

Graphic communication

Dimensioning Revision Notes

Name: Class:..... Teacher:.....

Introduction

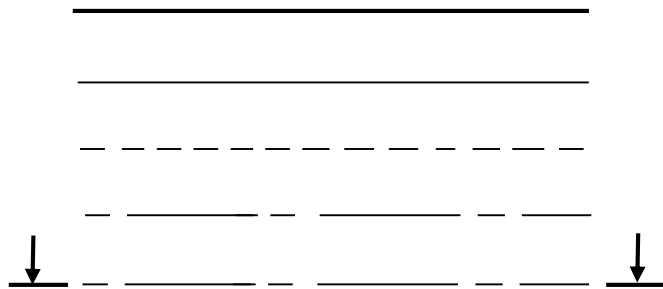
It is very important to add dimensions (measurements) when drawing accurate orthographic or working drawings. An orthographic drawing is usually the last drawing before manufacture and so dimensions must be clearly presented and understood.

Dimensions can be applied to simple sketches and designs as they help anyone looking at these to understand the overall size or scale. However, dimensions must be drawn correctly to British Standards so that everybody is able to understand them.

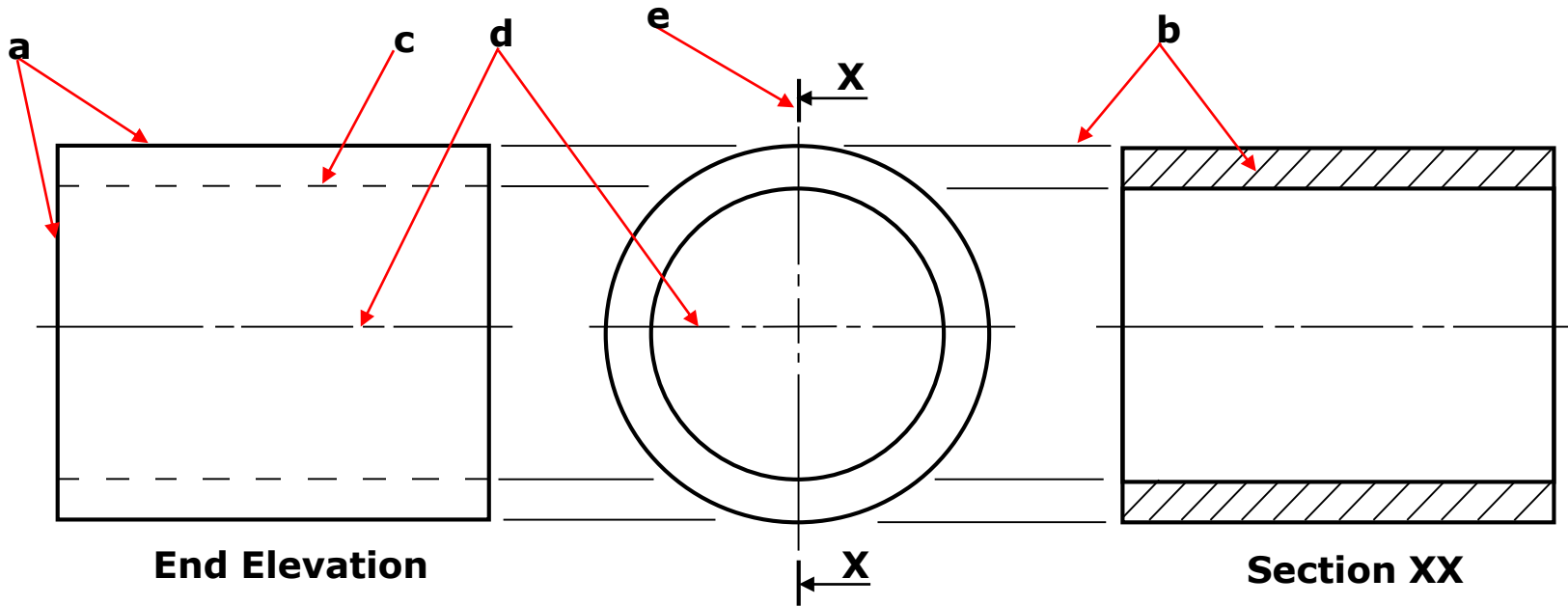
The importance of Dimensioning correctly

- They need to be accurate
- They need to be clear
- They allow a product/part to be manufactured accurately.
- They need to conform to British Standards, so that everyone understands them.

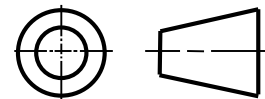
Line Types



- a. **Outlines** (thick and continuous)
- b. **Projection lines, cross hatching lines** (thin and continuous)
- c. **Hidden lines and edges** (thin short dashes)
- d. **Centre line** (thin chain lines)
- e. **Cutting plane line** (thick at ends with heavy closed arrows)



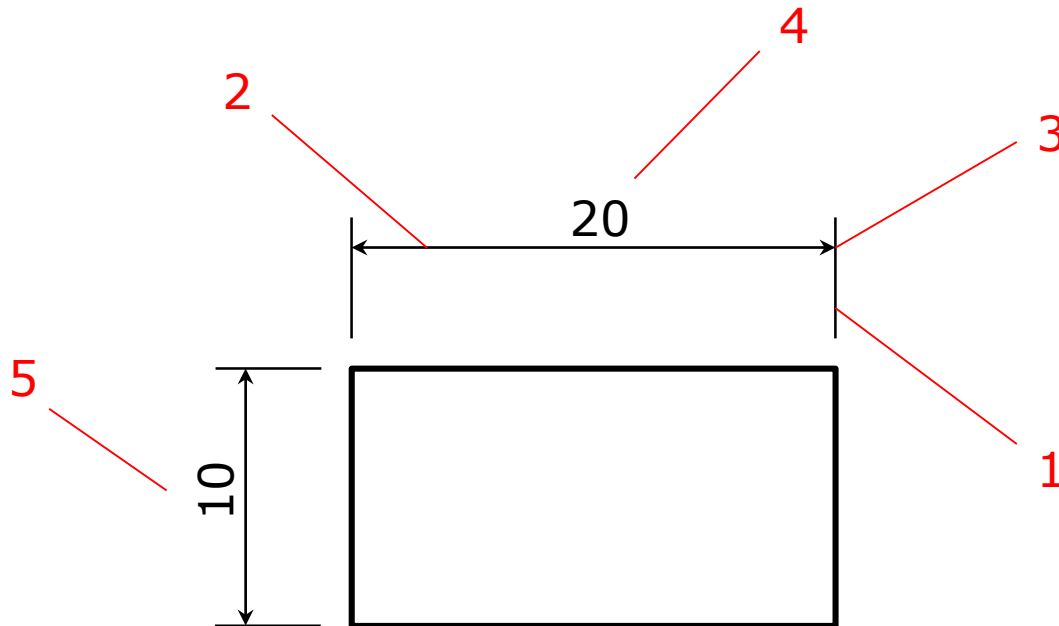
The 3 views shown above are drawn in 3rd angle projection: the symbol is shown opposite



Dimensioning Conventions

The diagram below shows the different elements that make up a dimension.

1. Projection lines (must leave small gap)
2. Dimension line
3. Terminator (narrow filled arrowhead)
4. Dimension (text, must sit above line)
5. If the dimension is in a vertical position the dimension must be rotated to sit above the line, and be read from the right hand side.
6. Linear dimensions should be expressed in millimetres (mm). The unit symbol **mm** should be omitted from the individual dimension.



Linear Dimensioning Methods

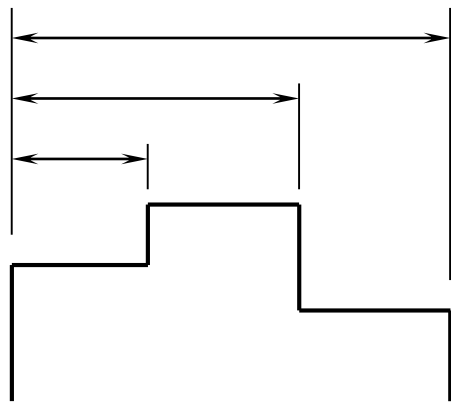
There are two main methods when dimensioning an object; **chain** and **parallel**, although a combination of the two is normally used.

Parallel

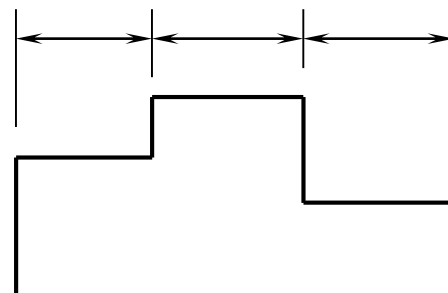
In this method all of the dimension start from a common reference or datum point. This method of dimensioning is more accurate than chain when tolerances affect the part, but require a lot of space around the drawing.

Chain

In this method the dimensions are placed end to end creating a chain. This methods is neater, taking up less space but can have a possible accumulation of tolerances making it less accurate than parallel.



Parallel

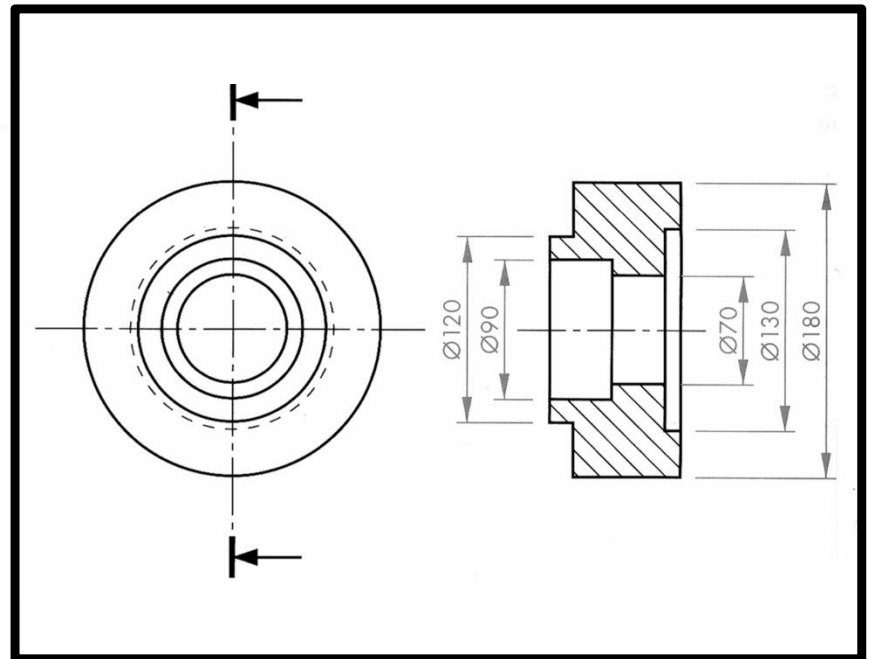
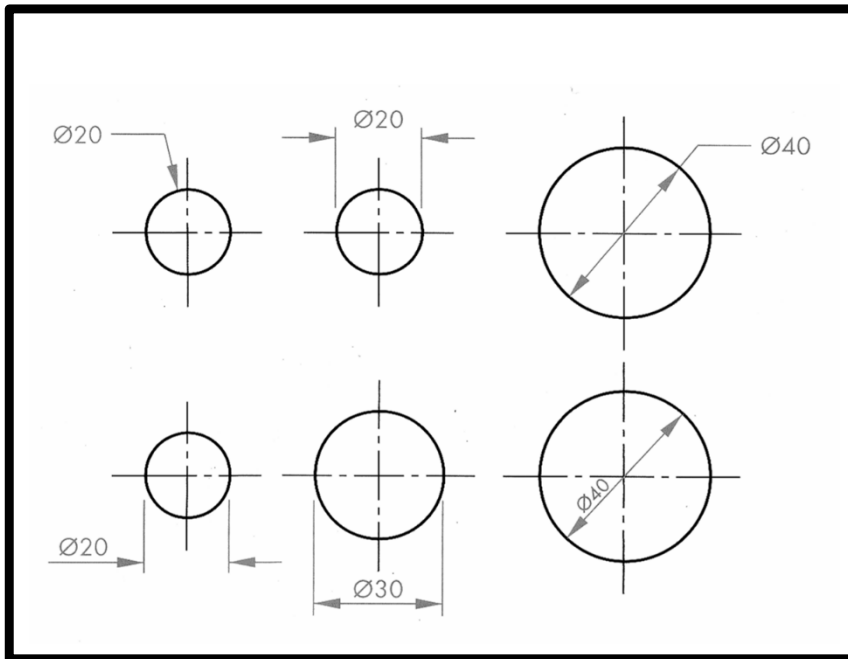
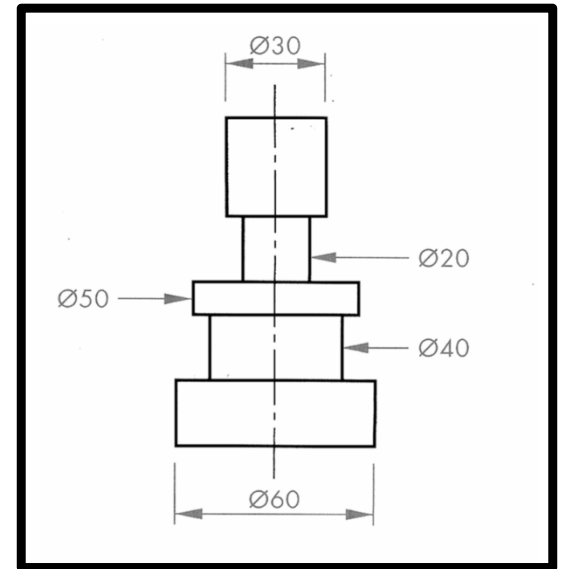


Chain

Dimensioning Diameters

When a complete circle is shown in a drawing, the diameter is shown by placing the symbol \varnothing in front of the figure. Radius **R** should never be used to dimension a complete circle.

There are a variety of methods for dimensioning a diameter, below are a number of the acceptable methods.



Example of Dimensioning

Below is an example of a shape which has been dimensioned correctly using British Standard conventions.

Dimensioning standard practice

Radii

Always show the radius on arcs, curves and rounded corners. The letter symbol **R** is always shown in front of the figure. Radii should be dimensioned by a line that passes through or in line with the centre of the arc. The dimension line should have only one arrowhead, which should touch the arc.

Diameters

Where a complete circle is shown in a drawing, the diameter is shown by placing the symbol \varnothing in front of the figure. The radius should never be used to dimension a complete circle. When holes or circles are dimensioned, the diameter is shown as well as the location of the centre.

Figures on linear dimension lines

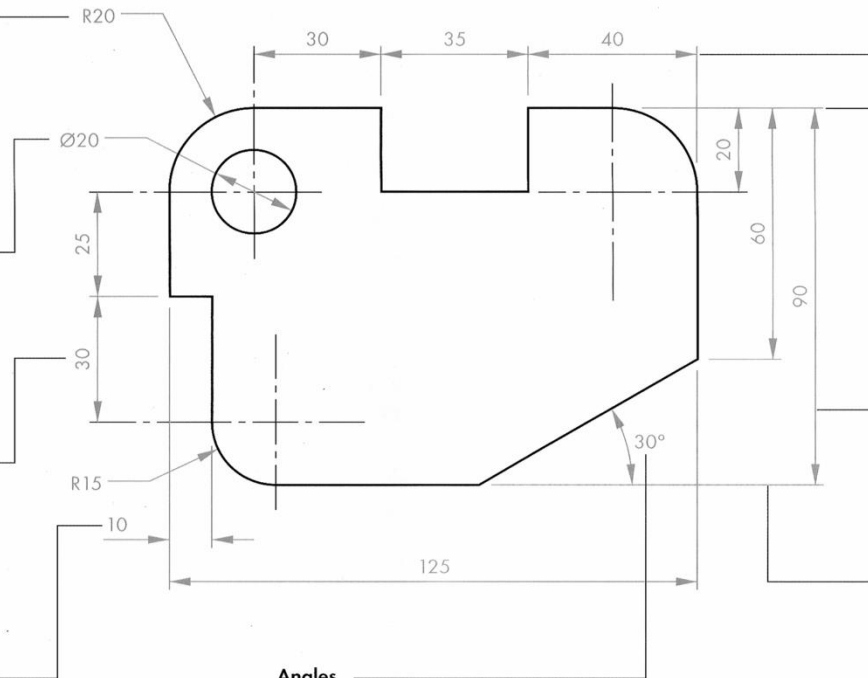
Figures on dimension lines should be placed so that they can be read from either the bottom or the right-hand side (above and along the line). Figures should not touch outlines, dimension lines or centre lines. Figures that require a decimal marker should use a comma, e.g. 22,1.

Dimensioning small features

Where space is limited for dimensioning small features, the figure can be placed centrally, above or in line with one of the dimension lines.

Angles

Figures on angular dimensions should be oriented so that they can be read from the bottom or the right-hand side of the drawing.



Intermediate dimensions

Intermediate dimensions give sizes for individual parts of the drawing which appear in line with each other. In this example the arrangement of these dimensions shown is known as **chain dimensioning** (one after the other).

Datum line

Multiple dimensions can be taken from a datum line (as in this example) and set out parallel to each other, using **parallel dimensioning**.

Overall dimension lines

Overall dimensions give the maximum sizes of objects (total length and total height). They should be placed outside all other dimensions.

Projection/leader lines

Projection, or leader, lines are used to allow the dimension line to be placed outside the outline of the drawing to aid clarity. A small gap should be left between the outline of the drawing and the projection line. Projection lines should be drawn at right angles to the dimension line and extend past it slightly.