



Australian Government

**MEM05081 Perform welds to code
standards using gas tungsten arc welding
process**

MEM05081 Perform welds to code standards using gas tungsten arc welding process

Modification History

Release	Comments
2	Unit title for the unit code MEM05061 corrected in the prerequisites. Update from manual metal arc welding (MMAW) to gas tungsten arc welding (GTAW).
1	This unit of competency was first released in MEM Manufacturing and Engineering Release 3.0.

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 gas tungsten arc welding.

It defines the skills and knowledge required to prepare and produce welds to code standards using gas tungsten arc welding (GTAW) 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 and 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 welding procedure specifications may satisfy the requirements of AS 1796 Pressure equipment — Qualification of welders, welding supervisors and welding inspectors or equivalent national and international standards.

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

Band: B

Unit Weight: 8

Licensing/Regulatory Information

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

Pre-requisite unit(s)

MEM05007 Perform manual heating and thermal cutting

MEM05049 Perform routine gas tungsten arc welding

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

MEM05074 Perform advanced welding using gas tungsten arc welding process

MEM05078 Apply welding principles

MEM05085 Select welding processes

MEM05092 Weld using gas tungsten arc 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(s)

Fabrication

Unit sector(s)

N/A

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) 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 weld procedure specifications (WPS), customer requirements, drawings, job sheets or work instructions 1.5 Obtain WPS clarification or approval of variation to WPS from appropriate person as required
2. Prepare welding materials and equipment for GTAW welding to code standard	2.1 Prepare materials to produce weld to code standard 2.2 Perform routine maintenance on welding equipment 2.3 Set up welding equipment 2.4 Select consumables in accordance with WPS
3. Weld joints using GTAW to procedure specifications	3.1 Weld materials in accordance with WPS 3.2 Apply post-welding heat treatment where specified 3.3 Inspect welded joints visually for conformance to specifications 3.4 Rectify discontinuities to ensure compliance to code requirements 3.5 Maintain weld records according to 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 leads and hand pieces are in good condition and the correct current carrying capacity.

Preparation includes one or more of the following:	• cleaning and preparation of base material • flame cut and ground or machined edge preparation • pre-heating • setting up of jigs, fixtures and clamps.
Materials include one or more of the following:	• carbon/manganese steel • stainless steel • low alloy steel.
Rectify includes the use of one or more of the following:	• oxy acetylene • air arc equipment • grinding devices.
Defects include one or more of the following:	• cracks • craters • inclusions • porosity • lack of penetration or fusion • imperfect weld size and/or shape • undercut • incorrect fabrication dimension • distortion • excess penetration • excess weld reinforcement • excess weld metal • arc strikes.
Welding procedure parameters include one or more of the following:	• material specification and grade • material preparation • joint details • process type • position • run sequence and pass number • welding process

	• filler material • material diameter • current • voltage • polarity • travel speed • pre and post heat input.
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Unit Mapping Information

Current Code and Title	Previous Code and Title	Comments	Equivalence
MEM05081 Perform welds to code standards using gas tungsten arc welding process	MEM05044 Perform welds to code standards using gas tungsten arc welding process		Not equivalent

Assessment Requirements for MEM05081 Perform welds to code standards using gas tungsten arc welding process

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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 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 weld procedure specifications drawings, sketches and verbal or written job instructions for performing pipe welds using gas tungsten arc welding (GTAW) to code standards on at least two occasions
- clean and prepare materials for welding to specifications
- set up welding equipment and perform routine maintenance
- produce butt welds in pipe with the axis horizontal, vertical and/or askew to meet customer specifications and the requirements of AS 1210 Pressure vessels, AS 4041 Pressure piping, and American Society of Mechanical Engineers (ASME) IX or equivalent national and international standards on at least two occasions
- rectify identified weld discontinuities on at least two occasions
- complete and maintain weld records related to GTAW 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 Pressure equipment — Qualification of welders, welding supervisors and welding inspectors or equivalent national and international standards relevant to GTAW
- standards or codes relevant to performing pipe welds to code standards using GTAW
- methods for preparing pipe for code standard welding
- pre-welding and post-welding heating methods and requirements for pipe welding to code standard
- causes and control of distortion when welding to code standards
- welding cracks or defects relevant to GTAW pipe welding to code standards
- requirements for maintaining weld records to code standard.

Assessment Conditions

- Assessors must:
 - have vocational competency in performing pipe welds to code standards using the gas tungsten arc welding (GTAW) 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.

Link

Companion volumes, including implementation guides, are found on the national training register - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>.