



Australian Government

Department of Education, Employment and Workplace Relations

MEM24008B Perform ultrasonic testing

Release: 1

MEM24008B Perform ultrasonic testing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating ultrasonic testing equipment and applying the testing procedure in a range of industrial applications.
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Application of the Unit

Application of the unit	<p>This unit applies to inspecting, interpreting, classifying and reporting on ultrasonic testing techniques of fabrications, structures and components. Testing is across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent and includes identifying abnormalities. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific ultrasonic testing equipment as specified in maintenance documentation, testing procedures or operator instructions.</p> <p>Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components and structures on a wide range of applications. Ultrasonic tests are performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal safety and OH&S regulations. 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 ISO 9712.</p> <p>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.</p> <p>Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected.</p> <p>Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected.</p> <p>This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit</p>
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	for progression to C5 (AQF level V).
	Band: A
	Unit Weight: 6

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for ultrasonic testing	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform ultrasonic testing	2.1. The most appropriate ultrasonic test for the material/application is selected. 2.2. Testing equipment is selected and prepared in accordance with standards and/or procedures. 2.3. Ultrasonic test is carried out in accordance with relevant standards, specifications and OH&S requirements. 2.4. Ultrasonic testing equipment is checked for defects, and maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
3. Interpret and report the results of ultrasonic tests	3.1. Indications are assessed and defects are detected and classified in accordance with national and international codes and standards. 3.2. Defects are confirmed in accordance with enterprise procedures and industry practices. 3.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- interpreting and following procedures

REQUIRED SKILLS AND KNOWLEDGE

- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques, equipment and procedures
- analysing test results
- reading, interpreting and applying relative testing standards
- reading, interpreting and applying relative conformance standards
- performing calculations relating to ultrasonic testing
- assessing risk
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes for a variety of test surfaces
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- principles of ultrasonic testing
- variables affecting test selection
- variables affecting test results
- ultrasound - frequency, velocity, wavelength, amplitude
- behaviour of ultrasound at interfaces
- characteristics of ultrasound in materials
- generation of ultrasound
- detection of ultrasound
- the flaw detector
- basic test methods:
 - 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
- testing methods and their application
- flaw size evaluation
- interpretation and evaluation:
 - defect types as related to product

REQUIRED SKILLS AND KNOWLEDGE

- codes and standards
- recording and reporting:
 - job records
 - routine reports
 - codes and standards
- written procedures:
 - presentation
 - use of standards
- types of discontinuities and their consequences
- procedures for carrying out ultrasonic tests
- tools, equipment, techniques and system verification checks necessary to carry out the ultrasonic test
- advantages and limitations of ultrasonic testing
- hazards and safety requirements associated with ultrasonic thickness testing
- maintenance and storage procedures for testing equipment
- range of defects
- methods/procedures for reporting test results
- any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to perform ultrasonic testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>
<p>Context of and specific resources for assessment</p>	<p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating ultrasonic testing equipment and the application of the testing procedure in a range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p>Method of assessment</p>	<p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>

EVIDENCE GUIDE

Guidance information for assessment	
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Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Preparation processes

Surface cleaning and drying

Obvious discontinuities

Observed changes in material homogeneity

Defects

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

Reported

Accurate identification of location and size of discontinuities

Unit Sector(s)

Unit sector	
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Co-requisite units

Co-requisite units	
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Co-requisite units		

Competency field

Competency field	Non-destructive testing
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