

Title	Lay out and mark off regular fabrication shapes under supervision		
Level	2	Credits	15

Purpose	People credited with this unit standard are, under supervision, able to: prepare for lay out and mark off of materials; make and use templates; mark out surface developments; and verify marking off and laying out of regular fabrication shapes.
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Classification	Mechanical Engineering > Engineering - Fabrication
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Available grade	Achieved
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Entry information	
Recommended skills and knowledge	Unit 2432, <i>Manually construct plane geometric shapes for engineering</i> ; or demonstrate equivalent knowledge and skills.

Explanatory notes

- 1 This unit standard is designed for people who are laying out and marking off sheet, plate, pipe, and sections in the fabrication industry under supervision.
- 2 The fabrication industry involves working with a wide range of material types, sections and thicknesses. Material types include – low carbon and alloy steels, stainless steels, aluminium alloys, copper alloys, plastics. Shapes include – sheet, plate, sections.
- 3 Assessment must involve more than one material type, more than one shape and more than one thickness, with a material range of either:
 - a 0.4mm to 6mm sheet and plate
 - light walled pipe
 - small sections, angles, and rolled hollow section;
 - or
 - b 3mm plate upwards
 - heavy walled pipe
 - large cross sectional angle, beam and rolled hollow section.
- 4 Assessment must be across a range of laying out and marking off operations.
- 5 Laying out and marking off at this level must include – right cylinders and ducts; truncated right cones and pyramids; branches of equal diameter cylinders; right bends and transitions of square to round; rectangle to round; square to rectangle; square to square and rectangle to rectangle between parallel planes; the lofting and marking out of plate; structural detail; flanges.

- 6 *Enterprise procedures* – documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site safety procedures, equipment operating procedures, codes of practice, quality assurance procedures, housekeeping standards, charging of time and materials, management of drawings and documentation, procedures to comply with legislative and local body requirements.
- 7 *Job specifications* refer to client's instructions, drawings, and/or contract.

Outcomes and evidence requirements

Outcome 1

Prepare for lay out and mark off of materials under supervision.

Evidence requirements

- 1.1 Materials are identified in accordance with job specifications.
- 1.2 Tools and equipment are identified in accordance with enterprise procedures.
- 1.3 Tools and equipment are maintained in accordance with enterprise procedures.
- 1.4 Allowances for fabrication and assembly are determined and calculated in accordance with enterprise procedures.
- 1.5 Pattern calculations are performed in accordance with enterprise procedures.
- 1.6 Identification of materials and quantities are estimated in accordance with enterprise procedures.
- 1.7 Method of pattern development to be used is identified or selected in accordance with enterprise procedures.
- 1.8 Structural details are identified in accordance with job specifications.
- 1.9 Potential hazards are identified and preventative action is taken in accordance with enterprise procedures.

Outcome 2

Make and use templates under supervision.

Evidence requirements

- 2.1 Template material is chosen in accordance with enterprise procedures.
- 2.2 Wrap around templates are produced in accordance with enterprise procedures.

- 2.3 Structural detail templates are produced to suit job specifications.
- 2.4 Datum points are established and transferred to in accordance with enterprise procedures.

Outcome 3

Mark out sections under supervision.

Evidence requirements

- 3.1 Material is identified in accordance with job specifications.
- 3.2 Sections are marked out in accordance with job specifications.
- 3.3 Datum points are established where required to aid fabrication.

Outcome 4

Mark out surface developments under supervision.

Evidence requirements

- 4.1 Material is identified in accordance with job specifications.
- 4.2 Surface to be developed is defined in accordance with job specifications.
- 4.3 Method of development is selected in accordance with enterprise procedures.
- 4.4 Fabrication allowances are determined in accordance with job specifications and transferred to pattern.
- 4.5 Datum points are established and marked to aid fabrication.
- 4.6 Marking out is carried out in accordance with job specifications.

Outcome 5

Verify marking off and laying out of regular fabrication shapes under supervision.

Evidence requirements

- 5.1 Datum points are verified to aid fabrication.
- 5.2 Laying out and mark off practices used are in accordance with enterprise procedures.
- 5.3 Patterns, sections and templates are inspected and measured for compliance to job specifications.
- 5.4 Non-conformance to job specifications is identified and reported to supervisor.

Planned review date	31 December 2019
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	31 October 1994	31 December 2014
Revision	2	14 April 1997	31 December 2014
Revision	3	5 January 1999	31 December 2014
Review	4	4 April 2001	31 December 2014
Revision	5	11 November 2005	31 December 2014
Review	6	17 July 2009	31 December 2014
Review	7	24 October 2014	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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.