



Australian Government

MSL975046 Perform complex tests to measure chemical properties of materials

Release: 1

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Modification History

Release	Comments
Release 1	This version was released in <i>MSL Laboratory Operations Training Package Release 2.0</i>. Supersedes and equivalent to MSL975018 Perform complex tests to measure chemical properties of materials. Conditional/optional prerequisite removed – code retained. Changes to elements and performance criteria. Range of conditions removed. Assessment requirements amended.

Application

This unit of competency describes the skills and knowledge to isolate analytes from complex matrices and perform multi-staged and multi-component analyses on them. The unit requires personnel to apply detailed knowledge of analytical chemistry to plan the analysis, prepare and measure samples, analyse and report results and make approved adjustments to procedures as required. Personnel are required to recognise atypical test data and results and troubleshoot common analytical procedure and equipment problems.

This unit applies to technical working in all industry sectors. All operations must comply with relevant standards, appropriate procedures and workplace requirements. Although a supervisor may not always be present, the technician will follow standard operating procedures (SOPs) that clearly describe the scope of permitted practice, including varying workplace/test procedures and communicating results to people outside the laboratory.

No licensing or certification requirements exist at the time of publication. However, regulations and/or external accreditation requirements for laboratory operations exist, so local requirements should be checked. Relevant legislation, industry standards and codes of practice within Australia must also be applied.

Pre-requisite Unit

MSL974019 Perform chemical tests and procedures

Competency Field

Testing

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 | Develop an analysis plan with supervisor | 1.1 | Liaise with client or sample provider to determine test requirements and sample characteristics |
| | | 1.2 | Record sample description, compare with specification, record and report discrepancies |
| | | 1.3 | Confirm suitable sample preparation methods, quantification and analytical techniques with supervisor |
| | | 1.4 | Schedule analysis using workplace procedures |
| | | | |
| 2 | Reduce the complexity of the sample | 2.1 | Obtain a representative analytical portion of the laboratory sample |
| | | 2.2 | Prepare validation checks for analytical portions |
| | | 2.3 | Use workplace procedures to simplify the sample matrix |
| | | 2.4 | Conduct tests to ensure that sample preparation is complete |
| | | | |
| 3 | Apply quantification method | 3.1 | Add modifiers to remove/minimise interferences |
| | | 3.2 | Conduct preliminary analysis to estimate analyte concentration |
| | | 3.3 | Match the concentration of analyte in the sample with the working range of the instrument |
| | | 3.4 | Prepare calibration standards to suit quantification method |
| | | | |
| 4 | Perform analysis | 4.1 | Set up and optimise instruments to suit sample/test requirements |
| | | 4.2 | Measure analyte response for standards, validation checks and samples |
| | | 4.3 | Conduct sufficient measurements to obtain reliable data |

Elements describe the essential outcomes.

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

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|---|------------------------------------|-----|--|
| | | 4.4 | Return instruments to standby or shutdown condition as required |
| 5 | Process and analyse data | 5.1 | Confirm data is the result of valid measurements |
| | | 5.2 | Perform required calculations and ensure results are consistent with estimations and expectations |
| | | 5.3 | Record results with the appropriate accuracy, precision units and uncertainty |
| | | 5.4 | Analyse trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel |
| | | 5.5 | Troubleshoot analytical procedure or equipment problems which have led to atypical data or results |
| 6 | Maintain laboratory records | 6.1 | Make entries on report forms or into a laboratory information management system accurately calculating, recording or transcribing data as required |
| | | 6.2 | Ensure traceability of sample from receipt to reporting of results |

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.

Unit Mapping Information

Equivalent to MSL975018 Perform complex tests to measure chemical properties of materials, Release 1.

Links

Training Package Companion Volumes -

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

Assessment Requirements for MSL975046 Perform complex tests to measure chemical properties of materials

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, and:

- isolated analytes from 3 different complex matrices and performed multi-staged and/or multi-component analysis on each.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- principles and concepts underpinning the analysis:
 - nature of specific sample matrices
 - effects of interferents with analyte behaviour, including ionisation, complexation, precipitation, masking and association
 - quantification methods
 - chemical and physical treatments to minimise interferences
- special needs for sample treatment or pre-treatment
- function of key components of equipment and effects of modifying instrumental variables on outputs and results
- typical sample preparation techniques
- quantification techniques
- analytical techniques
- typical analytes and samples requiring complex tests
- typical tests for completeness of sample preparation:
 - visual inspection for colour and solids

- odour
- pH and conductivity
- chemical tests for interferents, such as precipitation and colour forming
- basic screening instrumental tests, such as infrared, ultraviolet-visible (UV-VIS) and gas chromatography
- modifiers
- sample preparation procedures used for analyses
- basic equipment maintenance procedures
- calculation steps to give results in appropriate units, precision and uncertainty
- awareness of environmental sustainability issues as they relate to the work task
- legal, ethical and work health and safety (WHS) requirements specific to the work task including traceability, confidentiality and security requirements of all client information, and laboratory data and records.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - a standard laboratory
 - specialised analytical instruments, laboratory reagents and equipment, standard operating procedures (SOPs) and test methods.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

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