



Australian Government

MSL974017 Prepare, standardise and use solutions

Release: 1

MSL974017 Prepare, standardise and use solutions

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 MSL974001 Prepare, standardise and use solutions. Foundation skill information added. Range of conditions removed. Assessment requirements amended.

Application

This unit of competency describes the skills and knowledge to prepare, standardise and monitor the quality of solutions.

This unit of competency applies to laboratory technicians working in all industry sectors.

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

Nil

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 | Prepare solutions | 1.1 | Select appropriate procedure for solution preparation |
| | | 1.2 | Select equipment, materials and solvent of specified purity |
| | | 1.3 | Measure appropriate quantities of reagents for solution preparation and record data |

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| | | 1.4 | Select and assemble specified laboratory equipment and appropriate grade of glassware |
| | | 1.5 | Perform specified dilutions |
| | | 1.6 | Prepare solutions to achieve homogeneous mix of the specified concentration |
| | | 1.7 | Label and store solutions to maintain identity and stability |
| 2 | Standardise and use volumetric solutions | 2.1 | Assemble appropriate laboratory equipment |
| | | 2.2 | Perform serial dilutions as required |
| | | 2.3 | Standardise the solution to the required specified range and precision |
| | | 2.4 | Label and store solutions to maintain identity and stability |
| | | 2.5 | Use standard volumetric solutions to determine concentration of unknown solutions |
| 3 | Calculate and record data | 3.1 | Calculate specified concentrations |
| | | 3.2 | Use authorised procedure if data is to be modified |
| | | 3.3 | Estimate and document uncertainty of measurement in accordance with workplace procedures |
| | | 3.4 | Record all relevant details according to laboratory procedures and report results |
| | | 3.5 | Report concentration with appropriate units |
| 4 | Monitor the quality of laboratory solutions | 4.1 | Check solutions for visual deterioration and expiry date |
| | | 4.2 | Record details and label solutions according to laboratory procedures |
| 5 | Maintain a safe | 5.1 | Use established safe work practices and personal |

**work
environment**

protective equipment (PPE) to ensure personal safety and that of other laboratory personnel

- 5.2 Clean up spills using appropriate techniques to protect personnel, work area and environment
- 5.3 Minimise generation of waste and environmental impacts
- 5.4 Ensure the safe collection of laboratory and hazardous waste for subsequent disposal
- 5.5 Store equipment and reagents as required

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

- Numeracy skills to:
 - select and use primary and secondary standards and indicators
 - determine equivalence points using indicators and graphical methods
 - calculate the concentration of the solution with appropriate units and uncertainties given the chemical reaction for the titration
 - recognise control results that are not within acceptable range.

Other foundation skills essential to performance are explicit in the performance criteria of this unit.

Unit Mapping Information

Equivalent to MSL974001 Prepare, standardise and use solutions, Release 1.

Links

MSL Laboratory Operations Companion Volume Implementation Guide is available from VETNet -

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

Assessment Requirements for MSL974017 Prepare, standardise and use solutions

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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:

- prepared and effectively standardised at least 3 different solutions in accordance workplace procedures and/or standard methods
- selected and used primary and secondary standards and indicators
- determined equivalence points using indicators and graphical methods.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- concepts of metrology, including:
 - all measurements are estimates
 - precision, accuracy and significant figures
 - sources of error, uncertainty and repeatability
 - traceability
- scientific terminology for different types of solutions
- the chemistry of acids, bases, buffers and redox reactions
- chemical symbols and atomic mass
- formulae for calculating concentration % w/w, % w/v, % v/v, ppm (mg/L)
- moles and molarity
- what affects solubility
- reactions used for standardisation and desirable characteristics
- function and use of basic laboratory equipment
- grades of glassware, reagents and their use
- established safe work practices:

- use of PPE, such as safety glasses, gloves and coveralls
- correctly labelling reagents and hazardous materials
- handling and storing hazardous material and equipment in accordance with labels, SDS, manufacturer instructions, and workplace procedures and regulations
- regular cleaning and/or decontamination of equipment and work areas
- prompt clean-up of spills in accordance workplace procedures
- 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.

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 equipped with appropriate reagents and equipment to prepare and standardise solutions, such as pH meters; balances; magnetic stirrers, water baths and hot plates; measuring cylinders, beakers, conical flasks, volumetric flasks, pipettes and burettes; filter papers and funnels; and fume cupboards
 - standard methods and workplace procedures
 - containers and storage facilities.

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

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