

Chapter 4: Dimensioning Systems

Purpose of Dimensioning

The purpose of dimensioning is to provide a clear and complete description of an object. A complete set of dimensions will permit only one interpretation needed to construct the part. In some cases, engineering drawing becomes meaningless without dimensioning. Maintaining scale only does not make a drawing sufficient for manufacturer. By direct measurement from drawing according to the scale is very laborious, time-consuming and such a part cannot be manufactured accurately. In general dimensioning system provides following information

- Sizes and locations of features
- Material's type
- Number required
- Kind of surface finish
- Manufacturing process
- Size and geometric tolerance

General Conditions for Dimensioning

- Accuracy: correct values must be given.
- Clearness: dimensions must be placed in appropriate positions.
- Completeness: nothing must be left out, and nothing duplicated.
- Readability: the appropriate line quality must be used for legibility.

Elements of Dimension System

- Extension lines
- Dimension lines
- Arrowheads
- Leaders
- Texts, numbers and symbols.

General Rules for Dimensioning

- Dimensioning should be given within the extent of the view in general.
- Dimensioning should not be duplicated in other view.
- No subtraction or addition should be required to define or locate a feature.
- Dimensioning should be inserted on relatively larger available view to make it clear.
- One system of dimensions either unidirectional or aligned has to be used throughout the drawing.
- Dimensioning to the hidden lines should be avoided, in general.
- Dimensioning should be made on the view, which represents the shape of the part best.
- A zero must be placed before decimal point.

Rules of Extension Lines

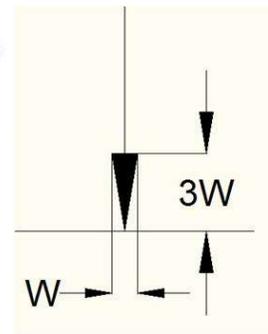
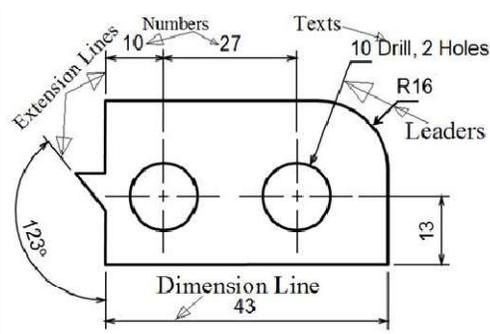
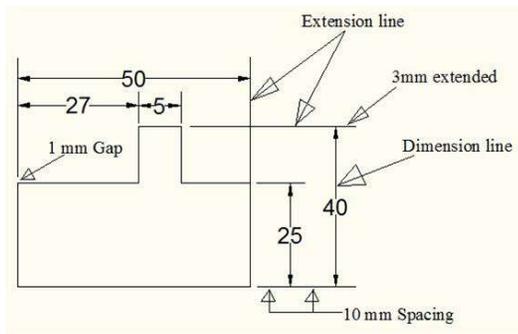
Extension lines are the lines that indicate the point or line or space on the drawing to which dimension is being applied. Following conditions should be maintained while inserting an extension line:

- A gap of 1mm has to be kept between extension line and visible line.
- An extension line should be extended about 3mm from the outmost dimension line.
- Extension lines may cross each other without break.
- Center lines can be used as extension lines.
- Extension lines are drawn usually perpendicular to dimension lines. But for overcrowded drawing they can be drawn at an oblique angle as well.

Rules of Dimension Lines

Dimension lines are the lines that show the dimensions of a specific portion indicated by extension lines. Following conditions should be maintained while inserting a dimension line:

- Dimension line should be approximately 10mm away from visible line.
- Spacing between consecutive parallel dimension lines may also be kept as 10mm.
- Dimension lines are broken near the middle to allow space for dimensions.
- As far as possible dimension lines should be placed outside the view.
- Dimension lines should not cross each other.
- Center lines should never be used as dimension lines.
- If space between extension lines is very short for inserting arrows, the arrows may be provided outside the extension lines.



Rules of Arrowhead

Arrowheads are used at both ends of dimension lines and at the ends of leaders. They are usually drawn freehand.

Following conditions should be maintained while inserting an arrowhead:

- As far as possible all arrowheads should be identical in shape and size throughout the drawing.
- An approximate ratio of the length to width of arrowhead as 3:1 should be maintained.
- Arrowheads must touch the line. It must not be either away from the line or cross the line.

Rules of Leaders

Leaders are used in engineering drawing for dimensioning of arcs, circles etc. They are also used to present note, symbols, item number or part number etc. Following conditions should be maintained while inserting a leader:

- A leader should always be inclined at an angle of 60° preferably and 45° occasionally.
- The length of horizontal bar should be 3mm.
- A leader should be terminated by either an arrowhead or a small dot of about 1.5mm diameter.
- Leaders should not be drawn bent unless necessary.
- Leaders should not cross each other, however, they may be drawn parallel to each other with a common horizontal bar.
- To direct a circle or an arc the leader should be so drawn, if it is imagined to extend it must pass through the center of the circle or the arc.
- All notes, symbols and dimensions in a leader need to be provided in horizontal direction.