



**Australian Government**

# **MEM05074 Perform advanced welding using gas tungsten arc welding process**

**Release: 1**

# **MEM05074 Perform advanced welding using gas tungsten arc welding process**

## **Modification History**

Release 1. Unit code changed. Changes to prerequisites, performance evidence and knowledge evidence. Supersedes and is not equivalent to MEM05020 Perform advanced welding using gas tungsten arc welding process.

## **Application**

This unit of competency has been developed for engineering fabrication trade training and the recognition of trade skills in advanced welding using manual metal arc welding.

It defines the skills and knowledge required to plan, prepare for, and carry out advanced welding using gas tungsten arc welding (GTAW) where the weld would be required to conform to AS 1554 Structural Purpose (SP) or equivalent national or international standards or codes as defined in the unit in combination with its prerequisites.

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. Where the welding associated with this unit also requires the application of welding codes and standards, the unit MEM05062 Apply welding and welding related codes and standards must also be selected. Where the welding associated with this unit also requires the welding to be undertaken according to a formal welding procedure specification, the unit MEM05068 Apply welding procedure specifications must also be selected. Where formal weld records associated with the application of this unit are required to be maintained, the unit MEM05065 Maintain weld records must also be selected.

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

Band: A

Unit Weight: 4

## **Pre-requisite Unit**

MEM05007 Perform manual heating and thermal cutting

MEM05049 Perform routine gas tungsten arc welding

MEM05052 Apply safe welding practices

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

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 including relevant standards and codes from specifications, drawings, job sheets or work instructions |
| 2. Prepare materials for welding                                 | 2.1 Prepare materials to achieve required weld requirements<br>2.2 Assemble and/or align materials to specification, where required                                                                                                                                                                                                                 |
| 3. Select, assemble and set up welding equipment and consumables | 3.1 Identify and select welding equipment and electrodes, accessories and consumables appropriate to the material<br>3.2 Assemble and set up alternating current (AC) or direct Current (DC) welding equipment                                                                                                                                      |
| 4. Weld joints to specifications using GTAW                      | 4.1 Apply appropriate distortion prevention measures<br>4.2 Ensure weld deposit is to specifications<br>4.3 Clean joints to specifications<br>4.4 Rectify any distortion using appropriate techniques                                                                                                                                               |
| 5. Ensure weld conformance                                       | 5.1 Inspect weld joints visually for conformance to specifications<br>5.2 Rectify any weld crack or defect with minimum loss of sound metal using correct techniques and tools                                                                                                                                                                      |

| Elements                                  | Performance Criteria                                                                            |
|-------------------------------------------|-------------------------------------------------------------------------------------------------|
| Elements describe the essential outcomes. | Performance criteria describe the performance needed to demonstrate achievement of the element. |
|                                           | 5.3 Complete 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.

|                                                                      |                                                                                                                                                    |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Welds include:                                                       | <ul style="list-style-type: none"><li>• GTAW fillet and butt welds carried out in all positions.</li></ul>                                         |
| Materials include one or more of the following:                      | <ul style="list-style-type: none"><li>• low carbon</li><li>• cast iron</li><li>• stainless and low alloy steel</li><li>• aluminium.</li></ul>      |
| Welding equipment includes:                                          | <ul style="list-style-type: none"><li>• settings, electrodes, gases and related equipment selected in accordance with welding procedure.</li></ul> |
| Preparation includes one or more of the following:                   | <ul style="list-style-type: none"><li>• pre-heating</li><li>• setting up of jigs, fixtures and clamps</li><li>• joint preparation.</li></ul>       |
| Distortion prevention measures include one or more of the following: | <ul style="list-style-type: none"><li>• pre-heating</li><li>• setting up of jigs</li><li>• fixtures and clamps.</li></ul>                          |
| Rectify includes the use of one or more of the following:            | <ul style="list-style-type: none"><li>• oxy acetylene</li><li>• air arc equipment</li><li>• grinding devices.</li></ul>                            |
| Weld cracks or defects include one or more of the                    | <ul style="list-style-type: none"><li>• porosity</li><li>• slag inclusions</li></ul>                                                               |

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following:

- discontinuities
- lack of penetration
- undercut.

## 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 MEM05074 Perform advanced welding using gas tungsten arc welding process

## Modification History

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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 and safe work practices
- identify and interpret specifications from drawings, sketches and verbal or written job instructions for performing advanced welding using gas tungsten arc welding process (GTAW) to AS 1554 Structural Purpose (SP) on at least two occasions
- select appropriate weld and joint preparation methods
- clean and prepare materials for welding
- weld materials to AS 1554 SP or equivalent using alternating current (AC) or direct Current (DC) welding machines and electrodes on at least two occasions
- apply distortion prevention techniques
- rectify identified weld cracks or defects.

*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)
- properties and characteristics of materials and consumables used in GTAW welding
- requirements to conform to AS 1554 SP or equivalent
- purpose of pre-welding and/or post-welding heating and the methods of application
- instructions, symbols, specifications, including bead size, bead placement, reinforcement and weld procedure sheet
- weld procedures and requirements
- different welder identification systems, including numbering, bar coding, paint coding, and letter stamps
- causes of weld cracks and defects and methods of rectification.
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## Assessment Conditions

- Assessors must:
- have vocational competency in performing advanced welding using 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.
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