



Australian Government

MSL974003 Perform chemical tests and procedures

Release: 1

MSL974003 Perform chemical tests and procedures

Modification History

Release 1. Supersedes and is equivalent to MSL974003A Perform chemical tests and procedures

Application

This unit of competency covers the ability to interpret chemical test requirements, prepare samples, conduct pre-use and calibration checks on equipment and perform routine chemical tests/procedures. These tests will involve several measurement steps. The unit includes data processing and interpretation of results and tracking of obvious test malfunctions where the procedure is standardised. However, personnel are not required to analyse data, optimise tests/procedures for specific samples or troubleshoot equipment problems where the solution is not apparent.

This unit of competency is applicable to laboratory or technical assistants and instrument operators in all 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.

1	Interpret and schedule test	1.1	Review test request to identify samples to be tested, test method and equipment and instruments involved
---	------------------------------------	-----	--

- requirements**
- 1.2 Identify hazards and workplace control measures associated with the sample, preparation and test methods, reagents and/or equipment
 - 1.3 Plan work sequences to optimise throughput of multiple samples
- 2 **Receive and prepare samples**
- 2.1 Log samples using standard operating procedures (SOPs)
 - 2.2 Record sample description, compare with specification and note and report discrepancies
 - 2.3 Prepare samples and standards in accordance with chemical testing requirements
 - 2.4 Ensure traceability of samples from receipt to reporting of results
- 3 **Check equipment before use**
- 3.1 Set up equipment and instruments in accordance with test method requirements
 - 3.2 Perform pre-use and safety checks in accordance with relevant workplace and operating procedures
 - 3.3 Identify faulty or unsafe components and equipment and report to appropriate personnel
 - 3.4 Check equipment calibration using specified standards and procedures
 - 3.5 Quarantine out-of-calibration equipment and instruments
 - 3.6 Ensure reagents required for the test are available and meet quality requirements
- 4 **Test samples to determine chemical species or properties**
- 4.1 Operate equipment and instruments in accordance with test method requirements
 - 4.2 Perform tests or procedures on all samples and standards in accordance with specified methods
 - 4.3 Shut down equipment and instruments in accordance with operating procedures

- | | | |
|---|---|--|
| 5 | Process and interpret data | 5.1 Record test data noting atypical observations |
| | | 5.2 Construct calibration graphs and compute results for all samples from these graphs |
| | | 5.3 Ensure calculated values are consistent with expectations |
| | | 5.4 Record and report results in accordance with workplace procedures |
| | | 5.5 Estimate and document uncertainty of measurement in accordance with workplace procedures |
| | | 5.6 Interpret trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel |
| | | 5.7 Determine if obvious procedure or equipment problems have led to atypical data or results |
| | | |
| 6 | Maintain a safe work environment | 6.1 Use established safe work practices and personal protective equipment (PPE) to ensure personal safety and that of other laboratory personnel |
| | | 6.2 Minimise the generation of wastes and environmental impacts |
| | | 6.3 Ensure the safe collection of laboratory and hazardous waste for subsequent disposal |
| | | 6.4 Care for and store equipment and reagents as required |
| | | |
| 7 | Maintain laboratory records | 7.1 Enter approved data into laboratory information management system (LIMS) |
| | | 7.2 Maintain confidentiality and security of workplace information and laboratory data |
| | | 7.3 Maintain equipment and calibration logs 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 and quality management
- national work health and safety (WHS) standards and codes of practice, and national measurement regulations and guidelines
- standard methods for chemical analysis by gravimetric, titrimetric, spectrometric, chromatographic and electrochemical techniques
- specific codes, guidelines, procedures and methods, such as:
 - Association of Analytical Communities International (AOAC International) Official Methods of Analysis, Royal Australian Chemical Institute (RACI) and/or American Association of Cereal Chemists (AACC) methods for inorganic constituents
 - Australian code of good manufacturing practice for medicinal products (GMP), and principles of good laboratory practice (GLP)
- workplace documents, such as 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; and waste minimisation and safe disposal procedures

Sample preparation processes

Sample preparation processes include one or more of:

- grinding

- preparation of discs
- digestion, dissolving, refluxing and mulling
- precipitation, filtration, flocculation, evaporation and centrifugation
- washing, drying, tracting and ashing

Non-instrumental tests or procedures Non-instrumental tests or procedures include one or more of:

- gravimetric analysis
- titrimetric analysis
- filtration, separation and solvent extraction techniques
- corrosion testing, cement content and accelerated weathering

Instrumental tests Instrumental tests include:

- spectrometry, chromatography and electrochemistry

Types of instrumentation and instrumental techniques Types of instrumentation and instrumental techniques include one or more of:

- colorimetric techniques, such as enzyme activity, chlorine in water, specific cations and anions
- infrared and ultraviolet-visible (UV-VIS) spectrophotometry
- other spectrometric techniques, such as fluorimetric analysis, flame atomic emission and flame atomic absorption spectrometry, and fourier transform infrared
- chromatographic techniques, such as column and thin layer analytical and preparative chromatography, gas or liquid chromatography, ion chromatography and gel filtration chromatography
- electrochemical techniques, such as pH, eH, conductivity and ion-selective electrodes
- electrophoretic techniques, such as for DNA patterns and determination of protein purity
- soil testing techniques, such as moisture content, organic matter content, specific anions and cations, auto-analysers for determination of total P, total Kjeldahl N, orthophosphate, nitrite/nitrate and ammonia

Chemical test methods Chemical test methods include one or more of:

- control of starting materials, in-process materials and finished products

- environmental monitoring
- basic troubleshooting and/or problem solving within the scope of SOPs and workplace processes

Safe work practices

Safe work practices include:

- ensuring access to service shut-off points
- recognising and observing hazard warnings and safety signs
- labelling of samples and hazardous materials
- handling and storage for hazardous materials and equipment in accordance with labelling, MSDS and manufacturer instructions
- identifying and reporting operating problems or equipment malfunctions
- cleaning equipment and work areas regularly using workplace procedures
- using PPE, such as hard hats, hearing protection, gloves, safety glasses, coveralls and safety boots
- following established manual handling procedures
- reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/wastewater, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel

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
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health, where relevant

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSL974003A Perform chemical tests and procedures

Links

Companion Volume implementation guides are found in VETNet -
<https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>