



Australian Government

Department of Education, Employment and Workplace Relations

MSATMVER403A Verify inspector's class reference standards

Revision Number: 1

MSATMVER403A Verify inspector's class reference standards

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	<p>This unit of competency covers the ability to calibrate reference standards to the inspector's class level in accordance with standard calibration procedures. These procedures specify all associated reference standards, equipment and methods to be used and the required parameters, quantities and ranges to be tested, including the criteria for validation or rejection. Standard calibration procedures are sometimes complex and lengthy but must be carried out in a methodical and standard manner. Personnel are not permitted to deviate from explicit instructions in any manner, nor modify the procedure, nor substitute alternative equipment.</p>
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Application of the Unit

Application of the unit	<p>This unit of competency is applicable to laboratory and calibration technicians who carry out testing and/or calibrations using standard calibration methods in National Association of Testing Authorities (NATA) accredited laboratories. They work under limited supervision and their results are interpreted and checked by the laboratory supervisor, quality officer or designated signatory.</p> <p>Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Receive and schedule inspector's class reference standards for calibration	1.1. Identify the level of verification required by the client 1.2. Evaluate and implement appropriate strategies where the standard's suitability for purpose does not meet client expectations 1.3. Enter details for the inspector's class reference standard into the organisation's information management system and apply appropriate tracking mechanisms 1.4. Process 'urgent' calibration requests according to the organisation's policy and procedures 1.5. Maintain confidentiality of all client and organisation data and information 1.6. Ensure that information provided to clients is accurate, relevant and authorised for release 1.7. Deal with customers politely, efficiently and in accordance with organisational policy and procedures
2. Prepare for calibration	2.1. Identify and access the appropriate procedure for the calibration in accordance with organisational policy and procedures 2.2. Identify possible sources of measurement error during calibration and implement appropriate control strategies 2.3. Condition inspector's class reference standards and high order reference standards in accordance with calibration and organisational procedures where applicable 2.4. Identify hazards and use the specified personal protective equipment, safety equipment and procedures 2.5. Evaluate the suitability of high order reference standards and measuring equipment selected for the calibration against the organisation's specification requirements and calibration procedure 2.6. Document calibration status, report out-of-calibration test equipment/high order reference standards and quarantine where required
3. Perform calibration	3.1. Assess the design and appearance of an inspector's class reference standard against prescribed standards 3.2. Perform calibration without variance according to the documented procedure to ensure repeatability of

ELEMENT	PERFORMANCE CRITERIA
	<p>measurement</p> <p>3.3. Confirm readings are the result of a valid measurement and record data as required</p> <p>3.4. Adjust inspector's class reference standard if applicable</p>
4. Analyse and report calibration results	<p>4.1. Estimate and document uncertainty of measurement in accordance with organisation's policy and procedures, if required</p> <p>4.2. Identify prescribed performance criteria for the inspector's class reference standard and evaluate against calibration results</p> <p>4.3. Analyse calibration results to confirm they are within the maximum permissible variation and uncertainty for the scope of calibration</p> <p>4.4. Analyse any variances from the performance criteria to identify isolated or systemic problems with the inspector's class reference standards or calibration procedure</p> <p>4.5. Record the results of each test/calibration accurately, unambiguously and objectively</p>
5. Finalise calibration	<p>5.1. Attach calibration labels, equipment stickers, quality control tags and tamper resistant seals as required by the organisation's procedures</p> <p>5.2. Prepare and submit to the laboratory supervisor a final report on the calibration detailing procedure, traceability, results and all other required information</p> <p>5.3. Store test equipment/high order reference standards and calibration records in accordance with organisational policy and procedures</p> <p>5.4. Identify and report unserviceable equipment or high order reference standards to the laboratory supervisor</p> <p>5.5. Clean equipment and high order reference standards in accordance with organisational policy and procedures</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- accessing, interpreting and applying a range of documents for the verification of reference standards including:
 - national measurement legislation
 - National Measurement Institute laboratory operating procedures
 - National Measurement Institute monographs
- accessing and interpreting Certificates of Verification for a range of higher order reference standards
- maintaining very close attention to procedures, accuracy and precision of measurement to ensure integrity of test/calibration results (especially during lengthy tests)
- examining each calibration step critically to ensure repeatability and validity of data
- selecting, setting up, validating, using and maintaining a range of balances and reference standards
- operating test equipment correctly and safely
- applying all relevant procedures and regulatory requirements to ensure the quality and integrity of the services or data provided
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving:
 - fractions, decimals, ratios, proportions and percentages
 - scientific notation, correct units and the correct number of significant figures
 - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
- recognising problems or departures in systems and documentation and initiating actions to prevent or minimise them
- preparing test/calibration documentation that is accurate and complies with requirements
- recognising and reporting opportunities for improvements to procedures
- planning routine tasks
- solving routine/expected problems
- working safely which may include applying basic first aid

Required knowledge

- understanding of the purpose of metrology and calibration, including common terminology, concepts, principles, procedures and applications
- detailed knowledge of specific metrology terms and principles such as uncertainty, maximum permissible variations, traceability and legal requirements for

REQUIRED SKILLS AND KNOWLEDGE

traceability

- NATA's and the National Measurement Institute's role in the measurement and testing system in Australia, measurement standards laboratories
- requirements for the competence of testing and calibration laboratories (for example, AS ISO/IEC 17025) as they affect job role and responsibilities
- national measurement legislation applicable to verification of inspector's class reference standards
- selection and application of appropriate test methods and calibration procedures
- hierarchy and appropriate selection of reference instruments
- detailed knowledge of calibration procedures (equipment, measurement steps, test conditions, environmental impacts, calculations, uncertainty treatment) to give results in appropriate accuracy, precision and units
- use of calibration and correction charts
- methods for statistical analysis (means, ranges, standard deviations) and estimation of uncertainty of measurement (may include the use of software)
- non-conformance/non-compliance procedures and protocols associated with equipment, reference material and calibration procedures
- troubleshooting procedures for equipment and test methods
- handling, transport, storage and operation of reference and working standards
- laboratory environmental control requirements
- organisation's policy and procedures for verifying inspector's class reference standards
- lines of communication, reporting procedures and legislative requirements
- relevant health, safety and environmental requirements safety principles and procedures relevant test environment, basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
<p>The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
Overview of assessment	<p>Competency must be demonstrated in the ability to perform consistently at the required standard for any inspector's class reference standards listed in the Range Statement.</p>
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Assessors should ensure that candidates can:</p> <ul style="list-style-type: none"> • identify, access and apply calibration procedures • identify and use high order reference standards of measurement • evaluate and adjust the impact of the operating environment on the results of the calibration • identify the scope of a calibration and compare results with expected outcomes • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	<p>This unit of competency is to be assessed in the workplace or simulated workplace environment.</p> <p>This unit of competency may be assessed with:</p> <ul style="list-style-type: none"> • MSATMREF301A Use and maintain reference standards. <p>Resources may include:</p> <ul style="list-style-type: none"> • reference standards, balances, weighing instruments and test equipment • computer and relevant software and/or organisation information management system • National Measurement Institute laboratory operating procedures • relevant legislative and organisational procedures.
Method of assessment	<p>The following assessment methods are suggested:</p> <ul style="list-style-type: none"> • questions to assess understanding of relevant metrology/calibration terms, principles and procedures

EVIDENCE GUIDE	
	<ul style="list-style-type: none"> • review of calibration reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify inspector's class reference standards in accordance with legislative and organisational procedures • observation of the candidate calibrating inspector's class reference standards. <p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.</p>
This competency in practice	<p>Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting.</p> <p>A customer delivers a 200 L Inspectors Class 1 Volume measure for calibration. Personnel in the laboratory's item reception area log the job and the laboratory supervisor assigns it to a calibration technician. He/she reads the work order and retrieves the approved calibration procedure. The procedure requires the measure to be tested gravimetrically. The technician accesses and validates the test equipment and high order reference standards. The density of the town water supply is determined using a verified hydrometer. The measure is visually inspected for defects and contamination. The volume of the measure is determined three times by filling the measure with town water to the capacity mark, recording the temperature of the water and recording the mass of water. This data is used, in conjunction with the town water density (determined previously) and thermal appropriate expansion/buoyancy corrections, to calculate the actual volume of the measure. The technician notes that some values are outside the allowable tolerance and adjustments will have to be made. He/she takes another set of readings after making the necessary adjustments and records them on the report. The technician applies the required calibration marks to the measure, updates the database, produces a test report and places the item in the despatch area for inspection by the supervisor. The supervisor</p>

EVIDENCE GUIDE

	visually inspects the item and checks the calibration data on the report. The job has taken four hours to complete.
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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, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Appropriate documentation

Where reference is made to documentation, it is expected the latest version will be used.

Appropriate documentation may include:

- high order reference standard Certificates of Verification
- test methods, calibration procedures and monographs (validated and authorised)
- organisational test reports
- organisational procedures e.g. company quality assurance manual
- National Measurement Institute laboratory operating procedures
- National Measurement Act
- occupational health and safety (OHS) regulations, guidelines and procedures
- equipment manuals and warranty, supplier catalogues and handbooks
- quality manuals, equipment and operating/technical manuals
- enterprise recording and reporting procedures and standard operating procedures (SOPs)

Hazards

Hazards may include:

- electric shock
- disturbance or interruption of services
- manual handling of heavy equipment boxes

Safety procedures

Safety procedures may include:

- use of personal protective equipment, such as hearing protection, gloves, safety glasses and coveralls
- ensuring access to service shut-off points
- regular cleaning of equipment and work areas

RANGE STATEMENT	
Inspectors Class Reference standards	<p>Inspectors Class Reference standards may include:</p> <ul style="list-style-type: none"> • inspector's class of reference standards as defined in the National Measurement Regulations
Operating procedures	<p>Operating procedures may include:</p> <ul style="list-style-type: none"> • manufacturers' specifications • industry guidelines • Australian standards • procedures and guidelines based on national measurement legislation
Legislation	<p>Legislation may include:</p> <ul style="list-style-type: none"> • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
OHS and environmental management requirements	<p>OHS and environmental management requirements refer to:</p> <ul style="list-style-type: none"> • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	<p>Operating environmental impacts may include:</p> <ul style="list-style-type: none"> • vibration • wind • heat • dust • electromagnetic interference • out of level • liquid being measured
Records	<p>Records may include:</p> <ul style="list-style-type: none"> • test reports • safety procedures

RANGE STATEMENT	
	<ul style="list-style-type: none"> a history of equipment calibration and test results
Standard calibrations	<p>Standard calibrations may involve testing and/or calibrating the following equipment and reference materials using standard methods and procedures:</p> <ul style="list-style-type: none"> common types of test equipment such as balances, calipers, masses, micrometers, tape measures, rules, temperature (digital) indicating systems, thermometers, timing devices, weighing instruments and volume measures

Unit Sector(s)

Unit sector	Trade Measurement
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		