



Australian Government

Department of Education, Employment and Workplace Relations

PUADEFTE006A Analyse test data

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

This unit covers the competency required to analyse data collected during a test and evaluation process. It includes establishing trends and relationships in the data, and establishing the acceptability of the data.

Application of the Unit

Application of the Unit

This unit was developed for Defence test and evaluation workers but is applicable to individuals who work in this field.

Typically these individuals must work independently or as part of a team under direct and indirect supervision, use discretion and judgement, and take responsibility for the quality of their output. All activities are carried out in accordance with relevant organisational policy and procedures.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability Skills This unit contains employability skills.

Pre-requisite Unit/s Nil

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency.

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

1. Perform scientific calculations

- 1.1 Consistency of raw ***data*** with expectations and reasonable ranges is ensured
- 1.2 Scientific quantities are ***calculated***
- 1.3 Calculated quantities and estimations are accurately determined.
- 1.4 Results are presented using the appropriate units, uncertainties and number of significant figures

2. Analyse trends and relationships in data

- 2.1 Relationships are determined between sets of data
- 2.2 Data are prepared and ***analysed*** to determine if a process is in control
- 2.3 Possible causes for out-of-control condition are identified
- 2.4 ***Organisational*** procedures are followed to return process to in-control operation

ELEMENT**PERFORMANCE CRITERIA****3. Determine variation and/or uncertainty in data distributions**

- 3.1 Raw data is organised into appropriate frequency distributions
- 3.2 **Statistical properties** are calculated for ungrouped and grouped data
- 3.3 Statistical properties are interpreted to determine characteristics of sample or population
- 3.4 Standard deviations and confidence limits are calculated for means and replicates
- 3.5 Uncertainty in measurements is determined using statistical analysis
- 3.6 Data acceptability is determined using statistical tests and organisational procedures

4. Check for aberrant results

- 4.1 Results that cannot be reconciled with documentation, testing procedures and/or expected outcomes are identified
- 4.2 Appropriate actions are determined in consultation with supervisor as required

5. Maintain results

- 5.1 Data is stored, retrieved and manipulated following document traceability procedures
- 5.2 Results are presented in an appropriate format
- 5.3 Entry of data and results are verified as correct
- 5.4 Security and confidentiality of data is maintained in accordance with workplace and regulatory requirements
- 5.5 Reports are prepared in a format and style consistent with their intended use and organisational guidelines

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required Skills

- complete mathematical calculations such as fractions, decimals, ratios, proportions and percent
- evaluate mathematical formulae
- interpret scientific properties
- prepare and interpret data
- prepare and interpret graphs

Required Knowledge

- characteristics of a valid measurement
- procedures for data traceability
- procedures for maintaining and filing records, security of data
- procedures for verifying data and rectifying mistakes
- relevant scientific terminology
- sources of uncertainty in measurements

Evidence Guide

EVIDENCE GUIDE

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- Nil

Consistency in performance

Competency should be demonstrated over time and should be observed in a range of actual or simulated work contexts.

EVIDENCE GUIDE

Context of and specific resources for assessment

Context of assessment

Competency should be assessed in the workplace or in a simulated workplace environment.

Specific resources for assessment

Access is required to:

- computer and relevant software or laboratory information system
- data sets and records
- relevant workplace procedures.

Guidance information for assessment

In all cases, practical assessment should be supported by questions to assess required knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.

- Assessment methods should reflect workplace demands such as literacy and the needs of particular groups.

Assessment methods suitable for valid and reliable assessment of this unit may include, but are not limited to, a combination of:

- authenticated evidence from the workplace and/or training programs
- case studies
- demonstration
- feedback from supervisors and peers regarding the candidate's ability
- observation
- portfolios
- projects
- questioning
- reviews or reports prepared by the candidate
- scenarios
- simulation or role plays.

Range Statement

RANGE STATEMENT

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

Data may include	Audio Electronic (digital or analogue) recordings/logs Imagery including satellite Linear, semi-log and log-log graphs Observations Physical components Physical evidence Qualitative statements Statistical results
Calculations of scientific quantities may include	Electrical properties: conductivity, resistivity, dielectric constants Mathematical calculations such as: algebraic, logarithmic, exponential, power functions, means, medians, modes, ranges, standard deviations, regression line equations and correlation coefficients Mechanical properties: stress, strain, elastic moduli, yield strength, hardness Optical properties: absorbance/transmittance, path length, extinction coefficient, concentration (Beer's Law), detection limits Percentage and absolute uncertainties in measurements and test results Quantities associated with quality control monitoring, assessment and reporting Thermal properties: heat capacity, thermal expansion, thermal conductivity, thermal resistance
Analysis may include	Graphical analysis including: - determination of linear, logarithmic, exponential and power relationships - regression lines and interpretation of correlation coefficients

RANGE STATEMENT

	Statistical analysis including: • analysis of variance (ANOVA) • data acceptability tests, such as Q, T and Youden • histograms, frequency plots, stem and leaf plots, boxplots, scatter plots • means, medians, modes, ranges and standard deviations • Pareto diagrams, Stewhart control charts, CuSum control charts • probability, normal probability plots • regression methods for calibration, linearity checks, comparing analytical methods
Organisations may include	Defence Defence contractors and sub-contractors Defence Materiel Organisation Defence Science and Technology Organisation International test agencies Universities
Statistical properties may include	• Frequency distributions • Means • Medians • Modes • Ranges • Standard deviations

Unit Sector(s)

Not applicable.

Corequisite Unit/s

Co-requisite Unit/s Nil