Section 8: Dimensioning Identification

<table>
<thead>
<tr>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>This section aims to enable the student to extend their knowledge of Drawing Interpretation from Engineering Drawings produced to AS1100 standard.</td>
</tr>
</tbody>
</table>

Objectives

At the end of this section you should be able to:

- Interpret information on detail drawings of engineering components.
- Interpret information on detail drawings of engineering assemblies.

Completion guidance

The work may need to be completed inside and outside the classroom if the majority of exercises are attempted.
Dimensioning identification

To cover this section the student needs to study the following sheets and be able to recognise and understand what the following dimensions are depicting.

- **Linear dimensions** - horizontal, vertical or oblique straight dimensions
- **Angular dimensions** - indication of angle in degrees, minutes and seconds or decimal measure as required.
- **Radii** - method used to indicate a rounded part.
- **Diameter** - method used to indicate a circle, often a hole.
- **Not to scale dimension** - method of showing that a dimension is not to the scale shown on the drawing. A thick line is shown under the dimension.
- **Auxiliary dimensions** - method of showing a dimension that can be calculated using existing dimensions shown on the drawing. A dimension that is basically not necessary but handy to have. They are not tolerated in any way and are enclosed in parenthesis.
- **Reference dimension** - another name for auxiliary dimension.
- **Common feature** - method of dimensioning a feature that repeats itself. That is, R5 TYP (a casting has radii of 5mm on all corners typical)
- **Tabular presentation** - a particular shape that comes in a range of sizes. That is, angle iron. (See example of varying size pins to the right).
- **Squares** - designated by drawing a small square beside the dimension which gives the distance across the flats.
- **Hexagons** - designated by the abbreviation Hex. Note: a hexagon can either be dimensioned across the flats (AF) or across the corners (AC). That is, Hex. 5mm AF, Hex. 8mm AC. Usually AF, but always be alert.
- **Holes** - things to be noted here are the shape of the hole, how it is to be produced (drilled, drilled and reamed, punched, broached etc.), whether it is blind, (does not go all the way through the material) or through hole (goes all the way through the material).
- **Screw threads** - things to be noted here are the shape of the thread (vee, square, acme, buttress, etc.), diameter, tapping size and pitch, as well as be aware that there are many different thread systems incorporating the old imperial threads as well as metric and special threads.
- **Tapers** - method of dimensioning tapers. Refer to the particular symbol used here.

For the method of dimensioning a shape that does not have a constant curve or taper.

**Datum** - an edge, face, centre line, centre of hole etc. from which all dimensions are taken.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>15</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>15</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>25</td>
<td>40</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>25</td>
<td>50</td>
<td>20</td>
<td>65</td>
</tr>
</tbody>
</table>

**Profile** - method of dimensioning a shape that does not have a constant curve or taper.

**Datum** - an edge, face, centre line, centre of hole etc. from which all dimensions are taken.

**Tabular presentation** - method of dimensioning tapers. Refer to the particular symbol used here.

**File** - method of dimensioning a shape that does not have a constant curve or taper.

**Datum** - an edge, face, centre line, centre of hole etc. from which all dimensions are taken.

**Profile** - method of dimensioning a shape that does not have a constant curve or taper.

**Datum** - an edge, face, centre line, centre of hole etc. from which all dimensions are taken.

**Tabular presentation** - method of dimensioning tapers. Refer to the particular symbol used here.
Dimensions

This section sets out the recommended methods used when dimensioning drawings, so that they will conform to the Australian Standards drawing practice AS1100.

Notes:

- The drawn outlines indicate the shape of an object. The dimensions indicate its size.
- Only those dimensions necessary for making the object should be shown on the drawing.
- All dimensions should be shown on the drawing once only.
- Dimensions should be shown on the view where the detail is seen clearest as an outline.

The drawn outlines indicate the shape of an object. The dimensions indicate its size. Only those dimensions necessary for making the object should be shown on the drawing. All dimensions should be shown on the drawing once only. Dimensions should be shown on the view where the detail is seen clearest as an outline.

Adjusting plate

Splice plate

The dimensions on these views are all unidirectional (read in one direction).
**Projection and dimension lines**

- Points of arrow must touch the projection line.
- Projection line must touch the projection line.
- Dimension lines spaced to suit figures and clarity.
- Dimension line goes to within 1mm of part being dimensioned.

**Location of dimensions**

- **A** Horizontal dimensions are placed above and in the centre of the dimension line.
- Vertical dimensions are placed above and in the centre of the dimension line, usually when seen from the right hand side of the drawing sheet.
- **C** Angular dimensions.

**Dimensioning small spaces**

Two common methods are shown for sizes 2 and 3.

**Dimensioning radii**

The leader line should be in line with the centre of the arc. The methods shown may vary on CAD.

**Dimensioning diameters**

The method shown may vary on CAD.

**Dimensions relating to a datum line or surface**

**Auxiliary dimensions**

These are dimensions used as a guide only. Often they are overall sizes. They are shown in parenthesis. Example (60).

Dimensions not to scale if part of a drawing is not to the correct scale. It should be highlighted by underlining. Example Ø10, Ø35, Ø45.
### Position of dimensions and projection lines

<table>
<thead>
<tr>
<th>Rule (applies in most cases)</th>
<th>Incorrect</th>
<th>Correct</th>
<th>Rule (applies in most cases)</th>
<th>Incorrect</th>
<th>Correct</th>
</tr>
</thead>
</table>
| 1. Dimensions should be kept outside the view if possible, there are times when it is better for clarity to put the dimensions on the view. | ![Incorrect Diagram](image1) | ![Correct Diagram](image2) | 5A Dimension lines and projection lines should not cross one another.  
Note: 1. Smallest dimension should be placed nearest to the outline progressing to largest dimension on the outside.  
2. Centre lines can be extended to act as projection lines when dimensioning. | ![Incorrect Diagram](image3) | ![Correct Diagram](image4) |
| 2. Do not repeat dimensions on the drawings.  
Length of item will be shown on either front view or top view, not on both. | ![Incorrect Diagram](image5) | ![Correct Diagram](image6) | 5B Projection lines can cross one another. | ![Poor Diagram](image7) | ![Much better Diagram](image8) |
| 3. (A) Do not use centre lines as dimension lines, they may be used as projection lines  
(B) Dimension lines should not be projection of a surface. | ![Incorrect Diagram](image9) | ![Correct Diagram](image10) | 6. Do not dimension features shown by hidden outlines.  
Only dimension features shown by outlines if possible. | ![Incorrect Diagram](image11) | ![Correct Diagram](image12) |
| 4. Do Not use outlines as dimensioning lines. | ![Incorrect Diagram](image13) | ![Correct Diagram](image14) | 7. When the note “dimensions are in millimetres” appears it is not necessary to show the millimetre sign with the dimensions. | ![Note not shown Diagram](image15) | ![Note shown Diagram](image16) |

---

Note: All dimensions are in millimetres.
Dimensioning

Linear pitches
Holes can be pitched along a straight line. It is called a pitch line and drawn as a centre line. Various methods are in use to dimension the pitch.

Examples:
Method 1

Method 2

Method 3

Methods 3, 4 and 5 overcome accumulative errors.

Method 4

Method 5

Circular pitches
Holes can be pitched around a circle called a pitch circle which is scribed as a circle or part circle from a centre. The diameter of the circle is designated as the pitch circle diameter or PCD.

Examples:
Exercise 8-1

Dimensioning

The following drawings of components contain some dimensions that are incorrectly shown with regard to AS 1100.

Draw a circle around, or highlight any dimension that is incorrectly shown, or could be considered a poor choice of position.
Datum

Datums are used to:
Prevent tolerance growth during marking out and manufacturing
To keep important dimensions relative to a certain position

Datums may be edges or centre lines (shown below).
The symbol for a datum is a filled in triangle (▲). This is placed on the datum line as shown. A letter inside a circle provides a reference for the datum.

Exercise 8-2

May be completed freehand or on a drawing board. Use a pencil so you can correct any errors.

The plate below is dimensioned randomly. Dimension the blank drawing below it using the left hand side and the bottom edge as datums.
Multi-view dimensioning

- Each dimension should appear on one view only
- All horizontal dimensions should be readable from the bottom of the sheet
- All vertical dimensions should be readable from the right side of the sheet
- All dimensions should be outside the views

Exercise 8-3

Dimension the orthogonal views from the pictorial specifications

Material: MS 2 thick

ALL DIMENSIONS ARE IN MILLIMETRES