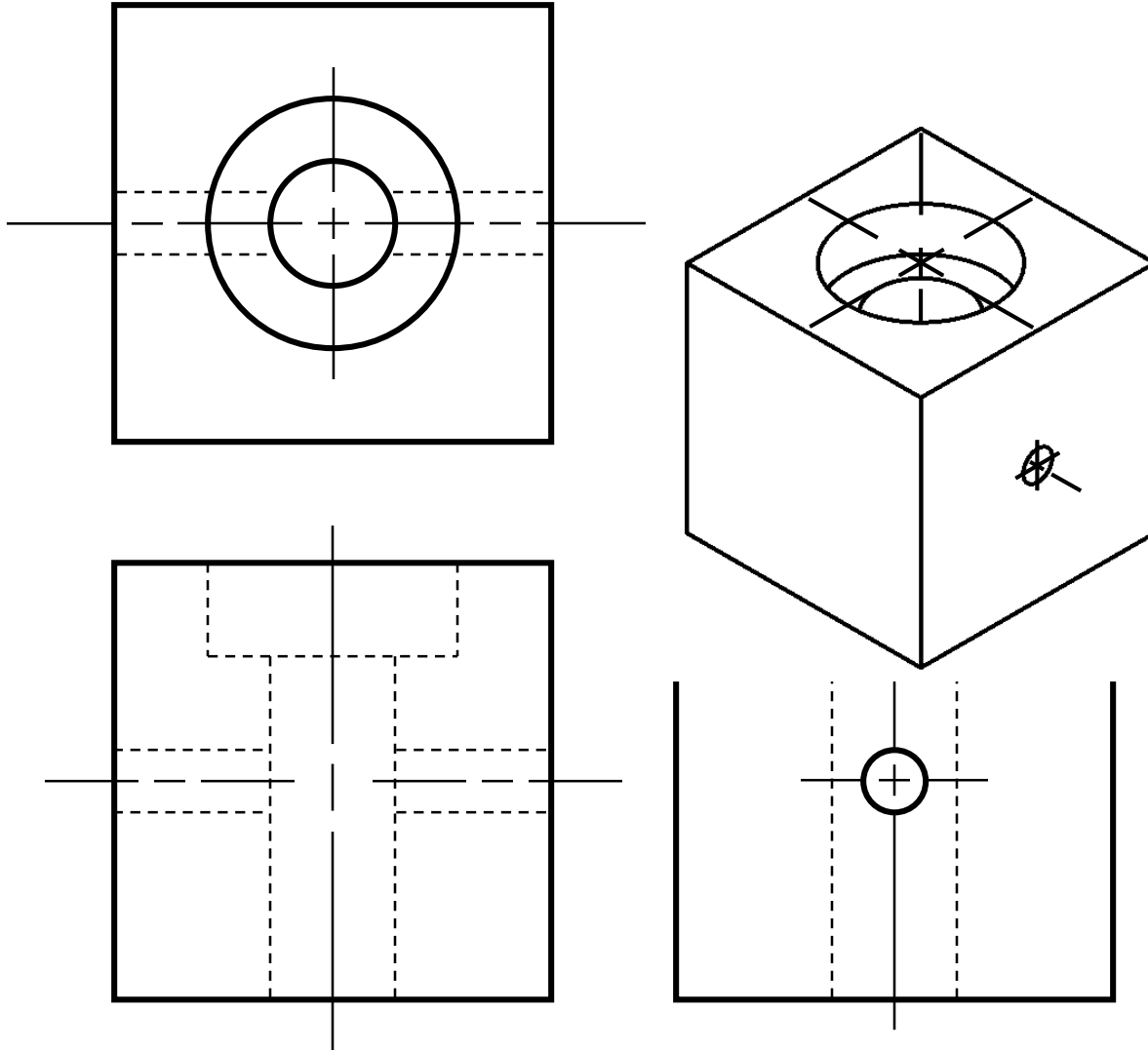


**Center Line:** are used to identify the centre of a circle, cylindrical features, or a line of symmetry.



**Hidden Lines:** Dashed lines are used to show important hidden detail for example wall thickness and holes..

# For Example:



1. **Visible**
2. **Hidden**
3. **Center**

That's All For Now...

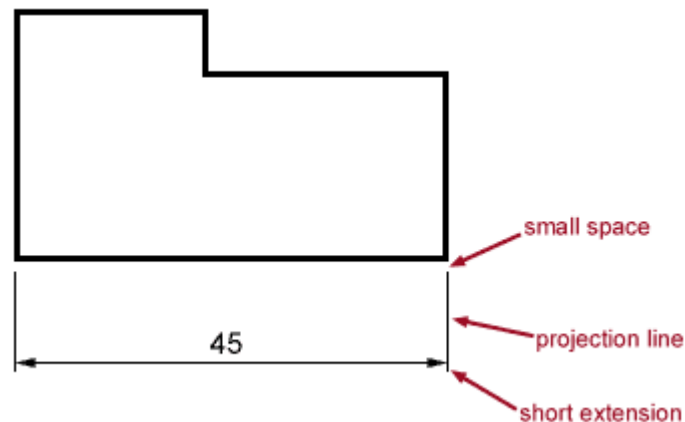






# Dimensioning

A dimensioned drawing should provide all the information necessary for a finished product or part to be manufactured. An example dimension is shown below.

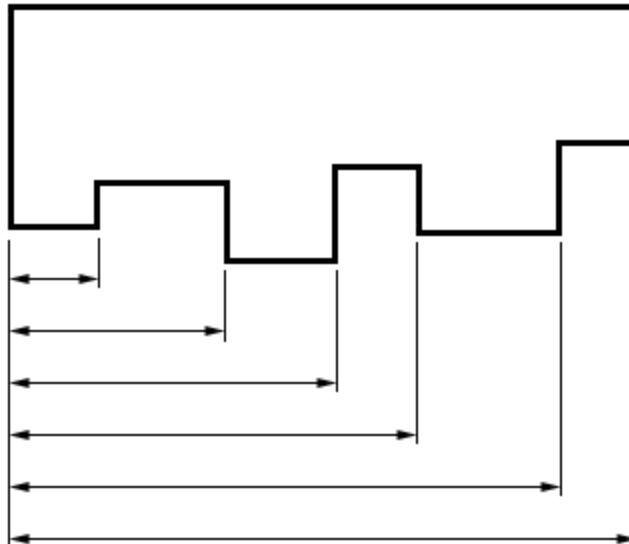


Dimensions are always drawn using continuous thin lines. Two projection lines indicate where the dimension starts and finishes. Projection lines do not touch the object and are drawn perpendicular to the element you are dimensioning.

All dimensions less than 1 should have a leading zero. i.e. .35 should be written as 0.35

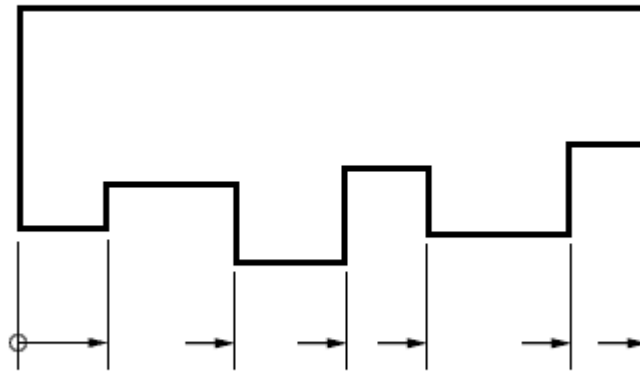
# Types of Dimensioning

- **Parallel Dimensioning**
- Parallel dimensioning consists of several dimensions originating from one projection line.

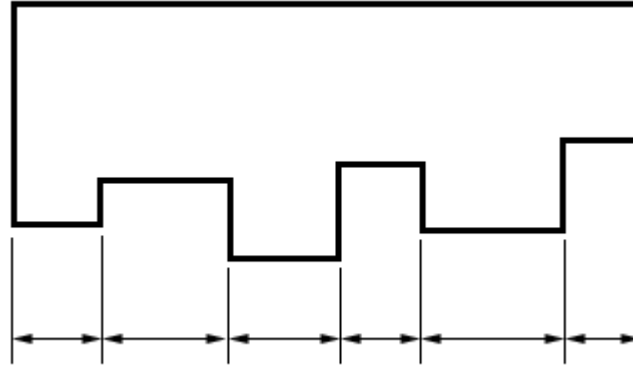


# •Superimposed Running Dimensions

•Superimposed running dimensioning simplifies parallel dimensions in order to reduce the space used on a drawing. The common origin for the dimension lines is indicated by a small circle at the intersection of the first dimension and the projection line.

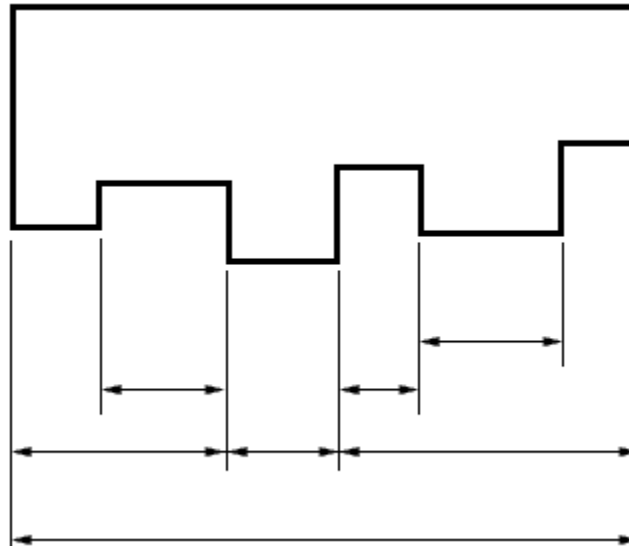


# •Chain Dimensioning

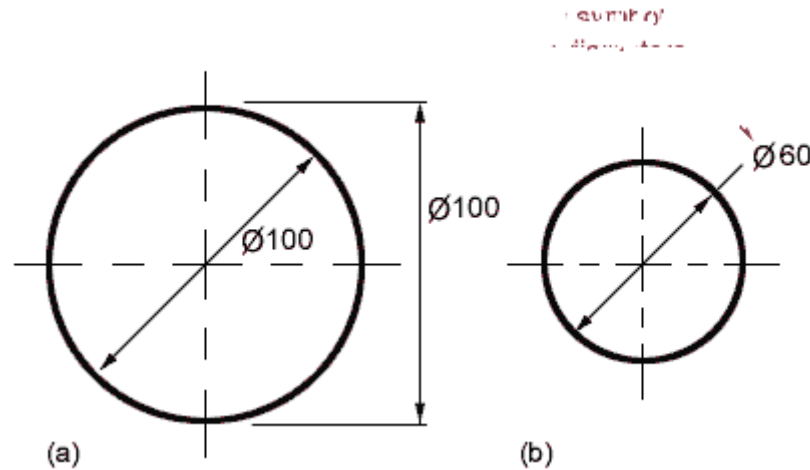


# •Combined Dimensions

A combined dimension uses both chain and parallel dimensioning.



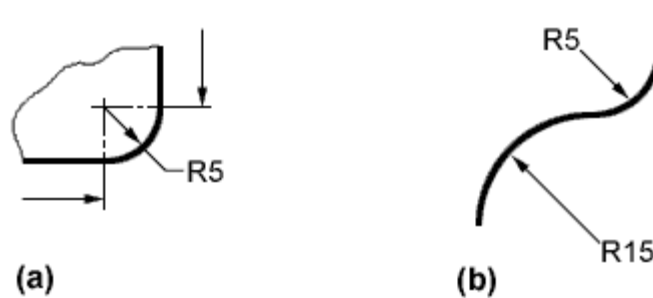
# Dimensioning of circles



- (a) shows two common methods of dimensioning a circle. One method dimensions the circle between two lines projected from two diametrically opposite points. The second method dimensions the circle internally.
- (b) is used when the circle is too small for the dimension to be easily read if it was placed inside the circle.

# Dimensioning Radii

- All radial dimensions are preceded by the capital **R**.



(a) shows a radius dimensioned with the centre of the radius located on the drawing.

(b) shows how to dimension radii which do not need their centres locating.

# Tolerancing


- It is not possible in practice to manufacture products to the exact figures displayed on an engineering drawing. The accuracy depends largely on the manufacturing process. A tolerance value shows the manufacturing department the maximum permissible variation from the dimension.
- Each dimension on a drawing must include a tolerance value. This can appear either as:
  - a general tolerance value applicable to several dimensions. i.e. a note specifying that the General Tolerance  $\pm 0.5$  mm.
  - or a tolerance specific to that dimension





# Drawing layout

All engineering drawings should feature a title block.

TITLE WHEEL BEARING	
NAME John Smith	CHECKED <i>JMS</i>
VERSION 1.1	DATE 16.10.98
NO NEED TO MEASURE -ALL MEASUREMENTS IN MM	SCALE 1:1
ITI ENGINEERING	

The title block should include:

Title:- title of the drawing

Name:- name of the person who produced the drawing

Checked:- before manufacture, drawings are usually checked

Version:- many drawings are amended, each revision must be noted

Date:- the date the drawing was produced or last amended

Notes:- any note relevant to the drawing

Scale:- the scale of the drawing

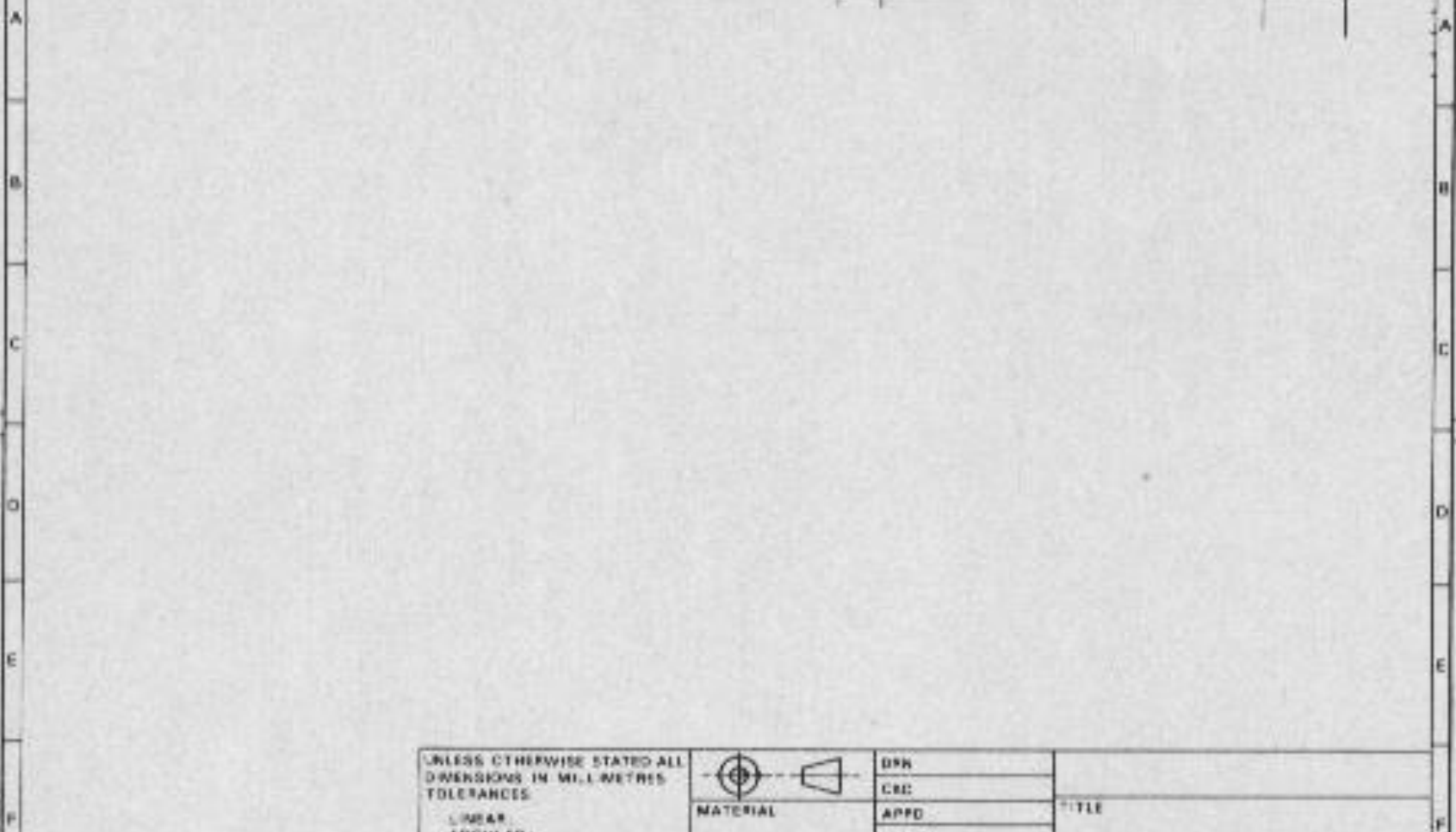
Company name:- name of the company

Projection:- the projection system used to create the drawing

DO NOT SCALE

REVISIONS

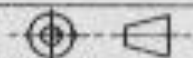
SYM	DESCRIPTION	DATE	APPD



UNLESS OTHERWISE STATED ALL DIMENSIONS IN MILLIMETRES TOLERANCES

LINEAR  
ANGULAR

CRAFTING STANDARD  
**AS 1100**



MATERIAL

FINISH

DPN
CRG
APPD
SSLED

TITLE

SIZE  
**A3**

CRG  
No.

SHEET

282 x 400 mm