

Dimensioning Guidelines

Engineers use technical drawings to convey precise information necessary to manufacture parts. As such, they include dimensions on the drawings. The American Society of Mechanical Engineers (ASME) publishes a 300+ page document called Y14.5 that standardizes the way engineers report dimensions on technical drawings. Below are some definitions, an example of a dimensioned drawing, and a list of some of the more general rules that will support you when recording dimensions on technical drawings.

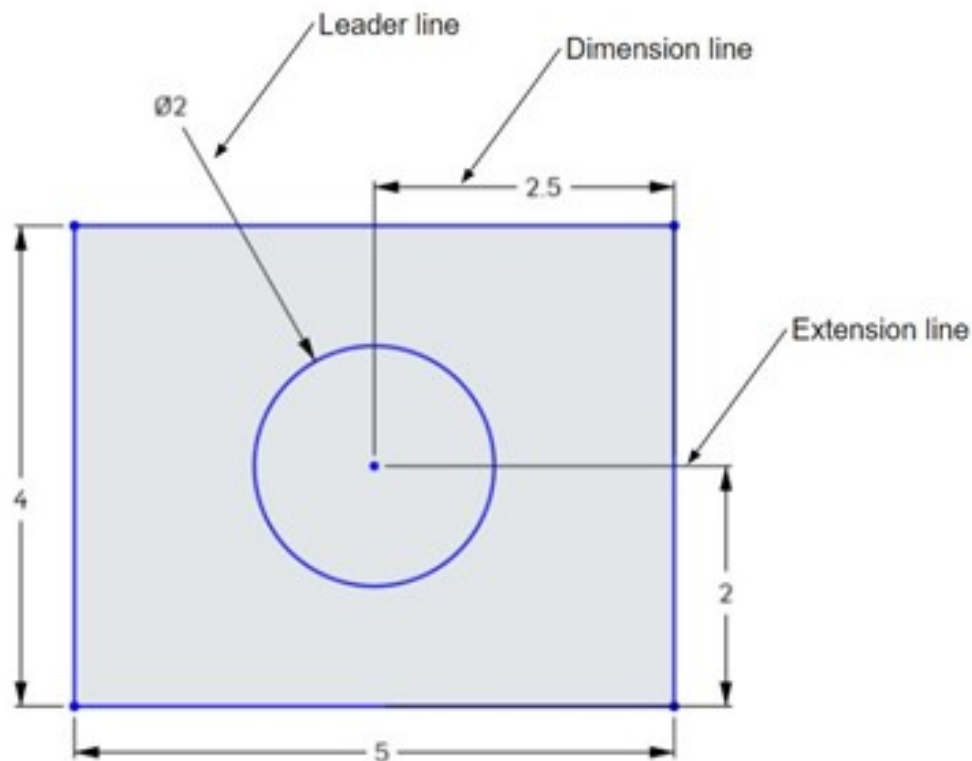


Figure 1. Dimensioned Technical Drawing

Leader Lines

Establishes a connection between a graphical representation of an item and some text.

Dimension Lines

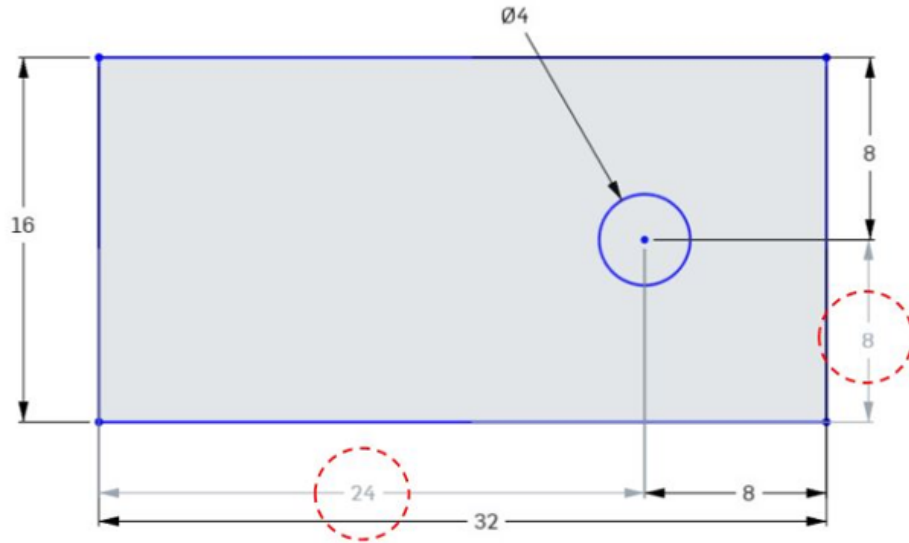
Indicates measurements in a drawing such as distance and angle measurement.

Extension Lines

Extends outward from a point on a drawing to which a dimension refers.

General Rules

1. Reflect the actual size of the object, not the **scaled**  size.
2. Include overall dimensions in the three principle directions—height, width, and depth.
3. Overall dimensions should be placed the greatest distance away from the object so that intermediate dimensions can nest closer to the object to avoid crossing extension lines.
4. Include all dimensions necessary to produce or inspect the part. Dimensions should be placed so that it is not necessary for the observer to calculate, scale, or assume any measurement.
5. Do not include unnecessary dimensions.
 - Dimensions should NOT be duplicated (over-dimensioned), nor should the same information be given in two different ways.
 - Do not include **chain dimensions**  that add up to a given overall dimension. In Figure 2, the circled dimensions are unnecessary because an observer can deduce those dimensions given the overall dimensions.



• Figure 2. Over-dimensioned drawing

Note: In the case of chain dimensions, in general, you do not need to know the measurement of every smaller dimension in a chain that contributes to an overall dimension if the overall dimension is given. At least one of the contributory dimensions should be omitted to avoid duplication.

6. Dimensions should be attached to the view that best shows the contour of the feature to be dimensioned.
7. A dimension should be attached to only one view (i.e., extension lines should not connect two views).
8. Place dimensions between adjacent views whenever possible.
9. Avoid dimensioning to **hidden lines** . Include cross-sectional views instead.
10. To the extent possible, place dimensions outside objects.

11. To the extent possible, avoid crossing lines of any kind (e.g. place longer dimension lines outside intermediate dimensions so dimension lines do not cross extension lines).
12. Dimensions should be given between points or surfaces that have a functional relation to each other.
13. Dimension lines should be spaced uniformly throughout the drawing.
14. Lines should not be excessively long.
15. Dimension numbers should be centered between arrowheads, except in a stack of dimensions, where they should be staggered.
16. Leader lines should point towards the center of the feature at an angle and should never be placed parallel to dimension or extension lines.
17. Circles are dimensioned by their diameter preceded by the symbol: Ø
18. Arcs or fillets are dimensioned by their radius preceded by "R".
19. Holes should be located in the view that shows the feature as a circle.
20. Holes should be located by their center lines which may be extended and used as extension lines.