



Australian Government

MEM24040 Undertake basic 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 basic visible dye testing and/or process penetrant line methods in a range of industrial applications. Personnel are required to follow written or verbal test instructions and use specified test equipment/materials. They are not responsible for either the choice of test method/technique used or the interpretation of results.

Basic 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, critical components, and/or structures.

This unit of competency applies to non-destructive testing (NDT) technicians who are performing basic penetrant tests as defined in Australian and international codes and standards in manufacturing, engineering, and associated industry sectors. The work is performed under the supervision NDT technicians recognised as competent in higher levels of penetrant testing; professional engineers and scientists; engineering technologists; and production, operations and maintenance managers.

This unit should not be selected when Unit MEM24022 Perform penetrant testing has already been selected.

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 industrial chemicals is required Unit MEM13003 Work safely with industrial chemicals and materials 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.

Licensing/Regulatory Information

Assessment as competent against MEM24040 Undertake basic penetrant tests may contribute to certification against the Australian NDT standards where the assessment 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. Determine job requirements	1.1 Comply with relevant WHS and regulatory requirements, codes of practice, standards, and standard operating procedures (SOPS) for basic penetrant testing 1.2 Use appropriate personal protective equipment (PPE) in accordance with SOPs 1.3 Identify job requirements from specifications
2. Prepare for testing	2.1 Assemble all specified testing equipment, materials and containers and safety equipment 2.2 Identify inspection area and determine if special access requirements are required 2.3 Clean and prepare inspection areas for testing using appropriate test procedures and materials 2.4 Assess inspection areas visually to identify obvious discontinuities
3. Conduct basic penetrant tests	3.1 Use the test technique specified in work instructions or standard operating procedures 3.2 Prepare test equipment and materials in accordance with relevant standards and/or operating procedures

	3.3 Select the test media and apply the test in accordance with workplace practices and specifications 3.4 Conduct the penetrant test in accordance with relevant work instructions 3.5 Record any site observations that may affect results
4. Report results of basic penetrant tests	4.1 Review conduct of the test and confirm test procedures were applied correctly 4.2 Monitor indications and determine whether they are true or false 4.3 Determine whether indications are relevant or non-relevant 4.4 Determine type of discontinuity for each relevant indication 4.5 Apply acceptance criteria to discontinuities to determine the presence of common defects 4.6 Seek advice for problems outside technical competence or knowledge 4.7 Record and classify the results of the tests according to written criteria 4.8 Report test results and complete all job records in accordance with relevant standards and/or procedures
5. Maintain a safe work environment	5.1 Use established safe work practices and personal protective equipment to ensure personal safety and that of others 5.2 Minimise environmental impacts of testing and generation of waste 5.3 Restore test site, clean inspection area and equipment and dispose of all waste in accordance with enterprise procedures 5.4 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.

Unit Mapping Information

Current Code and Title	Previous Code and Title	Comments	Equivalence
MEM24040 Undertake basic penetrant tests		This unit has been created to address a skill or task required by industry that is not covered by an existing unit of competency	Newly created

Assessment Requirements for MEM24040 Undertake basic 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 on at least two occasions. Each test occasion should be different in terms of:

- product form
- material specification
- discontinuity type

Each test should include:

- preparing the inspection area for testing and identifying discontinuities
- complying with WHS requirements during basic penetrant testing
- following work instructions and workplace procedures for performing basic penetrant testing and applying relevant standards and specifications
- applying test media and performing penetrant testing using specified techniques for material(s) to be tested
- checking and confirming basic indicators and identifying all defects in accordance with procedures
- reporting test results using standard workplace forms
- conducting testing with minimal environmental impact.

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:

- scope and description of basic penetrant test techniques performed in job role types of discontinuities and their consequences
- definition of a defect and examples of common defects
- general properties of penetrants such as: penetrability, removability, visibility
- classification of penetrants according to viewing characteristics:

- colour
 - contrast
 - fluorescent
- emulsifier and developer types
- use of standard test panels
- established assessment procedures and techniques
- pre-cleaning methods and their areas of use such as: solvents, vapour degrease, etching, detergents, paint removers, mechanical methods
- cleaning and preparation processes, procedures and the potential environment impact of incorrect testing procedures
- procedures for performing penetrant testing including:
 - penetrant application and dwell times
 - penetrant removal
 - developer application
 - dry powder and development time
 - factors affecting indications
 - non-relevant indications
 - post-cleaning methods and their areas of use
- standard recording and reporting formats and procedures for reporting test results, job records, routine reports
- basic maintenance and storage procedures for testing equipment
- relevant hazards, health, safety and environment requirements relevant to job role including WHS regulations, safe work procedures and use of Personal Protective Equipment (PPE).

Assessment Conditions

- Assessors must:
 - have vocational competency in undertaking basic 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>.