



Australian Government

MSL925004 Analyse data and report results

Release: 1

MSL925004 Analyse data and report results

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 MSL925001 Analyse data and report results. Foundation skills information added. Range of conditions removed. Assessment requirements amended.

Application

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

This unit of competency applies to technical officers and 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

MSL924003 Process and interpret data

Competency Field

Data

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 | Perform scientific calculations | 1.1 | Ensure raw data are consistent with expectations and reasonable ranges |
| | | 1.2 | Calculate scientific quantities involving algebraic, |

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

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4.2 Determine appropriate actions in consultation with supervisor

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.

- Oral communication skills to interact effectively with others.

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

Unit Mapping Information

Equivalent to MSL925001 Analyse data and report results, 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 MSL925004 Analyse data and report results

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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:

- calculated scientific quantities of laboratory data, including at least five 4 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
- used and interpreted statistical analysis and significance tests of laboratory data including at least 4 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, Shewhart 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)
- used and interpreted graphical analysis of laboratory data including at least 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.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- scientific and technical terminology: 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
- workplace procedures for:
 - data traceability
 - verifying data and rectifying mistakes
 - maintaining and filing records, and maintaining security of data
- 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:
 - 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 NVR/AQTF mandatory competency requirements for assessors.

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