



Australian Government

MSL935004 Maintain instruments and equipment

Release: 1

MSL935004 Maintain instruments and equipment

Modification History

Release 1. Supersedes and is equivalent to MSL935004A Maintain instruments and equipment

Application

This unit of competency covers the ability to check the serviceability and calibration of laboratory/field instruments and equipment and perform routine maintenance, such as cleaning and replacement of consumables and minor components. Personnel are also required to perform basic troubleshooting and repairs consistent with warranty and service agreements.

This unit of competency is applicable to technical assistants, instrument operators and technical officers working 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

Quality

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

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

1	Perform serviceability checks	1.1	Perform pre-use and after-use checks in accordance with appropriate workplace and manufacturer procedures
		1.2	Identify faulty or unsafe components and equipment
		1.3	Troubleshoot basic faults or report the need for major maintenance and/or repairs
		1.4	Complete instrument/equipment logbooks to workplace requirements

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| 2 | Conduct routine maintenance safely | 2.1 | Identify maintenance procedures, records and safety requirements |
| | | 2.2 | Plan and adjust maintenance schedules in accordance with operational requirements |
| | | 2.3 | Identify and replace or repair damaged, worn and/or spent components or items |
| | | 2.4 | Clean instruments and equipment using recommended cleaning agents and techniques |
| | | 2.5 | Store instruments and equipment in accordance with workplace and/or manufacturer requirements |
| | | 2.6 | Update maintenance records in accordance with workplace procedures |
| | | 2.7 | Arrange for reordering of consumable stocks and equipment components as necessary |
| | | | |
| 3 | Perform calibration/qualification checks | 3.1 | Operate instruments and equipment in accordance with workplace and/or manufacturer procedures |
| | | 3.2 | Check calibration/qualification using specified standards and/or procedures |
| | | 3.3 | Record all calibration/qualification data accurately and legibly |
| | | 3.4 | Document calibration status and report out-of-calibration equipment/instruments |
| | | 3.5 | Quarantine out-of-calibration items |
| | | | |
| 4 | Arrange instrument servicing where appropriate | 4.1 | Assess instrument repair status and determine if local repair or maintenance is possible and economical |
| | | 4.2 | Arrange for repair or maintenance of equipment from accredited service agent or other appropriate personnel 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, national and international standards, guidelines and codes covering competence of testing and calibration laboratories; laboratory design and construction; quality management; laboratory safety; occupational protective equipment; labelling of workplace substances; storage, handling and transport of dangerous goods; environmental management and physical containment levels and facility types
- national work health and safety (WHS) standards and codes of practice, national measurement regulations and guidelines, and national environment protection measures
- industry specific codes, regulations and guidelines, such as Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice; National Health and Medical Research Council (NHMRC) Guidelines, good laboratory practice (GLP) and Australian code of good manufacturing practice for medicinal products (GMP)
- workplace documents, such as standard operating procedures (SOPs); quality management; equipment manuals and warranties; supplier catalogues and handbooks; 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

Laboratory instruments and equipment

Laboratory instruments and equipment include, but are not limited to, one or more of:

- balances, glassware, plastic ware, glass, plastic and quartz cuvettes, pipettes, burettes and volumetric glassware, and density bottles

- blending, mixing and separating equipment, such as sieves and centrifuges
- autoclaves, dishwashers, refrigerators, freezers, ovens, hotplates, mantles, burners and muffle furnaces, microwave ovens, ultrasonic cleaners, incubators and water baths, and gas cylinders
- fume hoods, biohazard containers and biological safety cabinets
- microtomes and tissue processors, staining machines, cell analysers and cell counters
- colorimeters/spectrometers and polarimeters, light and fluorescence microscopes, refractometers, chromatographic equipment and electrochemical equipment
- thermometers, thermohygrographs, hydrometers, conductivity meters and pH meters and ion-selective electrodes, noise meters, melting point apparatus, viscometers and instrument chart recorders
- steel ruler/tapes and spirit levels, shovels, scoops, plates, rods, cylinder moulds and buckets
- riffers and splitters and mixers, compaction rammers and soil classification equipment, disintegration apparatus, penetrometers and hardness testing equipment
- pressure gauges, torque testers, load cells, strain gauges and tensiometers
- motors, pumps and generators

Basic repairs

Basic repairs include, but are not limited to, one or more of:

- replacement of reagents and consumables, such as fuses; lamps; hoses and belts; and replacement or top-up of oils, lubricants or coolants
- connecting gas supplies
- cleaning and/or replacement of cells, torches and burners
- maintaining syringes/injection equipment
- basic electrical checks involving simple digital multimeters
- changing injection port ferrules, optimising nebulisers and realigning of components
- cleaning and/or changing detectors (for gas liquid and liquid chromatographs)
- installation, conditioning and removal of columns for gas chromatographs (packed and capillary) and liquid chromatographs (columns and guard columns)
- appropriate storage of columns and other equipment not currently in use

Calibration status/qualification checks

Calibration status/qualification checks include, but are not limited to, one or more of:

- matching cells (for dual beam instruments)
- checks for monochromator wavelength and photometric accuracy
- checks for baseline flatness and stray light
- checks on electrode performance
- checking sensitivity
- injection/use of standard mixtures
- comparison with manufacturer specifications/chromatogram
- use of standard masses and solutions
- use of calibrated thermometers and glassware to assess instrument/component performance

Hazards

Hazards include, but are not limited to, one or more of:

- electric shock
- chemicals, such as acids and cleaning agents
- fluids under pressure, such as steam and industrial gases
- sharps, such as broken glassware
- sources of heat, such as burners, ovens and furnaces
- manual handling of heavy equipment
- crushing, entanglement and cuts associated with moving machinery

Safety procedures

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

- ensuring access to service shut-off points
- following appropriate manual handling procedures
- regular cleaning of equipment and work areas
- machinery guards
- signage, barriers and service isolation tags
- lockout and tag-out procedures
- use of personal protective equipment (PPE), such as hearing protection, gloves, safety glasses, coveralls and safety boots
- handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer instructions, and workplace procedures and regulations

WHS and environmental management requirements

WHS and environmental management requirements include:

- 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 MSL935004A Maintain instruments and equipment

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 MSL935004 Maintain instruments and equipment

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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:

- checking the serviceability of at least three (3) laboratory/field instruments or items of equipment and performing routine maintenance, such as cleaning, replacement of consumables and minor components, and correct storage
- conducting calibration status/qualification checks for at least two (2) instruments or equipment
- obtaining instrument/equipment readings with the required accuracy and precision
- following workplace data recording and reporting procedures
- determining whether an item of equipment/instrument is in correct working order
- recognising the need for specialist servicing and/or repairs
- performing basic troubleshooting to locate and rectify basic faults
- performing basic repairs consistent with warranty and service agreements
- following all relevant work health and safety (WHS) requirements.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- role and importance of regular calibration checks and maintenance of instruments and equipment, and maintenance schedules and procedures
- function of key components of the instrument or equipment operating principles, details of the pre-use, calibration and safety checks, and operating procedures for the items used
- sources of uncertainty in instrument or equipment operation and their control
- common sources of faults in the instruments or equipment used and details of their repair
- basic equipment cleaning, maintenance and storage procedures for items of equipment used
- workplace procedures for recording data and reporting results, communicating with service agents and suppliers and ordering stocks
- relevant hazards, WHS and environmental management, and control measures.

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:
 - relevant MSL974000 series units of competency
 - relevant MSL975000 series units of competency
- Holistic assessment methods include:
 - review of maintenance records and instrument/equipment logbooks completed by the candidate
 - observation of the candidate safely performing serviceability and calibration/qualification checks and routine maintenance
 - feedback from peers and supervisors about the ability of the candidate to maintain instruments and equipment
 - oral or written questioning to check required knowledge of workplace procedures for the safe use, calibration/qualification checks, cleaning, maintenance and storage of the instruments or items of equipment used.
- Access is required to all instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - standard laboratory equipped with appropriate instruments and equipment, reference materials, consumables; cleaning, decontamination and/or disinfection agents and equipment; and personal protective equipment (PPE)
 - workplace procedures, calibration and maintenance schedules, equipment manuals, supplier catalogues and information/records management 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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<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>