



Australian Government

MSMTMVER501 Verify complex measuring instruments

Release: 2

MSMTMVER501 Verify complex measuring instruments

Modification History

Release 2. Adjustments to Application, Performance Criteria and Range of Conditions. Adjustment to Assessment Conditions. Equivalent.

Release 1. Supersedes and is equivalent to MSATMVER501A Verify a complex measuring instrument

Application

This unit of competency covers the ability to apply National Instrument Test Procedures to determine whether complex measuring instruments of a particular class are suitable for trade use and to mark them accordingly. It involves the ability to perform significant calculations to assess instrument performance and conduct tests that may require coordination of a range of resources over extended durations in hazardous environments.

This unit of competency is applicable to verifiers operating under a servicing licence to test and mark a specific class of complex measuring instruments. Complex measuring instruments are used in a wide range of heavy industries. For example, automatic rail weighbridges, belt weighers, totalising hopper weighers, bulk fuel and liquid petroleum gas (LPG) flowmeters are used throughout the mining, road/rail freight and petroleum/gas industry sectors.

Verifications may be performed over extended durations up to five days in non-routine and hazardous environments. Verifiers must work safely which may include applying basic first aid, confined space entry, working with hazardous materials, working safely in hazardous environments, working with heavy machinery, use of appropriate workplace clearance forms, safety induction, working at heights and biosecurity issues.

Under the requirements of Regulation 2.43 of the *National Trade Measurement Regulations 2009*, a servicing licensee or an employee must not verify a measuring instrument relevant to this unit unless they hold a statement of attainment for this unit of competency.

Pre-requisite Unit

Nil

Competency Field

Trade measurement

Unit Sector

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 | Prepare for verification | 1.1 | Identify and evaluate the type of instrument to be verified |
| | | 1.2 | Access and correctly interpret documentation required for the verification |
| | | 1.3 | Identify and access test equipment, products and consumables required for the verification |
| | | 1.4 | Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures |
| | | 1.5 | Store and transport test equipment in accordance with organisational procedures and industry best practice |
| | | 1.6 | Develop a verification strategy to maximise resources and minimise time to complete the instrument verification |
| 2 | Liaise with the trader to schedule complex tests | 2.1 | Discuss testing arrangements with site controller where applicable |
| | | 2.2 | Identify relevant local workplace, health and safety issues and implement appropriate control strategies |
| | | 2.3 | Discuss the verification strategy with the trader to minimise its impact on the trader's normal operations |
| | | 2.4 | Arrange site clearances and suitable scheduling for tests |
| | | 2.5 | Negotiate access to trader's equipment, materials and support personnel required for testing to be available on site |
| | | 2.6 | Arrange for any equipment to be provided by the trader, if required |
| 3 | Initiate verification | 3.1 | Identify the site controller and explain/review the purpose of the verification |
| | | 3.2 | Review verification strategy to ensure there is minimal disruption to the public and/or trader |

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| | | 3.3 | Communicate verification strategy to personnel supporting the verification |
| | | 3.4 | Identify locations for product return or disposal, if applicable |
| | | 3.5 | Evaluate the impacts of the operating environment on the instrument performance or test results and implement corrective actions as necessary |
| | | 3.6 | Identify operational factors impacting on instrument performance or test result and implement corrective actions as necessary |
| 4 | Evaluate complex measuring instrument performance | 4.1 | Identify the maximum permissible errors for the instrument from the legislative requirements |
| | | 4.2 | Manage and review resources to maintain verification timelines |
| | | 4.3 | Provide effective communication to ensure relevant personnel are informed of variations to the verification strategy and verification progress |
| | | 4.4 | Check instrument for compliance with the appropriate Certificates of Approval |
| | | 4.5 | Test the instrument in accordance with relevant National Instrument Test Procedures and appropriate National Measurement Institute (NMI) guidance |
| 5 | Analyse verification results | 5.1 | Perform specified calculations to determine a performance result for the instrument with appropriate accuracy, precision and significant figures |
| | | 5.2 | Use graphical and statistical analysis to determine unknowns as necessary |
| | | 5.3 | Ensure calculations are consistent with estimations and reasonable expectations |
| | | 5.4 | Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements |

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| 6 | Report verification results | 6.1 | Display the verification result on the instrument in accordance with legislative requirements |
| | | 6.2 | Use test reports to present verification results in the required format |
| | | 6.3 | Complete verification documentation in accordance with legislative requirements and organisational procedures |
| | | 6.4 | Communicate results within the specified time and in accordance with organisational guidelines |
| 7 | Model and encourage compliance with statutory requirements | 7.1 | Apply organisation's quality procedures and practices to meet servicing licensee's legislative obligations |
| | | 7.2 | Clarify any issues about verifier obligations with their servicing licensee and/or licensing administering authority as they arise |
| | | 7.3 | Review work and seek feedback from others to confirm continuing compliance with legislative requirements |
| | | 7.4 | Identify implications of non-compliance with legislative requirements |
| | | 7.5 | Identify inadequacies in trader's use of instruments which may contribute to non-compliance with national measurement legislation |
| | | 7.6 | Explain inadequacies and possible remedial actions to trader |
| | | 7.7 | Respect the rights of the trader at all times |
| 8 | Maintain statutory records | 8.1 | Keep accurate and complete records in accordance with servicing licensee's legislative requirements |
| | | 8.2 | Ensure authorisation, training and relevant licences are current in accordance with organisational and servicing licensee's legislative requirements |
| | | 8.3 | Inform the licensing administering authority of changes to personal information as required by statute |

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.

National Instrument Test Procedures include one or more of:

- measuring instrument test procedures
- any other test procedure prescribed by the NMI

Classes of complex measuring instruments include one or more of:

- non-automatic weighing instruments >3 tonne
- LPG dispensers
- bulk LPG flowmetering systems
- bulk flowmetering systems for liquid hydrocarbons other than LPG
- bulk flowmetering systems for liquid products **other than** liquid hydrocarbons
- dispensers and flowmetering systems for gaseous products (excluding utility meters)
- automatic rail weighbridges
- continuous totalising automatic weighing instruments (belt weighers)
- discontinuous totalising hopper weighing instruments
- any other complex measuring instrument prescribed by the NMI

Test equipment includes:

- reference standards of measurement
- equipment, such as weighing instruments, substitution load, rail wagons, trains, control instruments, quantity of material normally weighed, two-way communication, pumping units, LPG cylinders, hydrometer pressure vessel, master meter, hoses, fittings and tankers

Certificates of Approval include:

- any Certificate issued by the Chief Metrologist under Regulation 60 of the *National Measurement Regulations 1999* approving the pattern of a complex weighing

instrument as being suitable for trade use

- Prescribed performance criteria for complex measuring instruments include:**
- that the instrument is of an approved pattern
 - that the instrument operates within the appropriate limits of error permitted by legislation
 - that the instrument is used in accordance with any legislative requirements

Verification Has the same meaning as Section 18GG of the *National Measurement Act 1960*

Verification marks Verification marks for different instruments are defined in Regulations 2.28 and 2.29 of the *National Trade Measurement Regulations 2009*

- Trading practices include one or more of:**
- methods used for the sale of goods
 - using measuring instruments
 - position of measuring instruments
 - environmental factors
 - suitability of instrument
 - incorrect measurement

- Legislation includes:**
- national measurement legislation
 - applicable Commonwealth, state and territory work/occupational health and safety (WHS/OHS) legislation

- NMI guidance includes:**
- NMI sanctioned variances to National Instrument Test Procedures for verification
 - updates
 - directives

- WHS/OHS and environmental management requirements include:**
- complying with WHS/OHS 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 material/product measured
 - applying any necessary hygiene controls

Unit Mapping Information

Release 2. Adjustments to Application, Performance Criteria and Range of Conditions.
Adjustment to Assessment Conditions. Equivalent.

Release 1. Supersedes and is equivalent to MSATMVER501A Verify a complex measuring instrument

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=d1287d36-dff4-4e9f-ad2c-9d6270054027>

Assessment Requirements for MSMTMVER501 Verify complex measuring instruments

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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:

- testing and marking at least one (1) complex measuring instrument
- accessing and correctly interpreting documentation required for verification of a complex measuring instrument
- ensuring test equipment and reference standards are fit for purpose in accordance with applicable legislation and organisational procedures
- planning, scheduling, preparing for and safely conducting a verification to optimise use of resources and minimise disruption to the public and trader
- checking compliance and evaluating the performance of a complex measuring instrument using appropriate Certificates of Approval, National Measurement Institute (NMI) policy and National Instrument Test Procedures, and adjusting for any impact of the operating environment and operational factors
- using specified calculations, graphical and statistical analysis to determine the performance result for a complex measuring instrument
- reliably determining if a complex measuring instrument is suitable for trade use in accordance with legislative requirements
- displaying the verification result on the instrument and completing all verification documentation in accordance with legislative requirements and organisational procedures
- identifying and communicating any inadequacies in servicing licensee's organisational procedures and practices that may contribute to non-compliance with legislative requirements
- maintaining the accuracy, completeness and currency of statutory records required of servicing licensees, such as authorisation, training and relevant licences
- identifying and communicating any inadequacies in trader's use of complex instruments which may contribute to non-compliance with national measurement legislation
- demonstrating professionalism and respecting the rights of the trader at all times
- using advanced communication and negotiation skills to:
 - explain verification procedures and verification outcomes to traders and managers
 - arrange site clearances, gain cooperation of site controllers and schedule complex tests
 - access external equipment and resources to complete the inspection

- organise large equipment to be dispatched ahead of a verification visit, when necessary
- using numerical skills to perform specified calculations involving:
 - fractions, decimals, ratios, proportions and percentages
 - evaluation of formulae containing powers, exponents and logarithms functions
 - use of scientific notation, correct units and correct number of significant figures
 - determination of regression line equations and correlation coefficients
 - preparation and interpretation of complex control charts and frequency distribution plots
- maintaining the security and confidentiality of data in accordance with organisational and regulatory requirements
- reporting results in the required formats and expected timeframe
- working safely.

Knowledge Evidence

- Must provide evidence that demonstrates knowledge of:
- general science principles and concepts, including:
 - physical states (solid, liquid and gas), weight, mass, gravity and density
 - pressure, pressure differential, backpressure and head pressure, fluid flow and viscosity
 - temperature effects and coefficients of expansion, flashpoint, boiling point and ice point
- metrological terms and terminology specific to instrument, such as maximum permissible errors, maximum permissible difference and maximum permissible variation, traceability, repeatability, uncertainty, error of measurement and error of indication, meter creep, hose dilation, temperature correction, linearization and gas elimination
- details of the design and applications for one (1) class of complex measuring instruments, the major instrument components and their function
- servicing licensee requirements, including:
 - quality management system
 - licence conditions
 - maintenance of statutory records
- national measurement legislation applicable to complex measuring instruments
- safe work method statements (SWMS) for trading environments relevant to job role
- NMI policy, National Instrument Test Procedures and operating procedures for equipment, and reference standards used in job role, including:
 - test conditions and possible environmental impacts on performance of the instrument
 - key preparation/measurement steps in test method
 - calculation steps to give results in appropriate units and precision
 - maximum permissible errors for instrument under test
 - safety principles and procedures relevant to instrument

- organisational policy and procedures for verifying a complex measuring instrument, including completion of test results, verification documents and statutory records
- organisational safety procedures and requirements of applicable Commonwealth, state and territory work/occupational health and safety (WHS/OHS) legislation
- basic first aid and site safety induction, if required.

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 should 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:
 - *MSMTMREF301 Use and maintain reference standards*
- Holistic assessment methods include:
 - review of test results, verification documentation and verifier statutory records completed by the candidate
 - feedback from supervisors and peers regarding the candidate's ability to verify the performance of a complex measuring instrument in accordance with legislative and organisational procedures
 - questions to assess understanding of relevant verification procedures, servicing licensee requirements, trader obligations and remedial actions
 - review of candidate's responses to verification scenarios, such as potential/actual non-compliances of traders and verifiers, appropriate actions, common issues and problems
 - observation of the candidate verifying a complex measuring instrument.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - latest versions of appropriate documentation, such as Certificates of Verification and Approval, NMI policy, intermediate National Instrument Test Procedures for verifying complex measuring instruments and relevant legislation
 - equipment manuals, safety data sheets (SDS), safety procedures and safety equipment
 - records, such as test reports; audit reports; instrument history and test results; and correction tables for volume, density and pressure for a range of liquids

- complex measuring instrument, test equipment and reference standards
- computer and relevant software and/or organisation information management system.
- 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 in trade measurement at least to the level being assessed and broad industry knowledge (such as a relevant industry qualification).
- Currency can be demonstrated through:
 - performing the competency being assessed as part of current employment in trade measurement OR
 - having consulted with trade measurement inspectors and/or verifiers performing the competency being assessed within the last twelve months.

Links

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