



Australian Government

Department of Education, Employment and Workplace Relations

MEM05010C Apply fabrication, forming and shaping techniques

Release: 1

MEM05010C Apply fabrication, forming and shaping techniques

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers applying fabrication, forming and shaping of a wide variety of shapes and products undertaken by an Engineering Tradesperson - Fabrication using a variety of forming and shaping techniques. The fabrication, forming and shaping is done to specifications interpreted from technical drawings and job specifications using a variety of tools and equipment.
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Application of the Unit

Application of the unit	<p>This unit of competency applies to fabrication, forming and shaping of plate, sheet and tubular ferrous and non-ferrous metal to specified measurements, tolerances and shapes. Skills covered by this unit are generally applied in occupational and work situations associated with steel fabrication, boilermaking or sheet metal work.</p> <p>This unit has been developed for Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade level skills in fabrication, forming and shaping.</p> <p>Predetermined standards of quality and safety are observed and work is carried out following standard operating procedures.</p> <p>This unit includes the ability to produce a wide range of shapes and products such as pipework, chamfers, cylinders, cones, angles, hoppers, ductwork, 'square to round', 'transitions', 'lobster backs' and all forms of tubular shapes, including hand rails, reticulation pipework and mufflers.</p> <p>Materials may include ferrous and non-ferrous and non-metallic materials. A variety of tools and equipment may be used including presses, shapers, benders, rollers and drop hammers.</p> <p>If heating or thermal cutting is required, MEM05007C Perform manual heating and thermal cutting should be accessed.</p> <p>Where marking off/out skills are required, then MEM12007D Mark off/out structural fabrications and shapes should be selected. Where welding is required, relevant welding units should be selected.</p>
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	<p>This unit does not cover repetitive fabrication, bending and shaping of metal and non-metallic materials by production workers, trades assistants etc. such as where the bending or shaping equipment has been pre-set and the material to be fabricated, formed or shaped has been pre-marked up or pre-cut to size. This unit is also not intended to apply in situations where products or shapes are merely bent using hand tools or equipment.</p> <p>Band: A</p> <p>Unit Weight: 8</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05037C	Perform geometric development
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	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. Select and set up forming/shaping equipment for a specific operation	1.1. Most appropriate tools and equipment are selected 1.2. Equipment is correctly set up and adjusted for operation to standard operating procedures 1.3. Allowances for shrinkage, thickness and inside/outside measurements are correctly made
2. Operate forming/shaping equipment	2.1. Machine is safely started up and shut down to standard operating procedures 2.2. Material and safety guards are correctly positioned. 2.3. Equipment is correctly operated and adjusted
3. Form and shape material	3.1. Material is levelled, straightened, rolled, pressed or bent to specifications/drawings using fabrication techniques 3.2. Correct hot or cold forming procedures are followed 3.3. Final form/shape is checked for compliance to specification and adjusted as necessary to standard operating procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- selecting tools and equipment
- setting up and adjusting equipment
- calculating allowances
- taking measurements
- starting up and shutting down the machine
- positioning material
- positioning safety guards
- obtaining drawings and/or specifications
- selecting the most appropriate forming/shaping process to achieve the required size and specification
- forming/shaping material to size and specification

REQUIRED SKILLS AND KNOWLEDGE

- checking the final form/shape of the object for conformance with specifications
- reworking the object to ensure conformance with specifications
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking task-related information

Required knowledge

Required knowledge includes:

- variety of hot and cold forming/shaping processes
- machines, tools and/or equipment required to perform forming/shaping processes
- reasons for selecting chosen tools, equipment and processes
- adjustments that can be made to the equipment and the effect of adjustments on the object being formed/shaped
- allowances when forming/shaping materials
- sources of data relating to allowances
- startup and shutdown procedures
- the material positioning/feeding requirements
- the location and function of all safety guards
- procedures for the forming/shaping process
- defects in formed/shaped materials
- defects that can be rectified by further work/adjustment
- hazards and control measures associated with undertaking fabrication, forming and shaping, including housekeeping
- safe work practices and procedures

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 apply fabrication, forming and shaping techniques to meet specifications. 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 situations and contexts. Critical aspects of assessment and evidence include:

- examining drawings and specifications to determine correct equipment to be used and sequence of fabrication, forming and shaping processes
- correctly identifying any specified tolerances
- correctly calculating allowances for shrinkage, thickness and inside/outside measurements
- setting up and safely operating equipment to ensure forming and shaping outcome is to specifications
- ensuring equipment is shut down and made safe
- carrying out hot and cold forming processes safely and to specifications including levelling, straightening, rolling, pressing or bending.

Context of and specific resources for assessment

This unit has been developed to support training in and recognition of trade level competency in fabrication, forming and shaping as applied to a sheet metal or metal fabrication 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 - Fabrication work are required to exercise fabrication, forming and shaping 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>
Guidance information for assessment	<p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying fabrication, forming and shaping techniques 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.	
Tools and equipment	<p>Tools and equipment may include:</p> <ul style="list-style-type: none"> • presses • shapers • benders • rollers • drop hammers
Material	Material may include ferrous and non-ferrous and non-metallic substances
Fabrication techniques	Fabrication techniques may include measurements and calculations associated with allowances for shrinkage, thickness and inside/outside measurements
Final form/shape	<p>Final form/shape may include:</p> <ul style="list-style-type: none"> • pipework • chamfers • cylinders • cones • angles • hoppers • ductwork • 'square to round' • 'transitions' • 'lobster backs' • all forms of tubular shapes, including hand rails, reticulation pipework and mufflers

Unit Sector(s)

Unit sector	
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication
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