



Australian Government

MEM18113 Perform ultrasonic thickness testing

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Modification History

Release	Comments
1	This unit of competency was first released in MEM Manufacturing and Engineering Release 5.0.

Application

This unit of competency defines the skills and knowledge required to perform ultrasonic thickness testing in a range of metal fabrication and welding trade related industrial applications including fabrications, structures and components across a wide range of industries.

Ultrasonic tests are performed on critical component or structural zones. Actual and potential defects are to be considered, together with ongoing abnormalities.

This unit should not be selected when unit MEM24028 Undertake ultrasonic tests has already been selected.

Where interpretation of technical drawings is required unit MEM09002 Interpret technical drawing should also be selected.

Where the selection and use of engineering measurement is required unit MEM12023 Perform engineering measurements should also be selected.

Where the selection and use of power tools are required unit MEM18002 Use power tools/hand held operations should also be selected.

Band: A

Unit Weight: 2

Licensing/Regulatory Information

Assessment as competent against MEM18113 Perform ultrasonic thickness testing may contribute to certification against Australian Standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in AS ISO 9712 NDT – Qualification and certification or subsequent Standards.

Pre-requisite unit(s)

MEM11011 Undertake manual handling

MEM13015 Work safely and effectively in manufacturing and engineering

MEM16006 Organise and communicate information

MEM18001 Use hand tools

Competency field(s)

Maintenance and diagnostics

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 specifications, job sheets or work instructions
2. Prepare inspection areas for ultrasonic thickness testing	2.1 Clean inspection areas and prepare for testing using appropriate procedures and materials 2.2 Carry out preparation processes in accordance with the relevant procedures 2.3 Assess inspection areas visually for obvious discontinuities
3. Perform tests	3.1 Identify nominated ultrasonic thickness test from SOPs 3.2 Prepare test equipment in accordance with manufacturers' instructions 3.3 Use appropriate calibration blocks to calibrate the gauge for the expected thickness range in the material being tested 3.4 Carry out ultrasonic tests in accordance with relevant standards 3.5 Maintain ultrasonic test equipment and store in accordance with SOPs
4. Report the results of ultrasonic thickness tests	4.1 Identify and confirm thicknesses tests in accordance with organisational standards and/or procedures

	4.2 Report test results including an accurate identification of location and size of discontinuities in accordance with organisational standards and/or procedures
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Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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.	
Ultrasonic test equipment includes one (1) or more of the following:	• contact, delay-line and immersion transducers • corrosion and precision gauges • D meters, a-scan D meter, analog a-scan, digital a-scan.
Discontinuities include one (1) or more of the following:	• thickness measurement of corrosion • delamination of nonferrous or ferrous alloys from composite materials.

Unit Mapping Information

Current Code and Title	Previous Code and Title	Comments	Equivalence
MEM18113 Perform ultrasonic thickness testing	MEM24007 Perform ultrasonic thickness testing	Superseded	Equivalent

Assessment Requirements for MEM18113 Perform ultrasonic thickness testing

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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:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications and standards for performing ultrasonic thickness testing
- preparing the area for testing and identifying discontinuities including observed changes in material homogeneity and defects in accordance with procedures
- carrying out ultrasonic thickness testing using techniques and equipment appropriate for material/s to be tested and interpreting and confirming basic thickness in accordance with procedures
- undertaking numerical operations and calculations associated with performing ultrasonic thickness testing
- reporting test results in accordance with procedures and customer service requirements 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 work practices and procedures and use of personal protective equipment (PPE)
- cleaning and preparation processes, procedures and work health and safety (WHS) requirements in relation to the preparation process for different test surfaces
- basic principles of ultrasonic thickness testing and properties and behaviour of ultrasound
- basic concepts associated with frequency, velocity, wavelength and amplitude

- generation of ultrasound
- types of discontinuities and their consequences
- procedures, tools, equipment, techniques and system verification checks necessary to carry out the ultrasonic thickness test
- advantages and limitations of ultrasonic thickness testing
- basic maintenance and storage procedures for testing equipment
- common basic defects, indications and thicknesses
- ultrasonic thickness testing equipment
- types of analog and digital displays including a-scan display and a b-scan display
- types of couplants and their characteristics
- straight beam testing method including:
 - calibration of thickness testing equipment using calibration blocks
 - setting of frequency
 - probe size and shape
 - thickness testing
- recording and reporting including job records, routine reports and codes and standards
- methods and/or procedures for reporting test results
- variables affecting test results and methods of controlling them
- component variables including size and geometry, distance location from entry surface, orientation to entry surface and reflecting characteristics of back wall
- discontinuities and abnormalities identified through ultrasonic thickness testing:
 - corrosion and its thickness
 - loss of thickness and wear.

Assessment Conditions

- Assessors must:
 - have vocational competency in performing ultrasonic thickness testing at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the current vocational education and training legislation, frameworks and/or standards.
- Where possible, assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.

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>.