



Australian Government

MSL905003 Create or modify automated calibration procedures

Release: 1

MSL905003 Create or modify automated calibration procedures

Modification History

Release 1. Supersedes and is equivalent to MSL905003A Create or modify automated calibration procedures

Application

This unit of competency covers the ability to create, edit, test and document computer controlled calibration procedures for test and measurement instruments. This may be in response to the introduction of alternative or new equipment, changing test circumstances, activities involved in research and development trials or to meet client needs. The unit covers performance of automated, including computer-aided, calibrations as well as the programming and control of automated calibration systems.

This unit of competency is applicable to calibration technicians/specialists who carry out tests and/or calibrations in first, second and third-party laboratories, and laboratories where testing and/or calibration forms part of inspection or product certification. They require a substantial, in-depth technical knowledge across a broad spectrum of advanced calibration practices and technologies, including a thorough understanding of equipment specifications and proprietary software writing skills. They are authorised by their laboratory to create or modify calibration procedures. They work with limited guidance and results of their work are checked by the laboratory manager, quality inspector or designated signatory.

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

MSL904001 Perform standard calibrations

MSL905001 Perform non-standard calibrations

MSL905002 Create or modify calibration procedures

Competency Field

Calibration

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 | Assess the suitability of available automated procedures | <div style="padding-left: 20px;">1.1 Determine the technical and quality deficiencies of the current automated calibration procedure</div> <div style="padding-left: 20px;">1.2 Research alternative established procedures, if available</div> <div style="padding-left: 20px;">1.3 Establish whether an available procedure can be customised or if a new procedure is needed</div> <div style="padding-left: 20px;">1.4 Obtain internal approval to develop an automation plan and strategy</div> <div style="padding-left: 20px;">1.5 Identify the resources required for automation and verify they meet necessary quality, laboratory and technical requirements</div> <div style="padding-left: 20px;">1.6 Confirm that the automated procedure will meet the needs of the client, if applicable</div> |
| 2 | Create or edit automated procedure | <div style="padding-left: 20px;">2.1 Identify and document all relevant calibration data to be collected, including parameters and ranges to be tested</div> <div style="padding-left: 20px;">2.2 Check that instructions are adequately documented to ensure repeatability of test</div> <div style="padding-left: 20px;">2.3 Document hazards and safety measures to be observed</div> <div style="padding-left: 20px;">2.4 List the requirements for calibration approval and rejection</div> <div style="padding-left: 20px;">2.5 Specify data to be recorded and produce a results template, if required</div> <div style="padding-left: 20px;">2.6 Edit or compile the procedure using appropriate software</div> <div style="padding-left: 20px;">2.7 Confirm that all calibration requirements can be fulfilled by using the procedure</div> <div style="padding-left: 20px;">2.8 Test run the program, check errors and debug as necessary</div> |

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| 3 | Configure instruments/equipment | 3.1 | Use the appropriate personal protective equipment (PPE), safety equipment and procedures |
| | | 3.2 | Configure workstation, reference standards, instruments and equipment |
| | | 3.3 | Verify performance of reference standards, instruments and equipment prior to use and adjust or calibrate as necessary |
| | | 3.4 | Identify and minimise potential sources of measurement error |
| 4 | Refine the automated procedure | 4.1 | Run automated procedure to confirm functionality of all steps |
| | | 4.2 | Recognise non-conforming results or data and amend the program or troubleshoot procedure/equipment as necessary |
| | | 4.3 | Verify all data are the result of valid measurements and all calculations are correct |
| | | 4.4 | Confirm the integrity of procedure at each step to ensure repeatability of measurement |
| 5 | Verify automated procedure is fit for purpose | 5.1 | Generate a calibration report and compare results achieved with other methods |
| | | 5.2 | Systematically analyse all measurement and environmental factors that may influence results and take corrective action |
| | | 5.3 | Quantify the uncertainties of results by analysing equipment specifications and test methodology |
| | | 5.4 | Arrange for internal peer checking of procedure, data and results and incorporate feedback |
| | | 5.5 | Review feedback from other laboratories to assess acceptance of procedure, if applicable |
| | | 5.6 | Confirm the procedure is fit for purpose and relevant to |

the client's needs and document as required

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| 6 | Document and review automated procedure | 6.1 | Ensure that the procedure is written in accordance with workplace procedures or statutory and regulatory requirements |
| | | 6.2 | Ensure that the procedure has been reviewed in accordance with workplace procedures |
| | | 6.3 | Report and present the procedure to appropriate personnel for validation before use |

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 current version of one or more of:

- Australian and international standards and codes covering:
 - general requirements for the competence of testing and calibration laboratories, laboratory safety, quality and environmental management
 - accuracy of measurement methods and results, expression of uncertainty (GUM), quantifying uncertainty in analytical measurement, quality assurance of measurement equipment
- national work health and safety (WHS) standards, codes of practice
- registration/licensing and/or National Association of Testing Authorities (NATA) accreditation requirements
- safety requirements for equipment, materials or products; material safety data sheets (MSDS); and incident and accident/injury reports
- standard operating procedures (SOPs), recording and reporting procedures
- quality manuals, equipment and operating/technical manuals
- test methods and calibration procedures (validated and authorised)
- test methods and calibration procedures published by international, national or regional standards, reputable technical organisations, scientific texts or journals and equipment manufacturers
- laboratory calibration software and programs, manufacturer's proprietary software
- laboratory layout, work flows and schedules

Editing or creating automated procedures

Editing or creating automated procedures involves, but is not limited to, using, testing and/or calibrating one or more of the following:

- common test equipment, such as anemometers, balances, barometers, callipers, environmental chambers, hygrometers, manometers, masses, micrometers, pressure equipment, spectrophotometers, tape measures, rules, temperature (digital) indicating systems, thermometers, thermocouples, timing devices, vibration analysis equipment and weighing instruments
- electrical reference standards, such as air-lines, analogue meters,

attenuators, bridges-manual balance, capacitors, DC voltage references, digital instruments (calibrators, DMMs, electronic transfer standards), inductors, instrument and ratio transformers, instrument transformer test sets, potentiometers, resistors, radio frequency (RF) power meters, RF thermistor mounts and thermal converters, shunts, time interval and frequency standards, transfer standards AC-DC, voltage dividers, volt ratio boxes and watt-hour references

- working standards, instruments and testing equipment, such as electromagnetic compatibility (EMC) test equipment, field strength meters, flammability test equipment, gauges/test fingers/test pins, hipot testers, impact hammers, impulse testers, instrument calibrators, network analysers, signal generators and spectrum and harmonic analysers

Hazards

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

- electric shock
- disturbance or interruption of services
- manual handling of heavy equipment boxes
- sources of electromagnetic radiation (lasers and RF generators/transmitters)
- fluids under pressure
- heat sources, such as ovens

Safety procedures

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

- ensuring access to service shut-off points
- use of PPE, such as hearing protection, gloves, safety glasses and coveralls
- handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, workplace procedures and regulations
- regular cleaning of equipment and work areas

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

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Links

MSA Training Package Implementation Guides - <http://mskills.org.au/training-packages/info/>