



Australian Government

MEM05077 Perform welding inspection

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Modification History

Release	Comments
2	Unit title for the unit code MEM05061 corrected in the prerequisites.
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 welding inspection.

It defines the skills and knowledge required to perform welding inspections, organise appropriate non-destructive tests (NDTs), validate welding procedure specifications (WPS), ensuring that quality assurance is carried out and monitoring procedures are undertaken, as defined in the unit in conjunction with its prerequisites.

Competency in this unit is based on broad knowledge of metallurgy associated with welding, mechanical properties of welded joints, heat treatment procedures and national and international welding and related standards. Test procedures and the scope of this unit of competency are determined by applicable Australian and/or international standards.

Where the conduct of destructive and/or non-destructive testing is required the appropriate test units must also be selected.

This unit must be selected in combination with one of the MEM coded welding units and their prerequisites. These units include:

MEM05060 Perform welds to code standards using submerged arc welding process

MEM05079 Perform welds to code standards using flux core arc welding process

MEM05080 Perform welds to code standards using gas metal arc welding process

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

MEM05082 Perform pipe welds to code standards using manual metal arc welding process

MEM05083 Perform welds to code standards using manual metal arc welding process

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

Band: B

Unit Weight: 10

Licensing/Regulatory Information

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

Pre-requisite unit(s)

MEM05061 Apply basic metallurgy principles to welding applications

MEM05062 Apply welding and welding related codes and standards

MEM05065 Maintain weld records

MEM05066 Develop and maintain welding procedures

MEM05068 Apply welding procedure specifications

MEM05078 Apply welding principles

MEM05085 Select welding processes

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

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 scope of required welding inspection	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements

	1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs 1.4 Identify welding inspection requirements from specifications, drawings, job sheets or work instructions
2. Confirm materials are to specification	2.1 Check markings and other manufacturers information against specifications 2.2 Select appropriate non-destructive tests and organise and/or conduct in accordance with SOPs or job specifications 2.3 Check if results of previous testing procedures are available and verify results as relevant to required welding inspection 2.4 Confirm suitability of materials for required welding
3. Review and validate welding procedure	3.1 Interpret joint design specification and review welding parameters 3.2 Review WPS and other document procedures 3.3 Organise preparation of production test piece or sample material 3.4 Arrange relevant destructive or non-destructive tests 3.5 Interpret test results and prepare report identifying required action
4. Ensure quality assurance procedures are carried out and confirm compliance	4.1 Check documentation for evidence of welder qualification against WPS 4.2 Check material identification is correct 4.3 Document movement of material through workshop site 4.4 Witness transferring material test certification numbers 4.5 Perform identification of consumables in accordance with welding procedures 4.6 Monitor storage and use of consumables and confirm compliance 4.7 Maintain and review welding inspection records to ensure traceability and compliance with requirements

5. Check fabrication for compliance with specifications	5.1 Check material forming against job requirements 5.2 Carry out dimensional checks against specifications 5.3 Make final inspection against specifications
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Foundation Skills

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

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.	
Welding inspection:	welding inspection may be performed on behalf of an inspecting authority, a principal, or in-house for a fabricator as part of quality control. In all cases the welding inspector acts independent of the welding supervisor or welding engineer responsible for developing the welding procedure specification.
Welding inspection scope includes verification of:	- material preparation - selection and use of consumables - welding of base metal to welding procedure specification - keeping of appropriate welding records - production of test pieces and sample material - NDT and other tests are commissioned in accordance with customer requirements, WPS and relevant codes and standards - fabrication dimensions and forming are consistent with specifications and where required - pre and post heat application.
Standards and codes include Australian or international standards	- welding processes - welding consumables

and codes covering the following:	- materials used in fabrication related projects or products - destructive and non-destructive testing of welds - qualifying of welders, welding inspectors and welding supervisors.
Welding procedure specification (WPS) format	the WPS can vary in format depending on fabricator and customer requirements and may be recorded and distributed electronically or on paper.
Non-destructive tests include one or more of the following:	- visual inspection - dye penetrant - magnetic particle - radiographic - ultrasound.
Welding procedure parameters include one or more of the following:	- material specification and grade - material preparation - joint details - position - run sequence and pass number - welding process - filler material - material diameter - current - voltage - polarity - wire feed speed where relevant - travel speed - pre and post heat input where required.

Unit Mapping Information

Current Code and Title	Previous Code and Title	Comments	Equivalence
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MEM05077 Perform welding inspection	MEM05025 Perform welding/fabrication inspection		Not equivalent
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Assessment Requirements for MEM05077 Perform welding inspection

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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
- review welding requirements for at least two welding projects and determine the scope of welding inspection required
- organise appropriate destructive and non-destructive tests or verify results of previous test procedures
- identify and validate welding procedures by interpreting joint design specification, organising test pieces, sample plates and pipe, interpreting the results and preparing a report identifying any required actions
- ensure quality assurance procedures are carried out, including checking identification (material test certification numbers), and documenting movement of material through workshop or site
- check materials can be traced to their source and a traceability register is being maintained
- carry out final inspection of fabrications, including material forming and dimensional checks against specifications
- maintain and review welding inspection records to ensure compliance on at least two occasions.

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)
- welding terminology and symbols
- non-destructive testing methods associated with welding and their application
- arithmetic operations, formulae and calculations required for testing welding/fabrications
- procedures for:
 - initiating the weld tests and obtaining previous weld tests
 - verifying/amending previously established weld test procedures
 - documenting welding procedures and preparing weld test pieces
 - documenting/recording the movement of material through the workshop and reasons why this is necessary
 - transferring material test certification numbers
 - identifying consumables and reasons for marking consumables for identification purposes
 - using and storing consumables and the consequences of inappropriate use and/or storage of consumables
 - maintaining welding quality records
- reasons for any identified discrepancies between previous and current weld tests
- effects of testing procedures on test results
- parameters and variables affecting the performance of the weld with respect to specifications
- weld discontinuities and relationship to weld quality
- tools, equipment, techniques and procedures necessary to check each variable, form and dimensions of the welded components
- tools, equipment, techniques and procedures to initiate, carry out, obtain and report the prescribed tests results
- discrepancies between the test results and weld specifications and remedial action to be taken to return welds produced to specification
- reasons and methods for correctly marking/identifying weld materials
- person(s) who can witness the transfer of material test certification numbers and reasons why this is important
- storage life of consumables
- welding quality requirements of the relevant code, standard and/or welding procedure.

Assessment Conditions

- Assessors must:
 - have vocational competency in performing welding inspection 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>.