



Australian Government

MSL973010 Conduct laboratory-based acceptance tests for construction materials

Release: 1

MSL973010 Conduct laboratory-based acceptance tests for construction materials

Modification History

Release 1. Supersedes and is equivalent to MSL973010A Conduct laboratory-based acceptance tests for construction materials

Application

This unit of competency covers the ability to conduct laboratory tests to confirm the acceptability of raw and/or manufactured construction materials. Personnel will have access to established test methods, workplace procedures and readily available advice. They are expected to obtain reliable test results safely and efficiently. In general, these personnel do not calibrate equipment and make only limited adjustments to the controls. The unit of competency does not cover interpretation or analysis of results or troubleshooting equipment problems.

This unit of competency is applicable to laboratory personnel working in the geotechnical and construction material testing industry sectors who conduct control and compliance tests in consulting laboratories or laboratories at extractive, manufacturing or construction sites using established test methods. These tests could involve aggregates, concrete, soils, road pavement or other specialised construction materials and products.

The unit of competency could also be relevant to laboratory technicians working in the water/wastewater and trade waste industry sectors.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

Nil

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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| 1 | Prepare for | 1.1 | Access relevant job instructions from laboratory |
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laboratory-based acceptance tests		information management system (LIMS)
	1.2	Interpret test request to confirm samples to be tested, the test method and equipment involved
	1.3	Identify hazards and workplace controls associated with the sample, preparation methods, reagents and/or equipment
	1.4	Assemble all required equipment and materials
	1.5	Plan work sequences for optimum efficiency and/or throughput of multiple samples
2	Prepare samples or test pieces	
	2.1	Retrieve samples and/or test pieces from storage and record their general appearance
	2.2	Check the accuracy and completeness of accompanying labels and documentation to ensure traceability
	2.3	Check that the storage/curing conditions of samples and/or test pieces were appropriate
	2.4	Compare samples and/or test pieces with test specifications, record observations and report discrepancies
	2.5	Prepare samples and/or test pieces in accordance with appropriate test method
3	Check test equipment before use	
	3.1	Set up equipment in accordance with test method
	3.2	Perform pre-use and safety checks in accordance with workplace procedures
	3.3	Identify faulty or unsafe equipment and report to appropriate personnel
	3.4	Check calibration status of instruments and report any out-of-calibration items to appropriate personnel
4	Perform laboratory tests	
	4.1	Conduct tests in accordance with test method and workplace procedures

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| | | 4.2 | Record data and observations in accordance with workplace procedures |
| | | 4.3 | Recognise obvious errors or atypical data and take appropriate corrective actions |
| | | 4.4 | Perform calculations as set out in test method |
| | | 4.5 | Compare calculated results with expected values and report atypical results promptly to appropriate personnel |
| | | 4.6 | Complete technical/administrative records and test reports in accordance with workplace procedures |
| | | 4.7 | Seek advice to deal with any situation beyond own technical competence |
| 5 | Maintain a safe work environment | 5.1 | Use safe work procedures and personal protective equipment (PPE) to ensure personal safety and that of others |
| | | 5.2 | Minimise generation of waste and environmental impacts of testing |
| | | 5.3 | Collect and/or dispose of all waste in accordance with environmental/quarantine requirements and workplace procedures |
| | | 5.4 | Care for and store equipment, used test pieces and back-up samples in accordance with workplace procedures |

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.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards covering the requirements for the competence of testing and calibration laboratories, laboratory safety, quality management and environmental management
- national work health and safety (WHS) standards and codes of practice, national measurement regulations and guidelines, and environmental legislation and regulations
- standard methods for sampling and testing construction materials, such as soils, aggregates, concrete and asphalt
- specific codes, guidelines, procedures and methods, such as:
 - AustRoads test methods, State/Territory Road Authority test methods
 - National Association of Testing Authorities (NATA) documents regarding construction materials testing (Field application document)
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS) and safety procedures; material, production and product specifications; production and laboratory schedules; workplace recording and reporting procedures; waste minimisation and safe disposal procedures; and maps and site plans
- sampling and testing procedures for specific sites, clients and samples

Laboratory-based acceptance tests

Laboratory-based acceptance tests include, but are not limited to, one or more of:

- testing of concrete, such as:
 - compressive and tensile tests
 - flexural tests
- testing of soils, such as:
 - laboratory density and moisture content
 - classification (consistency, particle distribution, dispersion and particle density)
 - unconfined compressive strength
 - pH and conductivity
 - colour
- testing of asphalt and bitumen seals, such as:

- density and compacted density
- particle size distribution
- stability/flow
- stripping (core samples)
- testing of aggregates, such as:
 - particle size distribution and grading
 - particle shape
 - particle density, durability and absorption
 - contamination (silt and organics)

Appropriate corrective actions

Appropriate corrective actions include, but are not limited to, one or more of:

- carefully re-reading procedures and checklists
- logically checking equipment set-up
- checking calibration, zero error and drift for the measuring instrument
- repeating test measurements
- checking data entry and transcription for errors
- seeking advice

Samples and test pieces

Samples and test pieces include, but are not limited to, one or more of:

- samples of aggregates, soil, rock, concrete and road pavement
- beams and cylinders for laboratory testing, such as Brazil test
- pats for Marshall stability/flow test

Workplace safety procedures

Workplace safety procedures include, but are not limited to, one or more of:

- recognising and observing hazard warnings and safety signs/barriers
- labelling of samples, reagents and hazardous materials
- use of PPE, such as hard hats, hearing protection, gloves, safety glasses, coveralls, respirators and safety boots
- handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer instructions, and workplace procedures and regulations
- following established safe handling procedures for tasks involving manual handling
- cleaning and decontaminating equipment and work areas

regularly using recommended procedures

WHS and environmental management requirements

WHS and environmental management requirements:

- complying with WHS and environmental management requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be compromised at any time
- applying standard precautions relating to the potentially hazardous nature of samples

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL973010 Conduct laboratory-based acceptance tests for construction materials

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Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- safely preparing at least three (3) different laboratory samples or test pieces and conducting laboratory tests on them to confirm their acceptability
- safely conducting laboratory-based acceptance tests in accordance with workplace procedures and test methods to provide reliable data within the required timeframe
- planning efficient work sequences involving multiple/parallel tasks
- checking, operating, cleaning, maintaining and storing test equipment in accordance with workplace procedures
- recognising obvious errors or atypical data and taking appropriate corrective actions
- estimating and calculating simple scientific quantities, such as density and moisture content
- recording and presenting results accurately and legibly
- maintaining security, integrity and traceability of all samples, test pieces, test data, results and documentation
- keeping accurate and complete technical and administrative records.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- the purpose and principles of construction materials tests performed as part of job role and key preparation/measurement steps in the test methods
- the properties of construction materials under test
- calculation steps to give results in appropriate units and precision
- expected values for sample type and sources of uncertainty (and methods for control) in construction materials tests routinely used in job role
- pre-use checks and operating procedures for test equipment routinely used in job role
- procedures for recording and reporting test results, calculations, test observations, and unexpected or atypical results and equipment problems
- procedures for ensuring traceability of samples, test pieces, test data and results
- workplace confidentiality requirements relevant to job role
- relevant hazards, work health and safety (WHS) and environmental management requirements.

Assessment Conditions

- Judgement of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- 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.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
 - MSL922001 Record and present data
 - MSL943002 Participate in laboratory or field workplace safety
 - MSL953001 Receive and prepare samples for testing
- Holistic assessment methods include:
 - review of test data, results and records generated by the candidate
 - feedback from supervisors and clients regarding the candidate's ability to conduct a range of laboratory-based acceptance tests reliably, safely and efficiently
 - oral/written questions about workplace procedures and test methods relevant to job role.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - sample preparation and test equipment and materials specified in the test method
 - test methods and description of test set-up, data sets and records
 - calculator and/or computer and relevant software or laboratory information system.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
 - relevant VET or other qualification/Statement of Attainment AND/OR
 - relevant workplace experience.
- Currency can be demonstrated through:
 - performing the competency being assessed as part of current employment OR
 - having consulted with a laboratory about performing the competency being assessed within the last twelve months.

Links

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