



**Australian Government**

# **MEM05088 Perform welds to code standards using oxy fuel gas welding process**

**Release: 1**

# **MEM05088 Perform welds to code standards using oxy fuel gas welding process**

## **Modification History**

Release 1. Unit code changed. Changes to prerequisites, performance evidence and knowledge evidence. Supersedes and is not equivalent to MEM05058 Perform welds to code standards using oxy fuel gas welding process.

## **Application**

This unit of competency has been developed for post trade engineering fabrication training and the recognition of post trade skills in performing welds to code standards using oxy fuel welding.

It defines the skills and knowledge required to prepare and produce welds to code standards using oxy fuel gas welding on different types of materials. Welds covered by this unit include butt and fillet welds in the flat, horizontal, vertical and overhead positions to meet AS 1210 Pressure vessels, AS 4041 Pressure piping and American Society of Mechanical Engineers (ASME) IX or equivalent national or international standards.

This unit, together with units MEM05061 Apply basic metallurgy principles to welding applications, MEM05062 Apply welding and welding related codes and standards and MEM05068 Apply weld procedure specifications may satisfy the requirements of AS 1796 Certification of welders and welding supervisors or equivalent national and international standards.

Where the welding associated with this unit also requires advanced manual thermal cutting, gouging and shaping is required, the Unit MEM05071 Perform advanced manual thermal cutting, gouging and shaping must also be selected.

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

Band: B

Unit Weight: 8

## **Pre-requisite Unit**

MEM05004 Perform routine oxy fuel gas welding

MEM05007 Perform manual heating and thermal cutting

MEM05052 Apply safe welding practices

MEM05061 Apply basic metallurgy principles to welding applications

MEM05062 Apply welding and welding related codes and standards

MEM05065 Maintain weld records

MEM05068 Apply welding procedure specifications

MEM05075 Perform advanced welding using oxy acetylene welding process

MEM05078 Apply welding principles  
MEM05085 Select welding processes  
MEM05097 Weld using oxy fuel gas welding process  
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  
MEM18001 Use hand tools  
MEM18002 Use power tools/hand held operations

## Competency Field

Fabrication

## Elements and Performance Criteria

| Elements                                                                             | 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)<br>1.2 Comply with work health and safety (WHS) requirements at all times<br>1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs<br>1.4 Identify job requirements from weld procedure specifications (WPS), customer requirements, drawings, job sheets or work instructions<br>1.5 Obtain WPS clarification or approval of variation to WPS from appropriate person in accordance with SOPs |
| 2. Prepare welding materials and equipment for oxy fuel gas welding to code standard | 2.1 Prepare materials to produce weld to code standard<br>2.2 Perform routine maintenance on welding equipment<br>2.3 Set up welding equipment<br>2.4 Select consumables in accordance with WPS                                                                                                                                                                                                                                                                          |
| 3. Weld joints using oxy                                                             | 3.1 Weld materials in accordance with WPS                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Elements                                     | Performance Criteria                                                                                                                                                                                                                                        |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Elements describe the essential outcomes.    | Performance criteria describe the performance needed to demonstrate achievement of the element.                                                                                                                                                             |
| fuel gas welding to procedure specifications | 3.2 Apply post-welding heat treatment where specified<br>3.3 Inspect welded joints visually for conformance to specifications<br>3.4 Rectify discontinuities to ensure compliance to code requirements<br>3.5 Maintain weld records in accordance with SOPs |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

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. |                                                                                                                                                                                                                                                               |
| Routine maintenance includes:                                                                                                                                                                                                                                                                 | ensuring oxy fuel gas welding equipment is in good condition.                                                                                                                                                                                                 |
| Consumables include one or more of the following:                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• filler rods</li> <li>• flux</li> <li>• fuel gas.</li> </ul>                                                                                                                                                          |
| Equipment includes one or more of the following:                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• gas cylinders</li> <li>• hoses</li> <li>• blowpipes</li> <li>• tips and nozzles</li> <li>• regulators</li> <li>• flashback arrestors.</li> </ul>                                                                     |
| Preparation includes one or more of the following:                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• cleaning and preparation of base material</li> <li>• joint preparation:               <ul style="list-style-type: none"> <li>• flame cut and ground</li> <li>• machined</li> </ul> </li> <li>• preheating</li> </ul> |

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• setting up             <ul style="list-style-type: none"> <li>• jigs</li> <li>• fixtures</li> <li>• clamps.</li> </ul> </li> </ul>                                                                                                                                                                                                                          |
| Materials include one or more of the following:                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• carbon/manganese steel</li> <li>• stainless steel</li> <li>• low alloy steel.</li> </ul>                                                                                                                                                                                                                                                                    |
| Welding procedure parameters include one or more of the following:                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• material specification and grade</li> <li>• material preparation</li> <li>• joint details</li> <li>• process type</li> <li>• position</li> <li>• run sequence and pass number</li> <li>• welding process</li> <li>• filler material</li> <li>• material diameter</li> <li>• polarity</li> <li>• travel speed</li> <li>• pre and post heat input.</li> </ul> |
| Defects include one or more of the following:                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• cracks</li> <li>• craters</li> <li>• inclusions</li> <li>• porosity</li> <li>• lack of penetration or fusion</li> <li>• imperfect weld size and/or shape</li> <li>• undercut</li> <li>• incorrect fabrication dimension</li> <li>• distortion</li> <li>• excess penetration</li> <li>• excess weld reinforcement</li> <li>• excess weld metal.</li> </ul>   |
| Rectify includes the use of one or more of the following:                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• oxy/ fuel</li> <li>• air arc equipment</li> <li>• grinding devices.</li> </ul>                                                                                                                                                                                                                                                                              |

## Unit Mapping Information

No equivalent unit.

## 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 MEM05088 Perform welds to code standards using oxy fuel gas welding process

## Modification History

Release 1. Unit code changed. Changes to prerequisites, performance evidence and knowledge evidence. Supersedes and is not equivalent to MEM05058 Perform welds to code standards using oxy fuel gas welding process.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include the ability to:

- follow work instructions, standard operating procedures (SOPs) and safe work practices
- identify and interpret job specifications and weld parameters from drawings, weld procedure specifications, sketches and verbal or written job instructions for performing welds using oxy fuel gas welding to code standards
- clean and prepare materials for welding to specifications on at least two occasions
- set up welding equipment and perform routine maintenance
- produce butt and fillet welds in the flat, horizontal, vertical and overhead positions to meet customer specifications and the requirements of AS 1210 Pressure vessels, AS 4041 Pressure piping and American Society of Engineers (ASME) IX or equivalent national or international standards on at least two occasions
- rectify identified weld discontinuities on at least two occasions
- complete and maintain weld records related to oxy fuel gas welding to code standards onto standard workplace forms.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

## 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 welding practices and procedures and use of personal protective equipment (PPE)
- requirements to produce welds to quality of AS 1210 Pressure vessels, AS 4041 Pressure piping and ASME IX or equivalent
- AS 1796 Certification of welders and welding supervisors or equivalent national and international standards relevant to oxy fuel gas welding
- standards or codes relevant to oxy fuel gas welding
- causes and control of distortion when welding to code standards
- purpose of and setting up requirements of:
  - gas cylinders
  - hoses

- blowpipes
- tips and nozzles
- regulators
- flashback arrestors
- methods for preparing plate for code standard welding
- causes of weld defects and methods of rectification
- pre-welding and post-welding heating methods and requirements for plate welding to code standard
- requirements for maintaining weld records to code standard.
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## Assessment Conditions

- Assessors must:
  - have vocational competency in performing welds to code standards using oxy fuel gas welding process 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.
- Knowledge assessment may be either verbal or written but must adequately reflect the knowledge requirements of the unit in a functioning workplace.
- 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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## Links

Companion Volume implementation guides are found in VETNet –

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