



Australian Government

MEM24008 Perform ultrasonic testing

Release: 1

MEM24008 Perform ultrasonic testing

Modification History

Release 1. Supersedes and is equivalent to MEM24008B Perform ultrasonic testing.

Application

This unit of competency defines the skills and knowledge required to operate ultrasonic testing equipment in a range of industrial applications including fabrications, structures and components across a wide range of industries to Level 2 (AS 3669 Non-destructive testing — Qualification and approval of personnel — Aerospace and AS ISO 9712 Non-destructive testing — Qualification and certification of NDT personnel) or equivalent.

Ultrasonic tests are performed on critical component or structural zones. Re-assessment of competency may be required at regular intervals in accordance with Australian Standards or other relevant standards. Actual and potential defects are to be considered, together with ongoing abnormalities.

Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices.

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.

No licensing or legislative requirements apply to this unit at the time of publication. 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 Non-destructive testing — Qualification and certification of NDT personnel.

Band: B

Unit Weight: 6

Pre-requisite Unit

MEM11011 Undertake manual handling

MEM13015 Work safely and effectively in manufacturing and engineering

MEM16006 Organise and communicate information

MEM18001 Use hand tools

MEM24012 Apply metallurgical principles

Competency Field

Non-destructive testing

Unit Sector

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
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
2. Prepare inspection areas for ultrasonic testing	2.1 Identify inspection areas and clean and prepare for testing using appropriate procedures and materials 2.2 Carry out preparation processes in accordance with the relevant procedures and statutory requirements 2.3 Assess inspection areas visually and identify obvious discontinuities
3. Perform tests	3.1 Select the most appropriate ultrasonic test for the material and/or application 3.2 Select testing equipment and prepare in accordance with standards and/or procedures 3.3 Carry out ultrasonic test in accordance with relevant standards and specifications 3.4 Check ultrasonic testing equipment for defects, and maintain and store in accordance with procedures and manufacturer instructions
4. Interpret and report the results of ultrasonic test(s)	4.1 Assess indications, detect defects and classify in accordance with national and international codes and standards 4.2 Confirm defects in accordance with organisational procedures and industry practices 4.3 Report test results including an accurate identification of location and size of discontinuities in accordance with organisational procedures, accepted industry practices and customer service requirements

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.

Defects include one or more of the following:

- corrosion
- metal fatigue
- deformation in nonferrous, ferrous alloys and steels
- composite materials
- fatigue cracks
- stress corrosion cracking
- manufacturing defects
- thickness measurement and fit
- mechanical and bonded repairs
- laminar tearing
- welding defects
- casting defects
- aircraft components.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM24008B Perform ultrasonic testing.

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 MEM24008 Perform ultrasonic 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, relative testing and conformance standards for performing ultrasonic testing
- preparing the area for testing and identifying discontinuities including observed changes in material homogeneity in accordance with procedures
- carrying out ultrasonic testing using techniques and equipment appropriate for material/s to be tested, checking and confirming basic indicators and identifying and classifying defects in accordance with national and international codes and standards on at least two occasions
- undertaking numerical operations and calculations associated with performing ultrasonic 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
- established assessment procedures and techniques
- principles of ultrasonic testing
- variables affecting test selection and test results
- ultrasound including frequency, velocity, wavelength and amplitude
- behaviour of ultrasound at interfaces
- characteristics of ultrasound in materials
- generation and detection of ultrasound
- basic test methods including pulse-echo and transmission methods, resonance methods, a, b, c, and p scan, types of coupling, single, dual and two-probe methods

- characteristics and applications associated with probes
- calibration methods
- variables
- contact and immersion test methods and their application
- flaw detector and flaw size evaluation
- interpretation and evaluation including defect types as related to product and codes and standards
- recording and reporting including job records, routine reports and codes and standards
- written procedures including presentation and use of standards
- types of discontinuities and their consequences
- procedures, tools, equipment, techniques and system verification checks necessary to carry out the ultrasonic test
- advantages and limitations of ultrasonic testing
- maintenance and storage procedures for testing equipment
- types of defects
- methods and/or procedures for reporting test results
- the following defects:
 - corrosion
 - metal fatigue
 - deformation in nonferrous alloys, ferrous alloys and steels
 - composite materials
 - fatigue cracks
 - stress corrosion cracking
 - manufacturing defects
 - thickness measurement and fit
 - mechanical and bonded repairs
 - laminar tearing
 - welding defects
 - casting defects
 - aircraft components.

Assessment Conditions

- Assessors must:
 - have vocational competency in performing ultrasonic testing 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.

- 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.
- 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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