



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM12006C Mark off/out (general engineering)**

**Release: 1**

## **MEM12006C Mark off/out (general engineering)**

### **Modification History**

Not Applicable

## Unit Descriptor

<b>Unit descriptor</b>	This unit of competency covers marking off/out by transferring dimensions from engineering drawings, prints or plans to engineering items that are to be either manufactured or set up. Dimensions may be directly transferred or may require calculation from information on the drawings, prints or plans.
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## Application of the Unit

<b>Application of the unit</b>	<p>This unit of competency applies to marking off/out techniques used for the transfer of dimensions from engineering drawings, prints or plans to items that are to be set up or manufactured, for example, engineering components, jigs and fixtures, castings, templates, dies and tooling.</p> <p>This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in mark off/out in general engineering. Skills covered by this unit are generally applied in occupational and work situations associated with trade level fitting, machining and toolmaking work.</p> <p>Marking off/out is undertaken using appropriate tools and equipment and templates are produced as required. Marking off/out techniques may apply to a range of materials and shapes.</p> <p>The task may be performed in a workshop or in situ.</p> <p>This unit is not intended to cover the skills used in a simple transfer of a dimension or marking a location point associated with general engineering and maintenance functions. For these skills refer to MEM07005C Perform general machining, MEM18006C Repair and fit engineering components or MEM18014B Manufacture press tools and gauges.</p> <p>Where a higher level of calculation, measurement or precision work is required, see MEM30012A Use mathematical techniques and perform simple statistical computations, MEM12003B Perform precision mechanical measurement or MEM18003C Use tools for precision work, respectively.</p> <p>For marking out structural fabrications and shapes, refer to</p>
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	<p>MEM12007D Mark off/out structural fabrications and shapes.</p> <p>This unit covers the marking out skills only. When the manufacture of templates is required, other appropriate units may need to be selected.</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 4</b></p>
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## Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

Prerequisite units		
<b>Path 1</b>	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Drawings, job instructions and specifications are interpreted and understood 1.2. Appropriate methods and sequencing are selected consistent with proposed manufacturing process using standard operating procedures
2. Transfer dimension	2.1. All marking off/out is carried out to specifications using appropriate tools and equipment 2.2. Datum points are correctly established 2.3. Dimensions are transferred and correct and appropriate calculations are used where required

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

Required skills include:

- determining job requirements
- transferring dimensions
- applying method and sequence of marking out
- making templates as required
- establishing datum points
- reading and interpreting routine information on written job instructions, specifications standard operating procedures and engineering drawings
- performing calculations using formulae
- locating, reading and interpreting information on written job instructions, specifications, drawings, charts, lists and other reference documentation
- checking and clarifying strategies

#### Required knowledge

Required knowledge includes:

- drawings, job instructions and specifications
- procedures for marking off/out
- tools, equipment and techniques related to the task

**REQUIRED SKILLS AND KNOWLEDGE**

- purpose of establishing datum points
- method of determining/calculating dimensions
- use and application of personal protective equipment
- safe work practices and procedures
- relevant hazards and control measures related to the competency

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

A person who demonstrates competency in this unit must be able to mark off/out in a general engineering situation. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include:

- examination of detailed drawings for marking out requirements and specifications including materials, measurements and tolerances, manufacturing methods, standards and code requirements
- correct calculation of measurements not shown on drawings
- sequence of measuring and/or development is determined correctly
- correctly establishing and marking datum points
- measurements are accurately transferred to component, jig, fixture, casting, template, die or tooling
- accurate production of templates.

#### Context of and specific resources for assessment

This unit has been developed to support training in and recognition of trade level competency in marking off/out general engineering items as applied to trade level fitting, machining and toolmaking work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace.

The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

#### Method of assessment

Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their geometric development skills and techniques across a range of jobs and specifications.

**EVIDENCE GUIDE**

	<p>A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit.</p> <p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.</p> <p>The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>
<b>Guidance information for assessment</b>	<p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with marking off/out general engineering items or other units requiring the exercise of the skills and knowledge covered by this unit.</p> <p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>

**Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and



**RANGE STATEMENT**

regional contexts) may also be included.

**Marking off/out**

Marking off/out may include engineering components, jigs and fixtures, castings, templates, dies and tooling

**Tools and equipment**

Tools and equipment may include:

- marking out tables
- surface tables
- rotary tables
- dividing heads
- vee blocks
- cylinder squares
- sine bars
- vernier height gauges
- protractors
- straight edge and set squares
- hammers
- scribes
- centre punch
- marking medium

**Unit Sector(s)**

<b>Unit sector</b>	
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**Co-requisite units**

Co-requisite units		

## Competency field

Competency field	Measurement
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