



Australian Government

MEM24006 Perform eddy current testing

Release: 1

MEM24006 Perform eddy current testing

Modification History

Release 1. Supersedes and is equivalent to MEM24006B Perform eddy current testing.

Application

This unit of competency defines the skills and knowledge required to perform eddy current testing including inspection, interpretation, classification and reporting of results on fabrications, structures and components across a wide range of industries and industrial applications 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.

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

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 eddy current testing	2.1 Identify inspection areas, 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 eddy current test for the material and/or application 3.2 Select test equipment and prepare in accordance with standards and/or procedures 3.3 Optimise test set up by calculating effects on probe dimensions, frequency and phase of induced field and material conductivity on eddy current penetration 3.4 Carry out eddy current test in accordance with relevant standards and specifications 3.5 Check eddy current test equipment for defects and maintain and store in accordance with procedures and manufacturer instructions
4. Interpret and report the results of eddy current tests	4.1 Assess indications and 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 in accordance with organisational procedures,

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	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
- fatigue cracks
- stress corrosion cracking
- heat damage
- metal properties sorting
- manufacturing defects
- coating thickness measurement.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM24006B Perform eddy current 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 MEM24006 Perform eddy current 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 eddy current testing
- preparing the area for testing and identifying discontinuities including observed changes in material homogeneity in accordance with procedures
- carrying out eddy current 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 eddy current 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
- established assessment procedures and techniques
- types of discontinuities and their consequences
- procedures, 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-Savart 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 and reactance
- cylindrical bars
- theory of eddy currents
- tubes
- geometric defect characterisation
- multiple defects and defect position and orientation
- characteristics of eddy current probes
- eddy current equipment including transmission, reception and data presentation
- types of equipment and their controls
- physical properties of materials
- electrical conductivity and magnetic permeability
- applications of eddy current testing
- influence of various parameters on eddy current measurement
- compensation
- structure and geometry of test part
- coupling influence and relative speed
- limitations of eddy current testing
- basic maintenance and storage procedures for testing equipment
- methods and/or procedures for reporting test results
- the following defects:
 - corrosion
 - metal fatigue
 - deformation in nonferrous/ferrous alloys steels
 - fatigue cracks
 - stress corrosion cracking
 - heat damage
 - metal properties sorting
 - manufacturing defects
 - coating thickness measurement.

Assessment Conditions

- Assessors must:
 - have vocational competency in performing eddy current 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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