Section 3: Line types - identification

<table>
<thead>
<tr>
<th>PURPOSE</th>
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<tbody>
<tr>
<td>In this section you will be able to recognise and interpret different line types, and the need for variation in thickness used on engineering drawings.</td>
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Objectives

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

- Identify line types used on engineering drawings.
  - Outlines
  - Hidden lines
  - Leader lines
  - Centre lines
  - Dimension lines
  - Break lines
  - Cross hatching lines

Completion guidance

The work may need to be completed inside and outside the classroom if the majority of exercises are attempted.
Line thickness
If all lines on a drawing were equally thick, the drawing is confusing and difficult to interpret, as the outlines do not stand out from the dimension lines, with small objects made obscure from the intersection of many thick lines.

All lines shown here are the same thickness

By varying the thickness and construction of lines on a drawing, we can express meaning which is otherwise difficult to express. To make sure everyone interprets drawings the same way, the use of each type and thickness of lines is defined in Australian Standard 1100 Drawing Practice.

Line shown here in varying thicknesses
You should follow the same basic principles in any sketching or drawing. By using pencils with soft leads to draw dark and thick lines, and hard leads to draw light and thin lines, it will assist.
## Types of lines used in engineering drawing

<table>
<thead>
<tr>
<th>Types of lines</th>
<th>Example of line</th>
<th>Example of application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Outlines:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Visible outlines</td>
<td>Thick</td>
<td></td>
</tr>
<tr>
<td>b) Hidden outlines</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td><strong>2. Centres:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Centre lines</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td>b) Pitch lines</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td>c) Pitch circles</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td><strong>3. Dimensions:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Dimension lines</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td>b) Extension lines</td>
<td>Thin</td>
<td></td>
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<tr>
<td>c) Leader lines</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td><strong>4. Breaks:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Break lines</td>
<td>Thin</td>
<td></td>
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<tr>
<td>b) break lines</td>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td>c) S break lines</td>
<td>Thin</td>
<td></td>
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<tr>
<td><strong>5. Sections:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Hatching lines</td>
<td>Thick</td>
<td></td>
</tr>
<tr>
<td>b) Cutting plane lines</td>
<td>Thin</td>
<td></td>
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<tr>
<td><strong>6. Existing &amp; adjacent parts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Existing &amp; adjacent parts</td>
<td>Thin</td>
<td></td>
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<tr>
<td>b) Material to be removed</td>
<td>Thin</td>
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Exercise 3-1 Name the type of line indicated:

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<tbody>
<tr>
<td>1.</td>
<td>Outline</td>
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<tr>
<td>2.</td>
<td>Extension line</td>
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</tr>
<tr>
<td>3.</td>
<td>Dimension line</td>
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<tr>
<td>4.</td>
<td>Centre line</td>
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<td>5.</td>
<td>Hidden outline</td>
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<td>6.</td>
<td>Leader line</td>
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Discussion should be allowed before and after the exercise.

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<td>3.</td>
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</table>
Exercise 3-2 - Types of lines

1. __________ 2. __________ 3. __________ 4. __________ 5. __________
6. __________ 7. __________ 8. __________ 9. __________ 10. __________

Discussion should be allowed before and after the exercise.

[Diagram showing dimensions and annotations like 100, 120, 300, 2 slots Ø wide, Hex nut, 200, 100, 25, 76, 38, 33, 36, 20, 10, 100, 120, 100, 120, 100, 120].
Exercise 3-3 Discussion should be allowed before and after the exercise.

Referring to drawing 95-B-100 sheet 1 of 1 on sheet MEC076 - 3 - 7 (page 42) answer the following questions.

1. Name the different line types used. (a) is shown as an example
   a. Visible outline
   b. ____________________
   c. ____________________
   d. ____________________
   e. ____________________

2. Indicate if the lines are either thick or thin. (a) is shown as an example
   a. Thick
   b. ____________________
   c. ____________________
   d. ____________________
   e. ____________________

3. A line is shown in zones A5, B5, C5 which looks like this. ____________________ What is this type of line called?

4. How many dimension lines are shown on the drawing?
   ____________________

5. How many extension lines are shown in the right side view?
   ____________________

6. How many of the extension lines in question (5) also serve as centre lines?
   ____________________

7. Are the dimensions on this drawing unidirectional or aligned? (Teacher to explain).

8. Numbers are shown in circles with leader lines pointing to components. What do these identify?

9. Identify the three freehand lines shown on the right side view.

10. Hidden outlines are shown on the front view. Identify the zone. ____________________

MEC076 - 3 - 6
NOTE:
1. END FLOAT OF GEARS IN ASSEMBLED PUMP MUST BE 0.1 TO 0.3mm.
2. PUMP BODY MAY BE GROUND WITHIN LIMITS SHOWN.
3. THIN JOINTING ONLY TO BE USED UNDER COVER ITEM 5. EXTRA JOINTING MAY BE USED TO GIVE CORRECT END FLOAT.