

Title	Mark out fabrication components using geometrical methods		
Level	3	Credits	5

Purpose	<p>This practical unit standard is one in a series of pattern development and marking out unit standards for people training in engineering fabrication trades.</p> <p>People credited with this unit standard are able to prepare for; and mark out fabrication components using geometrical methods; and check work after marking out.</p>
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Classification	Mechanical Engineering > Engineering - Fabrication
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Available grade	Achieved
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Prerequisite	Unit 25704, <i>Develop fabrication patterns manually for simple three-dimensional objects</i> , or demonstrate equivalent knowledge and skills.
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Guidance Information

1 References

Health and Safety at Work Act 2015.

Accident Compensation Corporation and Department of Labour. *Metal Industry Guidelines for Safe Work*. Wellington: ACC, 2007. Available from <http://www.acc.co.nz>.

Boundy, A; *Engineering Drawing, 8th edition*. McGraw-Hill Australia, 2011; ISBN 0071016767.

2 Definitions

Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

Specifications – detail that defines an object being made; commonly communicated by annotated and dimensioned drawings; by written description, or by other communication media. External references may also be used to specify objects such as tables or industry standards.

Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

3 Related unit standards

This unit standard is one of a set for fabrication shape development and marking out:

- Unit 25704, *Develop fabrication patterns manually for simple three-dimensional objects* (Level 3); typically assessed off job.
- Unit 30440, *Mark out fabrication components using geometrical methods* (Level 3); typically assessed on job.
- Unit 25705, *Develop fabrication patterns manually for complex three-dimensional objects* (Level 4); typically assessed off job.

4 Context

This unit standard is suitable for use in engineering contexts such as heavy and light metal fabrication, plastic fabrication; and heating, ventilation and air conditioning.

5 Materials

Examples of materials are – sheet, plate, structural sections, angles, channels, ducts, pipes, tubes.

Outcomes and performance criteria

Outcome 1

Prepare for marking out fabrication components using geometrical methods.

- Range six unique jobs each involving a minimum of three points from datum. A section mark out, and a simple development must be included within the six jobs. Examples of geometrical marking out jobs are:
- component mark out – pitch circle diameter (PCD), curved shapes, irregular shapes, polygons, series of holes, cut-outs such as slots and apertures;
 - development jobs – parallel lines, radial lines (cones); triangulation (square to round), or intersections;
 - section marking out jobs – scalloping, angle cuts, pipe intersections.

Performance criteria

1.1 Work is planned in accordance with job requirements.

Range work requirements, materials, tools and equipment, work sequences, identification of potential problems.

1.2 Fabrication materials are selected in accordance with job requirements.

1.3 Measuring and marking out tools are selected, and checked in accordance with accepted industry practice.

Range examples are – trammel points, scribe, chalk line, centre punch, straight edge, protractor, rule/tape, battens, engineer's square.

1.4 Datums and centre lines are determined from patterns or drawings in accordance with the specifications.

1.5 Allowances are made for material fabrication in accordance with job requirements.

Range examples of allowances are – cutting, bending/folding, material thickness, material utilisation/optimisation.

1.6 Marking or labelling is planned to enable assembly in accordance with accepted industry practice.

Range may include mistake proofing.

Outcome 2

Mark out fabrication components using geometrical methods.

Range jobs from outcome 1.

Performance criteria

2.1 Components are marked out in accordance with specifications.

2.2 Allowances for cutting or forming are applied in accordance with job requirements.

2.3 Geometrical methods are used for marking out.

Range examples are – bisecting lines, using Pythagoras' theorem, constructing polygons, tangents, curved lines, marking holes, development methods.

2.4 Marking out includes datums, alignment marks, centrelines, and mistake proofing as appropriate, in accordance with job requirements.

Outcome 3

Check work after marking out.

Performance criteria

3.1 Marked out components are checked and measured for compliance with specifications and any deviations rectified.

3.2 Completion of work is reported in accordance with workplace procedures.

Replacement information	This unit standard replaced unit standard 25874 and unit standard 25875.
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Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 July 2017	N/A

Consent and Moderation Requirements (CMR) reference

0013

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.