References

“Blueprint Reading Basics”
Warren Hammer
Industrial Press Inc.
Copyright 1989

“Blueprint Reading and Technical Sketching for Industry”
Thomas P. Olivo
Nelson Canada
Copyright 1992

Dimensioning and Tolerancing
ASME Y14.5M – 1994 (R1999)
ASME International
Three Park Avenue
New York, NY 10016-5990
Blueprints Have Three Main Parts:

- **Drawing** - Graphical representation that shows the exact shape of a component.

- **Dimensions** - Numbers that provide the measurements of a piece of a drawing.

- **Notes** - Include information that cannot be easily identified on the drawing or other information needed to fabricate the component. Some information may be important and some may be irrelevant.
Drawings:

Exploded View:

- good for viewing how pieces fit together
- usually no dimensions or piece information
Orthographic:

Each component has 6 sides and each can be shown as a view on a drawing. Typically, only 3 views (front, top, and right side) are provided unless other views are needed for clarification.
# Lines:

<table>
<thead>
<tr>
<th>Basic Lines</th>
<th>Line Symbol and Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visible (Object) Line</td>
<td>(Thick)</td>
</tr>
<tr>
<td>2. Hidden Line</td>
<td>(Thin)</td>
</tr>
<tr>
<td>3. Center Line</td>
<td>(Thin)</td>
</tr>
<tr>
<td>4. Extension and Dimension Lines</td>
<td>(Thin)</td>
</tr>
<tr>
<td>5. Projection Line</td>
<td>(Thin)</td>
</tr>
<tr>
<td>6. Cutting Plane Lines (Showing Direction of Viewing Plane Line)</td>
<td>(Thin)</td>
</tr>
<tr>
<td>7. Break Lines</td>
<td>(Thick) (for short breaks) (Thin)</td>
</tr>
<tr>
<td>8. Phantom (or Alternate, Adjacent, or Repeat Position) Line</td>
<td>(Thin)</td>
</tr>
<tr>
<td>9. Section Line</td>
<td>(Thin)</td>
</tr>
</tbody>
</table>
Sectional Drawings:

(A) PICTORIAL VIEW OF LINK ARM

(B) ORTHOGRAPHIC PROJECTION DRAWING OF THE PART

(C) IMAGINARY CUTTING PLANE PASSED THROUGH THE PART

(D) FULL SECTIONAL FRONT VIEW REPLACES THE REGULAR FRONT VIEW
Partial Sectional Drawings:

Cutting planes at a right angle

(A) Cutting planes pass through center lines

Regular top view (B)

Half section front view

Figure 25-1 Cutting plane position and the development of a half-section view
Partial Sectional Drawings:

**Figure 25-2**  Example of Broken-Out (Partial) Section of an Object

**Figure 25-3**  Offset Sectional View of a Machined Casting

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Blueprint Reading: 10
Dimensions:

Point to Point:

Datum:

- May be fractions or decimal and must include units
Dimensions (cont.):

Radii and Holes:

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Blueprint Reading: 12
Dimensions (cont.):

Reference Dimensions:

Dual Units:
Tolerances:

+/- X.XX

drawing, note or title block

Max./Min.

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Blueprint Reading: 14
Geometric Tolerancing:

All dimensions ± .016 unless otherwise specified.

This surface must be perpendicular within .008 total to datum A.

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Blueprint Reading: 15
Machining:

Types of Holes:

- Drilled
- Reamed
- Bored
- Countersunk
- Countercrilled
- Spotfaced
- Threaded
- Broached
Machining (cont.):

Threaded Sections:

- **GRAPHIC**
- **SCHEMATIC**
- **Simplified**

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Blueprint Reading: 17
Machining (cont.):

Chamfers:

Sealed Source & Device Workshop  Blueprint Reading: 18
Machining (cont.):

Welds:

<table>
<thead>
<tr>
<th>FILLET</th>
<th>PLUG OR SLOT</th>
<th>SPOT OR PROJECTION</th>
<th>SEAM</th>
<th>BACK OR BACKING</th>
<th>SURFACING</th>
<th>SCARF FOR BRAZED JOINT</th>
<th>FLANGE EDGE</th>
</tr>
</thead>
</table>

- **GROOVE WELD SYMBOL**

<table>
<thead>
<tr>
<th>SQUARE</th>
<th>V</th>
<th>BEVEL</th>
<th>U</th>
<th>J</th>
<th>FLARE-V</th>
<th>FLARE-BEVEL</th>
<th>CORNER</th>
</tr>
</thead>
</table>

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**Blueprint Reading:** 19
Notes:

- Finishes (Machining, Paints, Chemical Treatments)
- QC Inspections
- Default units, dimensions, or tolerances
- Instructions for fabrication processes
- Other instructions necessary to describe the part