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MSL925002 Analyse measurements and estimate uncertainties

Release: 1

MSL925002 Analyse measurements and estimate uncertainties

Modification History

Release 1. Supersedes and is equivalent to MSL925002A Analyse measurements and estimate uncertainties

Application

This unit of competency covers the ability to use statistical analysis to estimate and report measurement uncertainty in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (or its replacement Standard). Personnel are required to review their estimates of measurement uncertainty to assist with making decisions on the fitness for purpose of the measurements.

This unit of competency is applicable to laboratory personnel who work in calibration and testing facilities, process and interpret data and are required to determine uncertainties using standard methods. The rigour required in estimating uncertainty will depend on the required accuracy of the particular calibration, test or measurement.

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	**Identify the measured quantity and the uncertainty components**	1.1	Specify an equation for the measurement
		1.2	List uncertainty components that are associated with each input in the equation

2	**Determine the size of each uncertainty component**	2.1	Calculate the standard deviations and standard deviation of the mean from the measurement results
		2.2	Use calibration reports, manufacturer's specifications, quality control and validation data, and experimental data to collect other available information on the uncertainty components
3	**Reduce each uncertainty component to a standard uncertainty**	3.1	Allocate an appropriate distribution for each uncertainty component
		3.2	Calculate the standard uncertainties
4	**Calculate an expanded uncertainty to the required confidence level**	4.1	Calculate the sensitivity coefficient for each uncertainty component
		4.2	Calculate a combined standard uncertainty
		4.3	Determine an appropriate coverage factor based on the degrees of freedom associated with each uncertainty component
		4.4	Calculate the expanded uncertainty
5	**Report the expanded uncertainty**	5.1	Report the result and uncertainty to an appropriate number of significant figures
		5.2	Report the confidence level and coverage factor
		5.3	Determine the appropriateness of the size of the expanded uncertainty relative to the tolerance or required accuracy of the test
		5.4	Determine the fitness for purpose of the expanded uncertainty relative to the use of the measurement result

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 and guides, such as:
	• competency requirements for testing and calibration laboratories, quality management and measurement management
	• ISO 5725 Accuracy (trueness and precision) of measurement methods and results
	• ISO/IEC Guide 98-3:2008 Uncertainty of Measurement - Part 3 Guide to the Expression of Uncertainty in Measurement
	• Eurachem/CITAC Guide CG4 Quantifying uncertainty in analytical measurement, Eurolab technical report and Nordtest
	• National Association of Testing Authorities (NATA) accreditation program requirements and NATA technical notes
	• national measurement regulations and guidelines
	• Australian codes, such as of good manufacturing practice for medicinal products (GMP), and principles of good laboratory practice (GLP)
	• workplace documents, such as quality manual, customer quality plan, equipment manuals and warranty, supplier catalogues and handbooks
	• validated sampling and test procedures
Data	Data includes:
	• worksheets, spreadsheets or databases linked to information management systems
	• the results of tests, measurements and analyses
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Records	Records include information associated with one or more of: • purchase of equipment and materials and service records • manufacturer datasheets • calibration reports • history of calibration and test results
Work health and safety (OHS) 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 MSL925002A Analyse measurements and estimate uncertainties

Links

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