

**MEM24006B****Perform eddy current testing**

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| <b>Unit descriptor</b>               | This unit covers performing eddy current testing in a range of industrial applications.  |
| <b>Prerequisites</b>                 |  |
| Path 1                               | MEM18001C Use hand tools<br>MEM24012B Apply metallurgy principles  |
| <b>Competency field</b>              | Non-destructive testing  |
| <b>Application of the competency</b> | <p>This unit applies to inspection, interpretation, classification and reporting of results of eddy current testing on fabrications, structures and components across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific testing eddy current testing tools and equipment as specified in maintenance documentation, testing procedures or operator instructions.</p> <p>Actual and potential defects are considered, together with ongoing abnormalities in fabrications, components, structures and/or aircraft components. Eddy current 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&amp;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> |
| <b>Related units</b>                 | <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>  |
| <b>Band</b>                          | A  |
| <b>Unit weight</b>                   | 6  |

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| <b>Notes</b>  | This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V).   |
| <b>Elements</b><br>Elements are the essential outcomes of the unit of competency. | <b>Performance criteria</b><br>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 eddy current testing                               | <p>1.1 Inspection areas are identified, 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, statutory and OH&amp;S requirements.</p> <p>1.3 Inspection areas are visually assessed and <i>obvious discontinuities</i> are identified.</p>   |
| 2 Perform eddy current testing  | <p>2.1 The most appropriate eddy current test for the material/application is selected.</p> <p>2.2 Test equipment is selected and prepared in accordance with standards and/or procedures.</p> <p>2.3 Eddy current test is carried out in accordance with relevant standards, specifications and OH&amp;S requirements.</p> <p>2.4 Eddy current test equipment is checked for defects, and maintained and stored in accordance with procedures, OH&amp;S requirements and manufacturer instructions.</p> |
| 3 Interpret and report the results of eddy current tests                          | <p>3.1 Indications are assessed and defects are detected and classified in accordance with national and international codes and standards.</p> <p>3.2 <i>Defects</i> are confirmed in accordance with enterprise procedures and industry practices.</p> <p>3.3 Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.</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>Defects</i>                 | Corrosion, metal fatigue, deformation in non-ferrous/ferrous |

alloys steels, fatigue cracks, stress corrosion cracking, heat damage, metal properties sorting, manufacturing defects, coating thickness measurement etc.

## 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.

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

- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques and procedures
- reading, interpreting and applying relative testing standards
- reading, interpreting and applying relative conformance standards
- using calculations relating to eddy current 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
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- types of discontinuities and their consequences
- procedure for carrying out eddy current testing
- tools, equipment, techniques and system verification checks necessary to carry out eddy current testing
- basic principles of electricity, magnetism, electromagnetism and eddy current testing:
  - Reactance - field made by eddy current
  - Biot and Savant law – Definition, Practical (right hand) rules
  - Amperes law – Definition, Applications (toroid, infinite coil, flat coil)
  - Lenz law – Definition, Auto-induction factor, Mutual induction factor, Coupling factor
- induced currents – short circuit coil, metallic mass, skin effect, reactance
- cylindrical bars
- theory of eddy currents
- tubes
- geometric defect characterisation
- multiple defects
- characteristics of eddy current probes
- eddy current equipment:

- transmission
- reception
- data presentation
- equipment controls
- types of equipment:
- physical properties of materials
- electrical conductivity
- magnetic permeability
- applications of eddy current testing
- influence of various parameters on eddy current measurement
- defect position and orientation
- compensation
- structure and geometry of test part
- coupling influence
- relative speed
- limitations of eddy current testing
- hazards and safety precautions associated with eddy current testing
- basic maintenance and storage procedures for testing equipment
- common basic 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