

MEM24007B**Perform ultrasonic thickness testing**

Unit descriptor	This unit covers performing ultrasonic thickness testing in a range of industrial applications. Knowledge of metallurgy associated with the level of application in this unit is required.
Pre-requisites	
Path 1	MEM18001C Use hand tools
Competency field	Non-destructive testing
Application of the competency	<p>This unit applies to inspecting, interpreting and reporting on ultrasonic testing techniques of fabrications, structures and components. Testing is across a wide range of industries and includes identifying abnormalities such as thickness measurement of corrosion, laminations of non-ferrous/ferrous alloys steels, composite materials. 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 operators 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>
Related units	<p>This unit should not be selected when Unit MEM24008B (Perform ultrasonic testing) has already been selected.</p> <p>Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected.</p> <p>Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected.</p>

Band	A
Unit weight	2
Notes	There are no notes for this unit.
Elements Elements are the essential outcomes of the unit of competency.	Performance criteria Together, performance criteria specify the requirements for competent performance. Text in <i>italics</i> is explained in the range statement following.
1 Prepare inspection areas for ultrasonic thickness testing	<p>1.1 Inspection areas are cleaned and prepared for testing using appropriate procedures and materials.</p> <p>1.2 <i>Preparation processes</i> are carried out in accordance with the relevant procedures and OH&S requirements.</p> <p>1.3 Inspection areas are visually assessed for <i>obvious discontinuities</i>.</p>
2 Perform ultrasonic thickness testing	<p>2.1 Nominated ultrasonic thickness test is identified from standard operating procedures.</p> <p>2.2 Test equipment is prepared in accordance with standard operating procedures.</p> <p>2.3 Ultrasonic tests are carried out in accordance with relevant standards and OH&S requirements.</p> <p>2.4 Ultrasonic test equipment is maintained and stored in accordance with standard operating procedures and OH&S requirements.</p>
3 Report the results of ultrasonic thickness tests	<p>3.1 Basic thicknesses are identified and explained in accordance with enterprise standards and/or procedures.</p> <p>3.2 Basic thicknesses are confirmed in accordance with enterprise standards and/or procedures.</p> <p>3.3 Test results are <i>reported</i> in accordance with enterprise standards and/or procedures.</p>

Range statement

The range statement provides information about the context in which the unit of competency is carried out. The variables and scope cater for different work requirements, work practices and knowledge between States, Territories and the Commonwealth, and between organisations and workplaces. The range statement relates to the unit as a whole and provides a focus for assessment. Text in *italics* in the performance criteria is explained here.

The following variables may be present and may include, but are not limited to, the examples listed under the scope. All work is undertaken to relevant legislative requirements, where applicable.

Variable	Scope
<i>Preparation processes</i>	Surface cleaning and drying
<i>Obvious discontinuities</i>	Observed changes in material homogeneity
<i>Reported</i>	Accurate identification of location and size of discontinuities

Evidence guide

The evidence guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the unit descriptor, performance criteria, range statement and the assessment guidelines for the Metal and Engineering Training Package.

Overview of assessment requirements	A person who demonstrates competency in this unit must be able to perform ultrasonic thickness testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Context of assessment	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.
Interdependent assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing ultrasonic thickness testing in a range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	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.
Consistency of performance	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.
Required skills	Look for evidence that confirms skills in: <ul style="list-style-type: none"> • interpreting and following procedures • identifying inspection areas • identifying discontinuities and defects

- selecting appropriate testing techniques, equipment and procedures
- performing calculations
- 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
- basic principles of ultrasonic thickness testing
- properties and behaviour of ultrasound
- basic concepts associated with frequency, velocity, wavelength, amplitude
- generation of ultrasound
- types of discontinuities and their consequences
- procedures for carrying out ultrasonic thickness tests
- tools, equipment, techniques and system verification checks necessary to carry out the ultrasonic thickness test
- advantages and limitations of ultrasonic thickness testing
- hazards and safety requirements associated with ultrasonic thickness testing
- basic maintenance and storage procedures for testing equipment
- common basic defects
- indications and thicknesses
- methods/procedures for reporting test results
- ultrasonic thickness testing equipment
- types of displays:
 - a-scan display
 - b-scan display
- types of couplants, desirable characteristics
- straight beam testing method:

- calibration of thickness testing equipment
- frequency
- probe size and shape
- thickness testing
- plate testing
 - acceptance standards within the scope of this unit
- recording and reporting:
 - job records
 - routine reports
 - codes and standards
- variables affecting test results
- methods of controlling variables
- component variables:
 - size and geometry
 - distance location from entry surface
 - orientation to entry surface
 - reflecting characteristics of back wall
- 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