Alphabet and Precedence of line types

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CAD 190

Alphabet of lines

- Lines used in drafting are referred to as the **Alphabet of lines**.

- Line types and conventions for mechanical drawings are covered in the **ANSI Standard Y14.2 2009**.

- There are four distinct thicknesses of lines: **Very Thick**, **Thick**, **Medium** and **Thin**.

Alphabet of lines (Cont:)

- Every line on your drawing has a **meaning**.
  - Feature line, Hidden line, Dimension line, Leader line, Phantom line, Centerline, Break Line, etc.
- The **line type determines** if the line is part of the object or conveys information about the object.
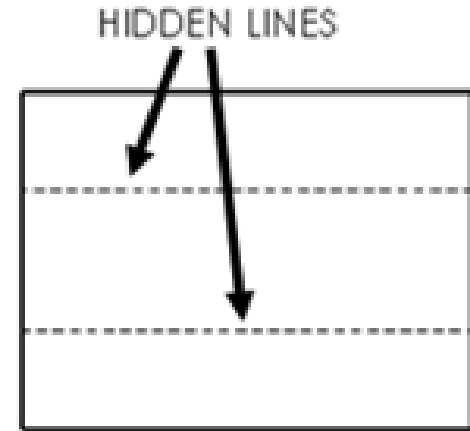
Alphabet of lines (Cont:)

- **Visible line/Feature line**
  - Continuous lines used to represent the visible edges and contours (features) of an object.
  - Since visible lines are the **most important lines**, they must stand out from all other secondary lines on the drawing.
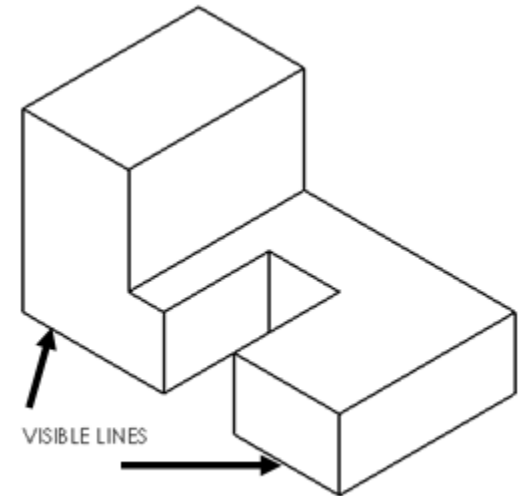
VISIBLE LINES
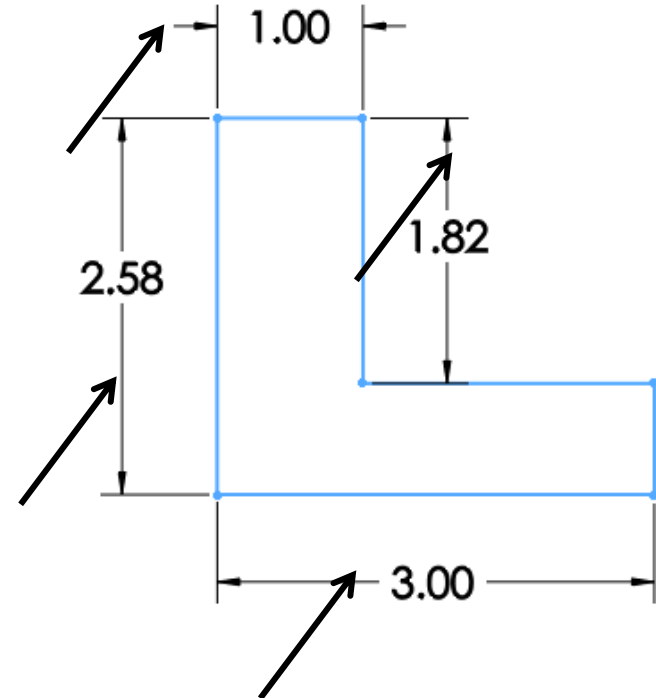
Alphabet of lines (Cont:)

- **Hidden line**
  - Short-narrow dashed lines.
  - Represent the hidden features of an object.
  - Hidden lines **should always begin and end with a dash**, except when a dash would form a continuation of a visible line.

HIDDEN LINES

Alphabet of lines (Cont:)

- ## Dimension line
  - Shows the **extent and the direction of dimensions**. If possible, dimension lines are aligned and grouped for uniform appearance.
  - Dimension lines are **broken** for the inserting of the dimension numbers (ANSI) standard.
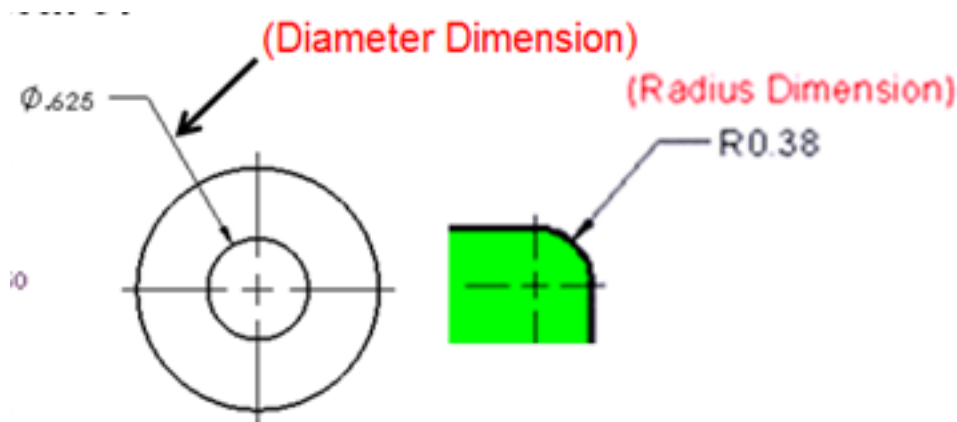
Alphabet of lines (Cont:)

- **Extension line**
  - Indicate the termination of a dimension.
  - An extension line must not **touch the feature (visible gap)** from which it extends
  - Approximately (2-3mm) visible gap.
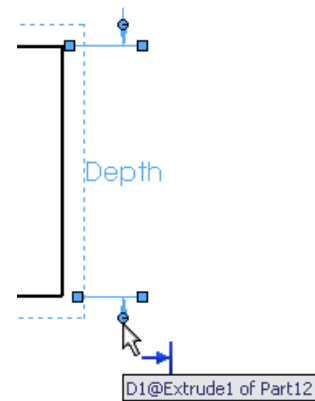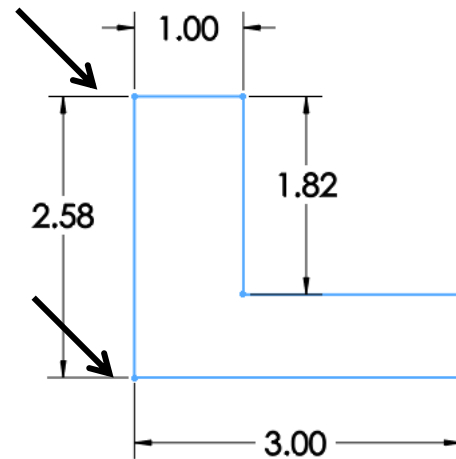
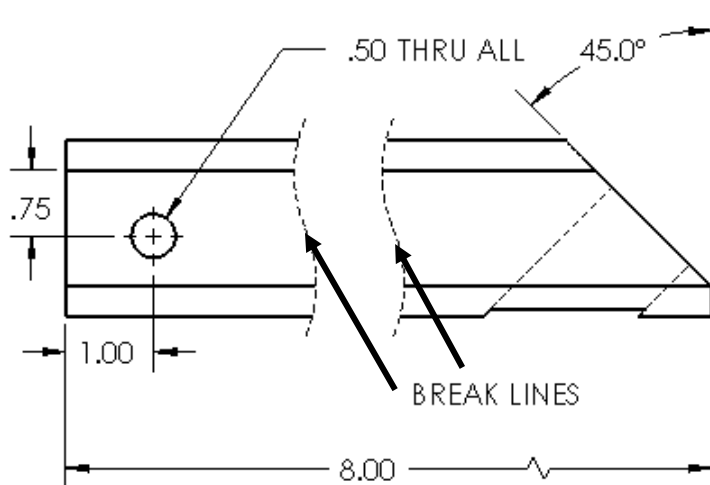# Alphabet of lines (Cont:)

- **Leader line**
  - A continuous straight line that extends at an angle from a note, a dimension, or other reference to a feature.
  - An arrowhead touches the feature at that end of the leader.

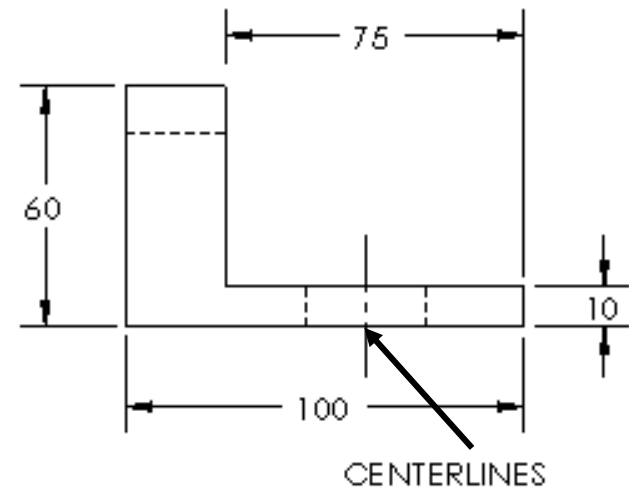# Alphabet of lines (Cont:)

- ## Break line

  - Represent an imaginary cut in an object, so the interior of the object can be viewed or fitted to the sheet. Line weight is thick (0.5-0.6mm).

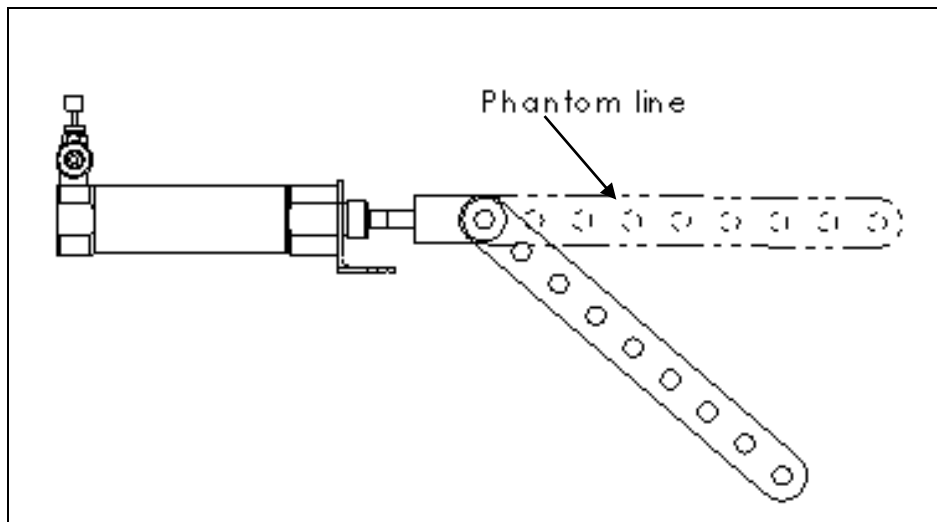# Alphabet of lines (Cont:)

- ## Centerline
  - Represent the axes of symmetrical parts of features, bolt circles, paths of motion, and pitch circles.
  - Thin, long and short dashes, alternately and evenly spaced, with long dashes placed at each end of the line.
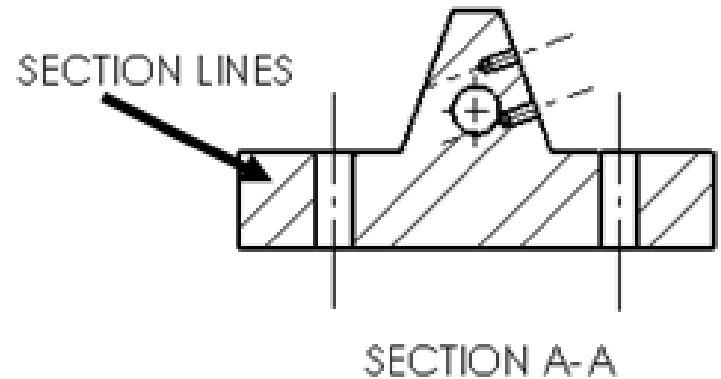
Alphabet of lines (Cont:)

- **Phantom line**
  - Represent alternate positions of moving parts, adjacent positions of related parts, and repeated details.

Phantom line
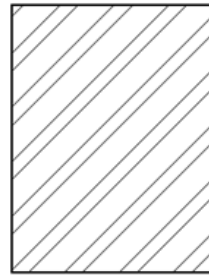
Alphabet of lines (Cont:)

- ## Section line
  - Thin, uniformly spaced lines that indicate the exposed cut surfaces of an object in a sectional view.
  - Spacing should be approximately (3mm) and an angle of 45°.
  - The section pattern is determined by the material being "cut" or sectioned.
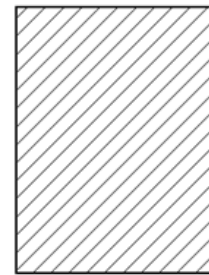

SECTION LINES

SECTION A-A
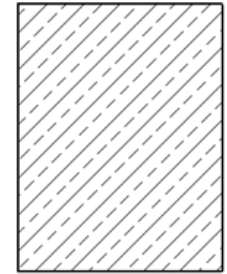
Alphabet of lines (Cont:)

- **Section line**
  - The section pattern is determined by the material being "cut" or sectioned.
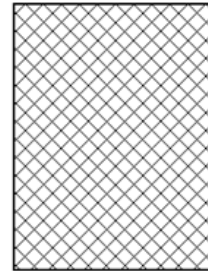 - Section lines are commonly referred to as "**cross-hatching**."
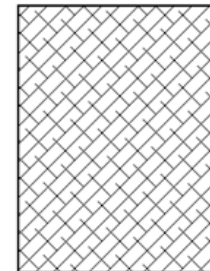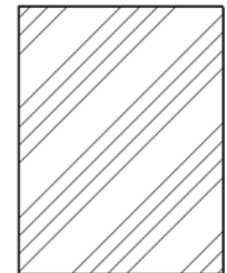
STEEL

CAST IRON

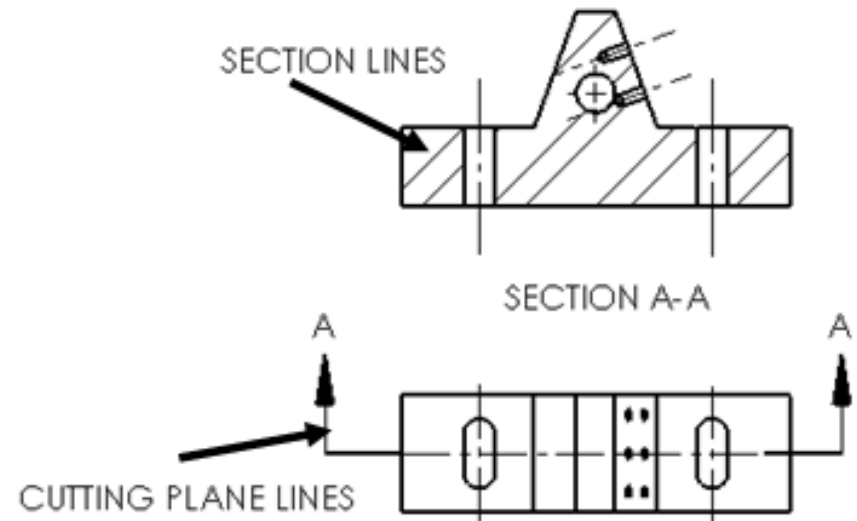COPPER / BRASS

PLASTIC

6061 ALLOY

RUBBER

Alphabet of lines (Cont:)

- ## Cutting Plane line
  - Show where an imaginary cut has been made through an object in order to view and understand the interior features.
  - Arrows are located at the **ends of the cutting plane line** and the direction **indicates the line of sight** into the object.

SECTION LINES

SECTION A-A

A   A

CUTTING PLANE LINES

Precedence of line types

- Whenever lines coincide in a view, certain ones take precedence.

- Since the visible features of a part (object lines) are represented by thick solid lines, they take precedence over all other lines.

- If a centerline and cutting plane coincides, the more important one should take precedence.

- Normally the cutting plane line, drawn with a thicker weight, will take precedence.

- The following list gives the preferred precedence of lines on your drawing:

Precedence of line types

1. Visible/Feature (object) lines
2. Hidden (dashed) lines
3. Cutting plane lines
4. Centerlines
5. Phantom lines

VISIBLE·LINE·/·FEATURE·LINE¶

HIDDEN·LINE¶
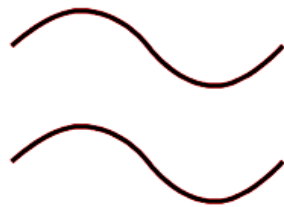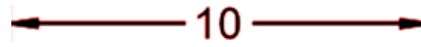
*PHANTOM LINE

CUTTING·PLANE·LINE¶

CENTERLINE¶

*Note: Click Tangent Edge, Tangent Edges with Font to obtain a Phantom line in a SOLIDWORKS drawing.
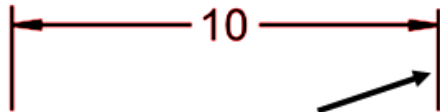
Precedence of line types

6. Break Line
7. Dimension
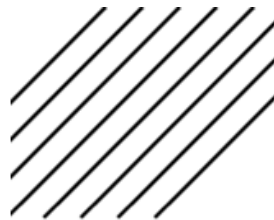8. Extension Lines/Leader Lines
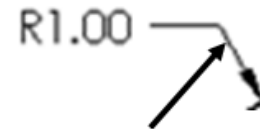9. Section Lines/Crosshatch Lines

·····BREAK·LINES·¶

DIMENSION·LINE¶

EXTENSION·LINES¶

SECTION·LINES¶

LEADER·LINE·-·BENT'