



Australian Government

MSL925001 Analyse data and report results

Release: 1

MSL925001 Analyse data and report results

Modification History

Release 1. Supersedes and is equivalent to MSL925001A Analyse data and report results

Application

This unit of competency covers the ability to perform scientific calculations, analyse trends and uncertainty in data and report results within the required timeframe.

This unit of competency is applicable to technical officers and laboratory technicians 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

MSL924001 Process and interpret data

Competency Field

Data

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 scientific calculations	1.1	Ensure raw data are consistent with expectations and reasonable ranges
		1.2	Calculate scientific quantities involving algebraic, power, exponential and/or logarithmic functions
		1.3	Ensure calculated quantities are consistent with estimations
		1.4	Present results using the appropriate units, uncertainties and number of significant figures

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| 2 | Analyse trends and relationships in data | 2.1 | Determine linear and non-linear relationships between sets of data |
| | | 2.2 | Prepare and analyse control charts to determine if a process is in control |
| | | 2.3 | Identify possible causes for out-of-control condition |
| | | 2.4 | Follow workplace procedures to return process to in-control operation |
| 3 | Determine variation and/or uncertainty in data distributions | 3.1 | Organise raw data into appropriate frequency distributions |
| | | 3.2 | Calculate means, medians, modes, ranges and standard deviations for ungrouped and grouped data |
| | | 3.3 | Interpret frequency distributions to determine the characteristics of the sample or population |
| | | 3.4 | Calculate standard deviations and confidence limits for means and replicates |
| | | 3.5 | Estimate the uncertainty in measurements using statistical analysis |
| | | 3.6 | Determine data acceptability using statistical tests and workplace procedures |
| 4 | Check for aberrant results | 4.1 | Identify results that cannot be reconciled with sample, sample documentation, testing procedures and/or expected outcomes |
| | | 4.2 | Determine appropriate actions in consultation with supervisor as required |
| 5 | Report results | 5.1 | Use charts, tables and graphs to present results in the required format |
| | | 5.2 | Verify that entry of data and results are correct |
| | | 5.3 | Prepare reports and records in a format and style |

consistent with their intended use and workplace guidelines

- 5.4 Communicate results within the specified time and in accordance with workplace confidentiality and security guidelines

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 enterprise requirements include the latest version of one or more of:

- Australian and international standards, guides and the National Association of Testing Authorities (NATA) Technical Notes that cover the application of international system of units (SI), accuracy of measurement methods and results, and quantifying uncertainty in measurement
- national measurement regulations and guidelines
- validated sampling and test procedures and spreadsheets developed in-house for assay and process calculations where applicable
- workplace procedures, manuals and/or plans covering quality assurance, customer service, material safety data sheets (MSDS), equipment, supplier catalogues and handbooks

Data

Data includes:

- worksheets, spreadsheets or databases linked to information management systems
- the results of tests, measurements, analyses or surveys

Records

Records include information associated with one or more of:

- purchase of equipment and materials
- service records
- safety procedures
- history of calibration and test results

Work health and safety (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 MSL925001A Analyse data and report results

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 MSL925001 Analyse data and report results

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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:

- performing laboratory computations involving:
 - evaluation of formulae containing algebraic, logarithmic, exponential and power functions
 - calculation of uncertainties
- calculating scientific quantities, including at least five (5) of the following:
 - percentage and absolute uncertainties in measurements and test results
 - pH, $[H^+]$, $[OH^-]$, buffer calculations, K_a , pK_a , K_b , pK_b and K_w
 - solubility constants K_s and pK_s
 - radioactivity (half life, dose, activity and exposure)
 - optical properties (absorbance/transmittance, path length, extinction coefficient, concentration (Beers law) and detection limits)
 - electrical properties (conductivity, resistivity and dielectric constants)
 - mechanical properties (stress, strain, elastic moduli, yield strength and hardness)
 - thermal properties (heat capacity, thermal expansion, thermal conductivity and thermal resistance)
 - food content (%) of water, ash, dietary and crude fibre, carbohydrate, protein, fat and specific vitamin
 - quantities associated with quality control monitoring, assessment and reporting
- using and interpreting statistical analysis and significance tests including at least five (5) of the following:
 - mean, median, mode, range, variance and standard deviation
 - measures of central tendency and dispersion
 - histograms, frequency plots, stem and leaf plots, boxplots and scatter plots
 - probability and normal probability plots
 - Pareto diagrams, Stewhart control charts and CuSum control charts
 - regression methods for calibration, linearity checks and comparing analytical methods
 - data acceptability tests, such as Q, T and Youden
 - t-test, f-test, analysis of variance (ANOVA)
- using and interpreting graphical analysis including at least three (3) of the following:
 - preparation and interpretation of linear, semi-log and log-log graphs

- determination of linear, logarithmic, exponential and power relationships
- regression lines and interpretation of correlation coefficients
- preparation of frequency distributions for given data
- preparation of complex control charts
- analysing trends and uncertainty in data
- analysing data to determine relationships between variables
- reporting accurate results in the required formats and expected timeframe
- storing, retrieving and manipulating data following document traceability procedures
- maintaining the security and confidentiality of data in accordance with workplace and regulatory requirements

Knowledge Evidence

- Must provide evidence that demonstrates knowledge of:
- scientific and technical terminology, such as variables, dispersion, central tendency, process control, process stability, normal distribution, confidence level and replication
- the characteristics of a valid measurement
- relevance/importance of the national measurement legislation and guidelines to laboratory measurement
- sources and estimates of uncertainty in measurements
- procedures for data traceability
- procedures for verifying data and rectifying mistakes

procedures for maintaining and filing records, and maintaining security of data work health and safety (WHS) and environment requirements.

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:
 - MSL924002 Use laboratory application software

- technical units, such as:
 - relevant MSL974000 series units of competency
 - relevant MSL975000 series units of competency
- Holistic assessment methods include:
 - review of data worksheets, calculations, computer files (such as spreadsheets and databases), statistical analysis, graphs and/or tables prepared by the candidate
 - questions to assess understanding of relevant procedures, trends in data and sources of uncertainty
 - review of reports and records prepared by the candidate
 - feedback from supervisors and peers regarding the candidate's ability to analyse and report data in accordance with workplace procedures.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - data sets and records
 - calculator
 - computer and relevant software, including spreadsheets, databases and statistical packages or laboratory information system
 - relevant workplace procedures.
- 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 competency 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.

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