



Australian Government

MEM24020 Apply materials technology principles to non-destructive tests

Release: 1

MEM24020 Apply materials technology principles to non-destructive tests

Modification History

Release 1: New unit.

Application

This unit of competency defines the skills and knowledge required to determine an appropriate strategy for a non-destructive test and interpret the test results, based on the composition, properties and behaviour of manufactured products.

Personnel are required to determine the most appropriate non-destructive test strategy and technique(s) for a particular application based on their capabilities and limitations for detecting specific discontinuities in metals, alloys and/or composites/plastics.

This unit of competency applies to non-destructive testing (NDT) level 2 and 3 technicians and other technicians and metallurgists who interpret NDT test results for processes used in manufacturing, maintenance, mining, oil/gas, and other industry sectors.

Where reading and interpretation of technical drawings is required, unit MEM09229 Read and interpret technical drawings 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 hand tools are required, unit MEM18001 Use hand tools 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 ISO 9712 Non-destructive testing — Qualification and certification of personnel.

Band: B

Unit Weight: 8

Pre-requisite Unit

MEM30007 Select common engineering materials

Competency Field

Non-destructive testing

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Apply general principles of non-destructive testing to materials and products	1.1 Check that specified non-destructive testing method, access and set-up requirements will leave material and product usable after NDT 1.2 Review general principles of calibration and uncertainty of measurement for implications for NDT request 1.3 Identify safety and environmental considerations of test methods 1.4 Comply with work health and safety requirements (WHS)
2. Review the properties of products and materials specified for non-destructive testing	2.1 Identify provided materials and products for consistency with specifications 2.2 Review material physical and mechanical properties and identify properties relevant to specified NDT 2.3 Review the implications of the manufacturing processes and use and operating conditions of provided products for NDT strategy
3. Determine test strategy and techniques for a product	3.1 Apply knowledge of material and product properties to predict the most likely failure modes, discontinuities and defects present and their significance 3.2 Identify an appropriate test strategy from standards, codes and standard operating procedures 3.3 Select appropriate test techniques to provide reliable data to confirm product integrity or detect degradation 3.4 Report findings including the methodology used and the advantages and limitations of the recommended test strategy and techniques.

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.

Materials include one or more of the following:

- ferrous metals, nonferrous metals and alloys
- polymers
- ceramics
- composites
- glasses
- natural materials.

Defects in weldments include one or more of the following:

- cracks
- lack of fusion
- cavities
- imperfect shape
- solid inclusions.

Casting methods include one or more of the following:

- die casting
- sand casting
- investment casting.

Defects in metal and alloy castings include one or more of the following:

- shrinkage cavities
- hot tears
- cold cracks
- gas holes
- segregation
- cold shuts.

Forging/wrought methods include one or more of the following:

- upset forging, die forging, smith forging
- rolling
- extrusion
- annealing.

Defects in forgings/wrought materials include one or more of the following:

- bursts
- laps
- seams
- inclusions
- stringers
- laminations
- burning
- flakes
- cracking.

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Fabrication methods for composites/plastics include one or more of the following:	• open moulding • resin infusion processes • high volume and automated methods.
Defects in composites/plastics include one or more of the following:	• laminations • disbonds • foreign objects • uncured composites • moulding discontinuities.
Principles of mechanical testing include one or more of the following:	• impact • tensile • hardness testing.
In-service discontinuities/defects include one or more of the following:	• corrosion modes and types • erosion modes and types • cracking.
Standards and codes include:	• the latest version of all relevant Australian and international standards and codes applicable to non-destructive testing of the material/product • codes of practice from Australian and overseas engineering and technical associations and societies.
WHS, regulatory requirements and workplace procedures include:	• WHS Acts and regulations • industry codes of practice • risk assessments • safe work practices • workplace documents such as workplace procedures or SOPs • equipment manuals • quality procedures • calibration and maintenance schedules; material safety data sheets (MSDS) safety procedures; and work schedules • workplace recording and reporting procedures • waste minimisation, containment, processing and safe disposal procedures.

Unit Mapping Information

No equivalent unit

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>