



Australian Government

MEM12007 Mark off/out structural fabrications and shapes

Release: 2

MEM12007 Mark off/out structural fabrications and shapes

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM12007 Mark off/out structural fabrications and shapes (Release 1).

Release 1. Supersedes and is equivalent to MEM12007D Mark off/out structural fabrications and shapes.

Application

This unit of competency been developed for engineering tradesperson - fabrication apprenticeship training and the recognition of trade-level skills in mark off/out of structural fabrications and shapes.

It applies to the marking off/out of general fabrications and shapes to specified measurements, tolerances and shapes using appropriate tools and equipment. Templates and patterns are produced as required.

Skills covered by this unit are generally applied in occupational and work situations associated with steel fabrication, boiler making or sheet metal work.

In a marine setting, it includes basic lofting/set out for construction of marine vessels and includes stem and transom development and use of tables of offsets that reflect chine and hull configuration. This includes lofting surfaces, straight edges, string lines, French curves and templates and marking out techniques apply to a range of materials and shapes.

Where more extensive lofting practices are required unit MEM09021 Interpret and produce drawings of curved 3-D shapes should also be selected.

Where marking out of general engineering components is required unit MEM12006 Mark off/out (general engineering) should also be selected.

Where the selection and use of tools is required unit MEM18001 Use hand tools and unit MEM18002 Use power tools/hand held operations, should also be selected as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: A

Unit Weight: 4

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements

MEM12024	Perform computations
MEM13015	Work safely and effectively in manufacturing and engineering
MEM14006	Plan work activities
MEM16006	Organise and communicate information

Competency Field

Measurement

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	Determine job requirements	1.1	Follow standard operating procedures (SOPs)
		1.2	Comply with work health and safety (WHS) requirements at all times
		1.3	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, drawings, job sheets or work instructions
2	Transfer dimensions from a detail drawing to work or surface	2.1	Determine and understand specifications and work requirements using correct and appropriate calculations
		2.2	Carry out marking out to specifications or procedures using appropriate tools and equipment
		2.3	Establish datum points
3	Make templates/patterns as required	3.1	Chose appropriate template/pattern material, as required
		3.2	Produce required templates to specifications
		3.3	Follow correct storage procedures, including labelling and identification to SOPs

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

4	Develop patterns and/or transfer measurements to structures	4.1	Chose and apply most appropriate development and/or measurement sequence
		4.2	Determine allowances for fabrication and assembly and transfer
		4.3	Check measurement transfer/layout of components to ensure accuracy/set out
5	Interpret relevant codes, standards and symbols	5.1	Interpret relevant standards/codes and symbols
		5.2	Interpret requirements of standards/codes and apply to materials and processes
6	Estimate quantities of materials from detail drawings	6.1	Identify materials
		6.2	Estimate quantities from drawing
		6.3	Minimise material wastage

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Template materials include one (1) or more of the following:

- steel plate
- perspex
- timber
- cardboard

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- paper

Storage procedures include one (1) or more of the following:

- labelling
- identification (e.g. template lofts)

Allowances include one (1) or more of the following:

- thickness
- bend
- pitch
- angle
- circumference
- perimeter

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM12007 Mark off/out structural fabrications and shapes

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications and drawings for fabrication requirements, including materials, measurements and tolerances, joining methods, standards and code requirements
- carrying out all marking off/out using appropriate marking out tools and equipment to specifications
- calculating measurements not shown on drawings, as required
- establishing and marking datum points
- selecting appropriate template material and producing templates to specifications
- storing templates, including labelling and identification, to procedures, as required
- developing patterns by selecting and applying appropriate development and/or measurement sequence and determining correct allowances for fabrication and assembly and transferring these measurements
- calculating allowances for fabrication and assembly, including shrinkage, thickness and inside/outside measurements, and transferring these measurements
- identifying and estimating quantities of materials from drawings with minimise wastage.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- procedures for marking off/out and pattern development
- tools and equipment to be used in the preparation of the marking off/out
- datum points
- materials that can be used for the preparation of templates and their application
- manufacturing allowances that have to be considered when developing patterns
- template labelling and identification procedures and storage requirements of templates

- appropriate methods of development/marking off/out of a range of given objects
- appropriate fabrication and assembly allowances
- effects of material type and thickness on fabrication and assembly allowances
- sources of data on fabrication and assembly allowances
- relevant standards and codes and the meaning of symbols used
- requirements of the codes/standards applicable to the work to be done
- materials from which the component/assembly is to be manufactured
- benefits of minimising material wastage.

Assessment Conditions

- Assessors must:
 - have vocational competency in marking off/out structural fabrications and shapes at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Assessment must occur in a functioning workplace. Where assessment in the workplace would be unsafe, impractical or threatens the environment, assessment must occur in a sufficiently rigorous simulated environment that reflects the circumstances that would be experienced in a functioning workplace. Assessment must cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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