



Australian Government

MEM24022 Undertake penetrant tests

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Modification History

Release	Comments
1	This unit of competency was first released in MEM Manufacturing and Engineering Release 5.0.

Application

This unit of competency defines the skills and knowledge required to undertake portable penetrant tests and/or processing on a dedicated penetrant line using visible dye and fluorescent techniques. Personnel are required to select the most appropriate penetrant test techniques and test equipment for a specific material or application; interpret the test data; detect and classify defects using relevant standards; and report the results.

Penetrant tests are performed on critical components or structural zones. Personnel are required to consider actual and potential defects as well as ongoing abnormalities in fabrications, components, and structures and/or aircraft components.

This unit of competency applies to engineering technicians and non-destructive testing (NDT) technicians who are performing penetrant tests as defined in Australian and international codes and standards working in manufacturing, engineering, aerospace and associated industry sectors. These employees work under the general supervision of personnel such as engineering associates, NDT technicians aligned to level 3 in technical standards; professional engineers and scientists; engineering technologists; and production, operations and maintenance managers

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.

Where the application of materials technology principles is required unit MEM24039 Apply materials technology principles to non-destructive tests should also be selected.

Band: B

Unit Weight: 4

Licensing/Regulatory Information

Assessment as competent against MEM24022 Undertake penetrant tests may contribute to certification against Australian NDT standards where assessment of this unit of competency is

carried out in conjunction with an examining authority as described in AS ISO 9712 NDT – Qualification and certification of personnel, or subsequent Standards.

Pre-requisite unit(s)

MEM13015 Work safely and effectively in manufacturing and engineering

MEM16006 Organise and communicate information

Competency field(s)

Non-destructive testing

Unit sector(s)

N/A

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. Establish job requirements	1.1 Comply with relevant WHS and regulatory requirements, codes of practice, standards and standard operating procedures (SOPs) for penetrant testing 1.2 Identify job requirements from specifications, drawings, job sheets or work instructions
2. Prepare for testing	2.1 Liaise with client to explain testing requirements and schedule tests 2.2 Use established safe work practices and personal protective equipment to ensure personal safety and that of others 2.3 Assemble all specified testing equipment, materials and containers and safety equipment 2.4 Identify inspection areas and determine if special access requirements appropriate for the NDT test need to be communicated to the client 2.5 Clean and prepare inspection areas for testing using appropriate test procedures and materials 2.6 Assess inspection areas visually and identify obvious discontinuities.
3. Conduct penetrant tests	3.1 Select the most appropriate penetrant test technique for the material or application

	3.2 Select test equipment and conduct pre-use checks in accordance with relevant standards and/or procedures 3.3 Select and apply appropriate test media in accordance with workplace/industry practices 3.4 Conduct penetrant tests in accordance with relevant standards and work instructions 3.5 Minimise environmental impacts of testing and generation of waste
4. Interpret and report the results of penetrant tests	4.1 Review conduct of the test and confirm test procedures were applied correctly 4.2 Monitor and assess indications and determine the type of discontinuity for each relevant indication 4.3 Apply acceptance criteria to discontinuities to detect defects 4.4 Classify defects in accordance with relevant national and international codes and standards 4.5 Confirm defects in accordance with workplace procedures and industry practices 4.6 Seek advice for problems outside technical competence or knowledge 4.7 Record any site observations that may affect results 4.8 Report test results and complete all job records in accordance with relevant standards and SOPs
5. Maintain a safe work environment	5.1 Restore test site, clean inspection area and equipment and dispose of all waste in accordance with enterprise procedures 5.2 Store and maintain penetrant testing equipment in accordance with standard operating procedures and WHS 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.	
Preparation processes include one (1) or more of the following:	• surface cleaning • drying.
WHS, regulatory requirements and workplace procedures include:	• WHS Acts and regulations • risk assessments • safe work practices • relevant workplace documents • codes, regulations and safe work practices covering the use, handling, storage and transport of dangerous materials such as chemicals, solvents, acids, or noxious waste products.

Unit Mapping Information

Current Code and Title	Previous Code and Title	Comments	Equivalence
MEM24022 Undertake penetrant tests	MEM24002 Perform penetrant testing	Superseded	Equivalent

Assessment Requirements for MEM24022 Undertake penetrant tests

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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. Different specimens means different in character, i.e. in product form, material specification, shape, size, or discontinuity type and be representative of products typically tested in the industrial sector

Evidence required includes:

- preparing the inspection area on at least two specimens for testing and identifying discontinuities including observed changes in material homogeneity in accordance with procedures
- complying with workplace procedures and WHS requirements at all times during penetrant testing
- identifying and interpreting specifications, standards, drawings, charts, lists and other reference material for performing penetrant testing on at least two specimens
- selecting the most appropriate penetrant test technique for the material or application
- undertaking penetrant testing using three or more of the following techniques on at least two specimens:
 - colour contrast water wash
 - colour contrast solvent remover
 - fluorescent water wash
 - fluorescent solvent remover
 - fluorescent post emulsified
 - process penetrant line methods using automated/mechanised timed systems
- applying test media and undertaking penetrant testing using appropriate techniques for the materials in at least two specimens
- checking/confirming indicators and identifying all defects including accurate identification of location and size of discontinuities and defects for at least two specimens

- classifying all defects for at least two specimens in accordance with national and international codes and standards
- performing measurements associated with penetrant testing on at least two specimens
- reporting test results for at least two specimens in accordance with workplace procedures and customer service requirements
- conducting all required testing with minimal environmental impact.

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:

- principles, applications and limitations of penetrant testing techniques
- requirements of any applicable standards, Safe Work Australia guidelines, State/Territory regulatory codes of practice/standards to penetrant testing
- penetrant testing techniques, methods and procedures for the range of situations used in job role
- tools, equipment, instruments
- cleaning and preparation processes and procedures, statutory and WHS requirements relevant to the preparation process
- established procedures and techniques for assessment of test results
- types of discontinuities and their consequences/effect on the material
- range of defects, common faults and damage to test equipment and materials
- implications of test results for the particular material/application
- methods and procedures for recording and reporting test results
- maintenance and storage procedures for test equipment.

Assessment Conditions

- Assessors must:
 - have vocational competency in undertaking penetrant tests at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the current vocational education and training legislation, frameworks and/or standards.
- 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.

Link

Companion volumes, including implementation guides, are found on the national training register - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>.