



Verifier's recognition kit – subclasses 10.1, 10.2 and 18.1

MSMSS00008 Trade Measurement Verification (Complex Measuring Instrument) -
Subclass 10.1 and 10.2

MSMTMVER302 Verify simple measuring instruments - Subclass 18.1

Version 2.0 – July 2021

Complete this kit by typing directly into the document.

| | |
|---|--|
| Applicant's name: | |
| Subclasses requested for assessment: | |
| Observation assessment method requested (select one) | <p>Video calling (VC) – not generally available for 10.1 or 10.2)</p> <p>Pre-recorded video/s - (not generally available for 10.1 or 10.2)</p> <p>In-person observation (applicant's choice of site)</p> |

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Version changes

| Version number | Main changes |
|----------------|--|
| V2.0 | <ul style="list-style-type: none">• First version of fillable form.• Assessment also includes mandatory observation• Added pre-completion checklist to establish readiness (inc. LLN)• Re-wording of some questions/instructions, including to aid clarity. Some questions removed and new questions added.• Test report questions removed for 18.1.• Verification form task changed to require completion using the electronic version of the form.• Supervisor/mentor report now called third party report with comments required for each checkpoint.• Kit to be completed electronically. |

Your recognition kit

This kit allows you to demonstrate your competence as a verifier of measuring instruments used for trade against the performance criteria and assessment requirements set out in the nationally recognised units of competency for the skill set:

MSMSS00008 - Trade Measurement Verification (Complex Measuring Instrument) – for subclasses 10.1 and 10.2

- [MSMTMREF301 – Use and maintain reference standards.](#)
- [MSMTMVER501 – Verify complex measuring instruments.](#)

and, if including subclass 18.1 (consoles), for the additional unit of competency:

- [MSMTMVER302 Verify simple measuring instruments.](#)

On successful completion of assessment, you will receive the appropriate statement/s of attainment.

Read these instructions carefully in combination with the [Recognition kit instructions](#) and [Instructions for observation assessments](#) documents. In addition, carefully read the instructions included at the start of each section.

Before you complete and submit your recognition kit, you should:

- read through the whole kit to understand what is required of you
- spend time in the field with an experienced verifier learning about the topics in the following checklist
- complete the checklist below, to self-assess your skills and knowledge.

Please contact the NMI administrator if you have difficulties in understanding the requirements for compiling/submitting your kit

Email: NMIadministrator@measurement.gov.au

Tel: 02 8467 3789

I have adequate skills and knowledge in the following to be able to complete this kit, and perform these tasks in the workplace, without direct assistance:

Yes No Not sure

Spoken English communication

Mathematics

English reading skills

Computer skills

The instruments I intend to verify

The techniques used in testing instruments, including planning and

Storing, maintaining and handling reference standards/test equipment

Likely impacts of the environment on the function of instruments and/or the standards/test equipment used to verify them.

Work health and safety considerations relevant to testing instruments

My organisation's and NMI requirements for recording and reporting details of verifications and other licensing matters

Any adjustments or corrections that may be needed during the verification

Marking instruments for verification (what to mark and where to place the mark)

If you have checked 'no' or 'unsure' to any of the items in the table above, and are unsure what you need to do to be in a position to answer 'yes', please speak to your supervisor.

Check the LLN section of the [Participant's handbook](#) if you need to develop your mathematics or English skills (speaking or reading) before you attempt this assessment.

In addition, you should have personally tested instruments, ideally under supervision, using the relevant national instrument test procedures to develop your skills - either in the workplace or in a simulated workplace environment.

Assessment instructions

Completion of the kit

You should complete this kit by typing directly into the document or clicking on checkboxes, where appropriate. If you have any problems with the functionality of the fillable kit, please email the kit to the NMI Administrator, detailing the issues that you are having, specifying which page/question etc.

Submit the whole document along with any additional scanned reports, documents and video/s.

DO NOT, print it out and scan it.

The kit comprises a number of components you must complete/submit, relevant to the subclass/es and/or test method) for which you are being assessed, including the following:

- **Your work history**
- **Written assessments** – including test report questions for subclasses 10.1 and 10.2. Complete only the parts relevant to the subclass/es you wish to verify and test method/s you intend to use.
- **A specific question** that asks you to complete one or more [verification forms](#) (Form 6) using the information provided.
- [Test reports](#) and, if you are being assessed for consoles (subclass 18.1), any **documents** printed from instruments you have tested.
- **Third party report/s** - a report/s from the verifier/s who worked with you during your training, or a work colleague (Where you have no access to a verifier).

In addition, you will be asked to demonstrate your skills by completing one or more simulated verifications, observed by your assessor or an NMI-appointed skills observer.

MAKE SURE YOU COMPLETE ALL PARTS OF THE RECOGNITION KIT APPROPRIATE TO THE INSTRUMENT SUBCLASSES YOU WISH TO VERIFY

Skills assessment requirements

In your workplace

This assessment requires that you **demonstrate your practical skills, by completing one or more simulated** initial verifications on instruments, in a real or simulated environment. During training within your organisation, you should have practised these skills, ideally under supervision of an experienced verifier/s, including completing the appropriate test reports that you will submit as evidence (workplace documents).

The experienced verifier/s that observe you should complete a third party report and sign the test reports you will submit.

Wherever possible, include examples from instruments that did not meet the requirements for verification, to show your understanding of unacceptable instrument performance.

For subclasses 10.1 and 10.2

You must provide copies of test reports relating to instruments you have tested (ideally) under supervision. You should have personally completed all the processes required as if you were completing **initial** verification of the instruments, without assistance. You will need to provide **at least one (1)** report.

Where you are being assessed for more than one subclass, a report should be included for each subclass included in this assessment.

If you also wish to be assessed for more than one **test method**, you should have tested an instrument using each test method, and submit a report from each of those tests.

You will complete additional report/s during your skills observation which will be submitted immediately following observation.

For consoles (subclass 18.1)

You must provide copies of **test reports** relating to consoles you have tested (ideally) under supervision. You should have personally completed all the processes required as if you were completing **initial** verification of those instruments, without assistance. You will need to provide **three (3) test reports in total**, including the report you complete during your skills observation/video which will be submitted immediately following observation. **In addition**, you must provide the **dockets printed during testing**.

See the [Workplace test reports](#) section for more information.

NMI observation

Your assessor will need to confirm you have the necessary practical and communication skills required when verifying measuring instruments and consoles. This includes you demonstrating knowledge of, and implementing, safe work practices. Depending on the circumstances, this will be completed by one of the following methods:

- In-person observation (your choice and arrangement of site) - The assessor, or an NMI-appointed skills observer, will observe you completing all the processes required for verification of an instrument either at your work place or another suitable location (e.g. a trader's site).
- ***Video calling** - The assessor will use video calling to complete a direct observation of you, either at your work place or another suitable location (trader's site).
- ***Pre-recorded video/s** - You will provide a video, or series of videos, showing you completing all the stages required for verification of an instrument, in a real or simulated situation.

***Video calling (VC) and pre-recorded video (PRV) options are not generally available when testing instruments used for measuring LPG.** This is because VC/PRV equipment poses a safety hazard due to its potential to trigger an explosion and also the risk for the camera operator not being aware of other hazards, such as traffic.

For consoles, these methods can be used **BUT ONLY to record test operations completed in a kiosk**. There should be no use of video equipment in the vicinity of LPG dispensers/flowmeters.

Be sure to mark your preferred observation method option on the [front](#) of this kit and on the [Recognition kit checklist](#).

- If you choose to complete the observation using video calling, your assessor will contact you to schedule a suitable time and date.
- If you have chosen to provide a video/s, and you are unable to email the video file/s, the NMI Administrator will provide a link where you can upload your video/s, after we have received your kit.
- For in-person observation at your workplace, or other suitable location of your choice, you will liaise with the assessor or skills observer.

IMPORTANT – Please see separate [Instructions for observation assessment](#)

Third party reports

You should supply a report from a person (or persons) who has worked directly with you and who can comment on your workplace performance over time. Ideally, this person is a verifier who has worked directly with you during your training, AND who holds a statement/s of attainment relevant to this skill set/unit of competency and instrument subclass/es. If you don't have access to a verifier during your training, but have a workplace supervisor or colleague who works with you, ask them to provide a report. **Note, you may be asked to complete additional observations if you cannot provide a third party report from a verifier.**

Ask the person/s completing the report/s to read the instructions for completing their report **before** you undertake this kit. **If more than one person can provide evidence to support your assessment, have each of them complete a separate report for submission.**

- An existing verifier should complete the [Third party report \(experienced verifier\) only](#).
- Any other work colleague, who isn't a verifier, should complete the [Third party report \(non-verifier\)](#).

If you have access to an existing verifier, ensure they observe you testing the instruments for which you will provide [workplace test reports](#) for this kit. **They should sign each report you provide**, to confirm that you have correctly followed the relevant, current, national instrument test procedures for **initial verification**.

If you don't have access to anyone in your workplace who can provide either of the above third party reports, please contact the NMI administrator.

IMPORTANT - Submission of the kit and enrolment

Once you have completed all relevant components, complete the separate [Recognition kit checklist](#) and the checklist on the [Applicant's details form](#) to confirm that you are submitting **all** the components required for this assessment.

Save this document on your computer, and name the file by adding your name to the file name e.g. If your name is Joe Smith, the file name for your completed kit will be:

RK 10.1, 10.2 & 18.1 F V2.0 Joe Smith.

Scan each of the additional documents you have completed, and save them by the name of document and the kit, e.g. save the test reports you are submitting as:

RK 10.1, 10.2 & 18.1 F V2.0 Test report 1 Joe Smith

If submitting videos, name them **RK 10.1, 10.2 & 18.1 F V2.0 Video <instrument subclass> Joe Smith**

Include a number for each video so your assessor can watch them in order, e.g. Video 18.1 (1); Video 18.1 (2) etc.

Email the kit and the other documents to nmiadministrator@measurement.gov.au and keep your original kit and documents. Your assessor will ask questions about your kit when they speak to you, so you need to have it available.

The NMI Administrator will advise you how to submit any video/s if you are unable to email them.

Once we have received all parts of your assessment, the NMI Administrator will contact you regarding enrolment.

Assessment

Your assessor uses a number of forms to record the results of each part of your assessment. The forms are included at the end of this kit for your information.

Following enrolment, you will be assigned an assessor and an NMI-appointed skills observer (SO) for your observation (where applicable).

If a SO completes your observation, they will contact you to make arrangements. Following observation, they will provide their report to your assessor.

Once your assessor receives your submitted material, and any observation report, they will:

- assess the submitted material
- determine if any further evidence is required
- discuss your workplace skills with the person/s providing any third party report (if necessary)
- contact you to confirm arrangements for any skills observation (if they are completing the observation)
- contact you to arrange a mutually convenient time to call you, if required, to:
 - confirm your understanding
 - discuss the reports/documents/videos you submitted
 - ask any other questions to confirm your competence.
- record your results and provide feedback on the assessment recording form
- return the kit to our administrator for processing and confirmation of the result of your assessment, by email, and posting out your statement of attainment, when successful.

Applicant's details

Name: First Middle Family

Email address:

Telephone: Work Mobile

Name of any third party providing a report:

Third party's telephone number:

Third party's email address:

Company name:

Check the licence subclass/es and test methods you are being assessed for - relating to the skill set MSMSS00008 - Trade Measurement Verification (Complex Measuring Instrument):

10.1 - Fuel dispensers used for LPG tested using a master meter

10.2 - Bulk LPG flowmetering systems tested using a master meter

10.1 - Fuel dispensers used for LPG tested using a mass flowmeter

10.2 - Bulk LPG flowmetering systems tested gravimetrically

10.1 – Fuel dispensers used for LPG tested gravimetrically

Check if you also wish to be assessed for the unit of competency MSMTMVER302 Verify simple measuring instruments for the licence subclass 18.1 (consoles)

Checklist to ensure you have included all required components of this kit. Check all that apply:

Applicant's work history

Third party report/s

Written assessment (all subclasses)

Written assessment (18.1)

Written assessment (10.1 - all test methods)

Written assessment (10.2 - all test methods)

Written assessment (10.1 - test specific methods)

Written assessment (10.2 test specific methods)

Master meter method

Master meter method

Mass flowmeter method

Gravimetric method

Gravimetric method

Completed test report questions for:

10.1 Fuel dispensers used for LPG:

Master meter method

10.2 Bulk LPG flowmeters:

Master meter method

Mass flowmeter method

Gravimetric method

Gravimetric method

Applicant's details

Completed verification form/s:

- 10.1 - Fuel dispensers used for LPG
- 10.2 - Bulk LPG flowmeter
- 18.1 – Console

Test reports from tests you have completed in the workplace. (Check all relevant to the subclasses/test methods you wish to be assessed for):

10.1 Fuel dispensers used for LPG

- Master meter method
- Mass flowmeter method
- Gravimetric method

10.2 Bulk LPG flowmeters

- Master meter method
- Gravimetric method

18.1 Consoles

Applicant declaration: I verify that I personally completed all the work and activities related to, and submitted as part of, this kit.

(Complete the declaration once you are ready to submit the kit)

Name:

Date submitted:

Complete your work history on the next page

Applicant's work history and training

Details of current employment

Organisation:

Postal address:

Date employment started:

Date training related to these subclasses started:

Title of your current position:

Details of previous relevant employment

Organisation:

Postal address:

Period of employment:

From:

To:

Title of your previous position:

Relevant work experience

Specify the length of time you have been testing each subclass of instrument, the type of instruments you have worked with, and the **approximate number** of instruments you have tested (including under supervision and in simulated workplace situations).

Detail any relevant training courses you have attended (name and date) and attach copies of any relevant trade qualifications:

Assessment recording form (assessor)

Applicant:

Assessor name:

Date kit received:

Summary of evidence used to assess the applicant:

Written assessments

Completed [verification form task/s](#)

Review of test reports/transaction records

Skills observation/report/review of video/s

Third party report/s

Conversation with applicant

Other – specify:

To obtain the skill set MSMSS00008 - Trade Measurement Verification (Complex Measuring Instrument), - (subclass 10.1/10.2) - applicants must demonstrate competence in both units of competency.

This applicant was assessed as:

Competent

Not yet competent

MSMTMVER501 Verify complex measuring instruments.

MSMTMREF301 Use and maintain reference standards

To obtain the separate unit of competency - MSMTMVER302 Verify simple measuring instruments – (subclass 18.1) applicants must demonstrate competence in the unit of competency.

This applicant was assessed as:

Competent

Not yet competent

MSMTMVER302 Verify simple measuring instruments

Check whether they are satisfactory/not yet satisfactory for each subclass/test method requested

Satisfactory

Not yet satisfactory

10.1 Fuel dispensers used for LPG – master meter method

10.1 Fuel dispensers used for LPG – mass flowmeter method

10.1 Fuel dispensers used for LPG – gravimetric method

10.2 Bulk LPG flowmetering systems – master meter method

10.2 Bulk LPG flowmetering systems – gravimetric method

18.1 Control systems for liquid-measuring instruments

Applicant's ID checked at interview:

Assessor's name:

Date:

RTO Manager's signature:

Date:

Assessor's feedback form

Assessor: Please include feedback to the applicant here. Particularly where you have assessed the applicant as NYC, ensure you identify which assessment requirements the applicant has not yet demonstrated (e.g. Performance criteria (PC) 2.4 of the unit of competency (UoC) MSMTMREF301 – Use and maintain reference standards was not met as you were unable to correctly validate the reference standard suitability).

Assessor's name:

Date:

Instructions for all written assessments

You must complete the 'all subclasses questions'

In addition, complete all questions relating to the specific subclasses you wish to verify.

For multiple choice questions, check the correct answer, or answers. If you make a mistake, you can simply uncheck the box/es and check the new correct box/es.

For free text questions, type in the text box provided below each question. Include any calculations you use. The text box shouldn't limit how much you can write, but the size of the box indicates the expected maximum length of your answer.

If you have any problems writing your calculations in the text box, write them on a separate page/document, clearly indicating the question they relate to (e.g. All subclasses Q29), then scan or photograph them and email along with your kit.

Name the added document **RK 6.5, 6.6, 6.9 & 18.2 F V3.0 Calculations Joe Smith**

Written assessment 'all subclasses'

If you are completing more than one recognition kit at the same time, you only need to answer these 'all subclasses' questions once.

1. In your own words, describe:

a) what a hazard is.

Correct

Incorrect

b) what a risk is.

Correct

Incorrect

2. List **four** basic duties you have under the safety legislation in your state or territory, as an employee or worker.

Satisfactory

Incomplete

Incorrect

3. List the main workplace health and safety **hazards** that you face when verifying measuring instruments or measures. Your answer should relate to the environments and method/s of verification for instruments/measures for which you are currently being assessed. Write your answer below. **Include at least 5 common hazards (add another 5 per additional kit you are completing at the same time).** In addition, identify the main controls you apply to ensure your safety, and list any specific workplace procedure that applies to the hazard.

| Hazards | Controls | Workplace procedures |
|---------|----------|----------------------|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |

Satisfactory Incomplete Incorrect

4. Do you know what a SDS and a SWMS are?

a) Explain what a SDS is:

Correct Incorrect

b) Give an example of when you would use a SDS:

Correct Incorrect

c) Explain what a SWMS is:

Correct Incorrect

d) Give an example of when you would use a SWMS:

Correct Incorrect

5. As part of the licence conditions, a servicing licensee is required to maintain a quality management system. From the following list, select each item that is included in your quality management system manual. Check **all** that apply.

a) The requirement for all measuring instruments/measures to be of an approved pattern and comply with their certificate of approval.

b) Details of mandatory reverification periods for instruments/measures used for trade.

c) References to the national instrument test procedures relevant to the servicing licence.

d) Procedures relating to instruments/measures that cannot be verified.

Satisfactory Incomplete Incorrect

6. Which document, maintained by the servicing licensee, details the required format of the mark that verifiers, working under that servicing licence, must apply to show an instrument/measure has been verified? Choose the single correct answer.

a) The National Trade Measurement Regulations 2009.

b) The licensee's quality manual.

c) The National Instrument Test Procedures.

d) The licensee's servicing licence.

Correct Incorrect

7. You have just changed your home address. What are you required to do? Choose the single correct answer.

a) Nothing.

b) Notify my employer who will notify NMI within 2 months.

c) Notify my employer who will notify NMI within 14 days.

d) Call my local trade measurement inspector and leave a message.

Correct Incorrect

8. If you verify a measuring instrument/measure, how long do you have to submit notice of the verification to the National Measurement Institute on the approved form? Choose the single correct answer.
- a) 7 days
 - b) 14 days
 - c) 21 days
 - d) 1 month

Correct Incorrect

9. Select the actions you would take when you test a measuring instrument/measure in use for trade and you determine that you cannot verify it. Check **all** that apply.

- a) Replace the verification mark with one indicating the instrument/measure can no longer be used for trade.
- b) Remove any existing verification mark (where feasible).
- c) Notify the owner within 14 days.
- d) Notify the owner immediately.
- e) Notify NMI within 14 days
- f) Notify NMI immediately.

Satisfactory Incomplete Incorrect

10. What could be the consequence if you failed to provide the trader with a notice of non-verification when you have been unable to verify a measuring instrument/measure used for trade? Check **all** that apply.

- a) No consequence provided I told the trader they couldn't use the instrument/measure for trade.
- b) Customers could get incorrect measure.
- c) Nothing, it's the trader's responsibility to check the instrument/measure is correctly marked.
- d) I could be fined.
- e) I could be restricted from verifying instruments/measures.

Satisfactory Incomplete Incorrect

11. If you were unsure of the correct way to apply a verification mark to a measuring instrument/measure, or any other requirement relating to the verification process, what would you do? Write your answer below. Include at least **three** points.

Satisfactory Incomplete Incorrect

12. How often must a measuring instrument/measure used for trade (excluding weighbridges used for public weighing) be re-verified? Choose the single correct answer.
- a) Every 3 years.
 - b) Every 5 years.
 - c) Whenever it has been adjusted/repared or every 2 years.
 - d) Whenever an adjustment or repair affects its metrological performance.
- Correct Incorrect
13. Can you verify a measuring instrument/measure where its certificate of approval states 'cancelled in respect of new instruments as from 1 January 2014'? Choose the single correct answer.
- a) No, never.
 - b) Yes, always.
 - c) Yes, if the instrument/measure was manufactured before 1 January 2014.
 - d) Yes, provided the instrument is new.
- Correct Incorrect
14. What markings would you apply to an instrument/measure you verified on 26 May 2021 if your servicing licensee code is DBA and you have the verifier number VR 01278? Choose the single correct answer.
- a) DBA 1278 B1
 - b) 1278 B 21
 - c) DBA 1278 E21
 - d) DBA 1278 E1
 - e) 1278 DBA B21
- Correct Incorrect
15. The following questions relate to the connection of auxiliary devices to measuring equipment.
- a) Which document specifies the requirements for the installation of auxiliary indicating or printing devices and POS systems installed prior to 1 August 2012? Choose the single correct answer.
 - i. S1/0/A
 - ii. S1/0B
 - iii. Supplementary certificate of approval for the device/system
 - iv. Measuring instrument approval

Correct Incorrect
 - b) Which document specifies the requirements for the installation of auxiliary indicating or printing devices installed after 1 August 2012, **excluding** POS or Control systems? Choose the single correct answer.
 - i. S1/0/A
 - ii. S1/0B
 - iii. Supplementary certificate of approval for the device/system
 - iv. Measuring instrument approval

Correct Incorrect

- c) Which document specifies the requirements for the installation of POS systems installed after 1 August 2012? Choose the single correct answer.
- i. S1/0/A
 - ii. S1/0B
 - iii. Supplementary certificate of approval for the device/system
 - iv. Measuring instrument approval

Correct Incorrect

- d) When verifying an instrument which has an auxiliary device (other than a POS or control system) connected to it, what are the requirements for verification marking? Choose the single correct answer.

- i. Apply a mark to the instrument only
- ii. Apply a mark to the auxiliary device only
- iii. Apply a mark to both the auxiliary device and the instrument

Correct Incorrect

16. Provide a couple of examples of how a trader's use of an instrument/measure may impact on its performance. (Give **two** examples per instrument type you are being assessed for at this time).

Satisfactory Incomplete Incorrect

17. In your organisation, how do you maintain records relating to verification? You should include at least 2 points.

Satisfactory Incomplete Incorrect

18. In order to verify instruments/measures, what are the principal legal requirements for the business and the individual completing a verification? Include at least 3 points in your answer.

Satisfactory Incomplete Incorrect

19. Who is responsible for determining whether a particular model of instrument can legally be used for trade in Australia?

Correct Incorrect

20. Where could you find the legal units of measurement for Australia? Choose any that apply.

- a) On the NMI internet pages.
- b) In the National Measurement Act 1960
- c) In the National Measurement Regulations 1999.
- d) In the licensee's quality manual

Correct Incorrect

21. MPEs for instruments/measures may be given in a number of different documents. If the instrument/measure you are to verify was first approved on the 20th January 2020, where would you find the correct MPE to use during testing?

Correct

Incorrect

The questions listed below apply specifically to the knowledge requirements for the unit of competency MSMTMREF301 - Use and maintain reference standards.

22. List the **reference standards/test equipment** you use when verifying measuring instruments or measures. (Include capacity ranges, scale intervals and class/es, where appropriate) The answer you give should relate to **all** instrument subclasses for which you are being assessed. Write your answer below.

Satisfactory

Incomplete

Incorrect

23. How do you protect the integrity of the **reference standards and test equipment** you described in the previous question? Your answer should relate to storage, transportation and handling of reference standards and equipment. Write your answer below. Include **at least four** points.

Satisfactory

Incomplete

Incorrect

24. This question relates to the reference standards/test equipment you use, not the instrument/measure being tested.

What environmental factors could influence the integrity of the **reference standards and test equipment** that you use when verifying instruments/measures? The answer you give should relate to any instrument subclasses for which you are being assessed. Check **all** that apply.

- a) Temperature
- b) Humidity
- c) Electrical interference
- d) Wind/air movement
- e) Rain/water
- f) Gravity
- g) Dust/dirt
- h) Instrument level
- i) Pressure
- j) Vibration
- k) Other (detail):

Satisfactory Incomplete Incorrect

25. How do you control these factors when undertaking a verification? The answer you give should relate to the standards/equipment for all subclasses for which you are being assessed. Write your answer below. You should include **at least one control per item selected above.**

Satisfactory Incomplete Incorrect

26. You have damaged a reference standard used to verify measuring instruments/measures. What should you do with it? Choose the single correct answer.

- a) Fix the damage
- b) Quarantine it, until it has been repaired, tested and approved for use by the appropriate authority.
- c) Use it until it can be repaired.
- d) Quarantine it and then use it once repaired, if it is repairable.

Correct Incorrect

27. When using reference standards/test equipment, what signs/symptoms/measurement results might alert you to a possible problem/fault/damage with those standards/test equipment? Provide answers for each of the types of standards or equipment you use when verifying instruments/measures of the subclass/es you are being assessed for. Include **at least two** points per different type of reference standard/test equipment you use.

Satisfactory Incomplete Incorrect

28. You have verified and marked a measuring instrument/measure when you notice that a reference standard/test equipment used for the verification is damaged or faulty. What should you do with regards to the verified instrument/measure? Write your answer below. Include **at least two** points.

Satisfactory Incomplete Incorrect

29. What does your quality management system require your organisation to do when there is a change to the reference standards/test equipment you use, i.e. when you acquire new standards/test equipment, when your standards/test equipment are re-verified, when you dispose of standards/test equipment that are broken/excess to requirements? Check **all** that apply.

- a) Ensure that new standards/test equipment have the appropriate certification.
- b) Allocate a junior member of staff to clean the new standards/test equipment.
- c) Update the list of reference standards/test equipment.
- d) Supply a copy of the updated list of reference standards/test equipment to NMI within 30 days of the change.
- e) Supply a copy of the updated list of reference standards/test equipment to NMI within 14 days.

Satisfactory Incomplete Incorrect

30. What is the principal purpose of a certificate of verification (e.g. a Reg. 13 certificate)? Write your answer below

Satisfactory Incomplete Incorrect

31. What procedures does your business need in place for maintenance and calibration of your reference standards/test equipment? Refer to your quality manual. Write your answer below. Include **at least two** points.

Satisfactory Incomplete Incorrect

32. Can you identify any limitations of the reference standards/test equipment you use during verification related to the verification or the environment in which they are used? Address this question to all reference standards/test equipment you may use for the subclasses you are currently being assessed for, describing the limitations and how significant they might be.

Satisfactory Incomplete Incorrect

33. What are organisations who are authorised to verify reference standards called?

Correct Incorrect

Written assessment (Subclass 10.1 common questions)

Complete **ONLY** if you are being assessed for this subclass

1. What is the permitted density range of LPG for the model SGB Commander single listed in the certificate of approval number 10/1/13? Choose the single correct answer.

- a) 0.505 to 0.545 kg/L
- b) 0.515 to 0.525 kg/L
- c) 0.510 to 0.560 kg/L
- d) 0.525 to 0.535 kg/L

Correct

Incorrect

2. Define the following abbreviations:

| Abbreviation | Description |
|--------------|-------------|
| $V_{FD,c}$ | |
| E_{AV} | |
| V_{FD15} | |
| C_{tiFD} | |
| P_e | |
| E_c | |
| D_p | |

Satisfactory

Incomplete

Incorrect

3. You are conducting an interlock test on an LPG dispenser that is part of a multiple fuel dispenser module. You wish to conduct the part of the test relating to dispensers sharing a common pumping unit. There are a number of steps to take during this test in a particular sequence. Which of the following choices gives the correct steps in the correct sequence? Choose the single correct answer.

- a) Pick up and authorise the hose under test, but ensure it doesn't authorise by placing a dummy hose in the hang-up.
Pick up and authorise the hose sharing the pumping unit with the hose under test.
Squeeze the trigger of the hose sharing the pumping unit and ensure no fuel flows
- b) Pick up and authorise the hose under test.
Pick up and authorise the hose sharing the pumping unit with the hose under test.
Squeeze the trigger of the hose under test and ensure no fuel flows
- c) Pick up and authorise the hose under test.
Pick up a hose on the same side as the hose authorised.
Squeeze the trigger of the other hose selected and ensure no fuel flows.
- d) Pick up and authorise the hose sharing the pumping unit with the hose under test.
Pick up and authorise the hose under test, but ensure it doesn't authorise by placing a dummy hose in the hang-up.
Squeeze the trigger of the hose under test and ensure no fuel flows.

Correct

Incorrect

4. While testing a LPG dispenser without a VFD/VFD15 switch (compensator switch), the results listed below were observed.
- a) Complete the table by calculating the errors for each delivery to three decimal places. Complete any calculations in the box under the table.

| Delivery | $V_{FD,c}$ | V_{REF} | Error |
|-----------------|------------|-----------|-------|
| Uncompensated 1 | 31.78 L | 31.82 L | |
| Uncompensated 2 | 31.64 L | 31.80 L | |
| Uncompensated 3 | 32.50 L | 32.61 L | |
| Compensated 1 | 30.72 L | 30.66 L | |
| Compensated 2 | 31.41 L | 31.38 L | |
| Compensated 3 | 31.17 L | 31.13 L | |

Satisfactory Incomplete Incorrect

- b) Does the dispenser pass the accuracy and temperature conversion device tests? Explain your answer (include any calculations used).

Satisfactory Incomplete Incorrect

5. Define density and explain in your own words what happens to LPG as the pressure decreases, and how that impacts its density.

Satisfactory Incomplete Incorrect

6. In the following table, complete the correct calculated price and determine whether the dispenser passes or fails the price computing test. Use the text box for any calculations you make.

| Volume indicated (L) | Unit price (c/L) | Indicated price to pay (\$) | Calculated price to pay (\$) | Pass | Fail |
|----------------------|------------------|-----------------------------|------------------------------|------|------|
| 48.34 | 67.9 | 32.82 | | | |
| 65.65 | 102.9 | 67.56 | | | |
| 50.12 | 71.9 | 36.05 | | | |

Satisfactory Incomplete Incorrect

7. From the calibration table shown below, what is the true temperature for the thermometer if it reads 28°C? Choose the single correct answer. Use the text box below to show your calculations.

- a) 28.06°C
- b) 28.24°C
- c) 28.10°C
- d) 28.00°C

Correct Incorrect

| Denomination | True Value | Correction |
|--------------|------------|------------|
| 0°C | 0.4°C | 0.4°C |
| 5°C | 5.4°C | 0.4°C |
| 10°C | 10.4°C | 0.4°C |
| 15°C | 15.6°C | 0.6°C |
| 20°C | 20.6°C | 0.6°C |
| 25°C | 25.3°C | 0.3°C |
| 30°C | 30.0°C | 0.0°C |
| 35°C | 35.4°C | 0.0°C |
| 40°C | 39.8°C | -0.2°C |
| 45°C | 44.7°C | -0.3°C |
| 50°C | 50.1°C | 0.1°C |

8. You are asked to carry out annual accuracy checks on LPG dispensers at a large service station, and repair and re-verify any that are outside MPE/faulty. You notice that the density of the LPG has changed since the last check and the density is now outside the approved range for the dispensers and the measurements are incorrect to the disadvantage of the customer. What should you do? Check **all** appropriate options.
- a) Nothing, it's none of your business
 - b) Report the business to the NMI for using inaccurate instrument
 - c) Remove the verification mark, and issue a notice of non-verification explaining the reason
 - d) Tell the controller of the site of your findings and see what he will do for you to keep quiet about it
 - e) Inform the controller of your findings and advise that the instruments are not approved for this LPG density and discuss options to address the situation

Satisfactory Incomplete Incorrect

9. Which of the following repairs would require you to re-verify a LPG dispenser? Check **all** that apply.

- a) Replacement of a faulty nozzle
- b) Adjustment of the calibration settings
- c) Changes to the software version in the dispenser
- d) Replacement of worn data plate
- e) Repair of a faulty non-return valve
- f) All of the above

Satisfactory Incomplete Incorrect

10. You have just been employed by a licensee who holds a licence for instruments of licence subclasses 5.1, 5.2, 10.1 and 10.2. You have statements of attainment for instruments of sub-classes 10.1 and 10.2 and about 10 years ago, you used to repair and verify fuel dispensers (subclass 5.1). Your employer has just received a call out from a valued customer to repair a number of fuel dispensers rejected by a trade measurement officer. His usual verifier is on leave for a week, so he asks you to go and repair and re-verify the instruments. What should you do? Choose the single correct answer.

- a) Repair and verify the fuel dispensers
- b) Verify the fuel dispensers using the other verifier's verification number
- c) Tell your employer that you are not competent to re-verify the fuel dispensers
- d) Repair the fuel dispensers and leave without verifying them, without advising the customer
- e) Tell your employer to do it himself

Correct Incorrect

11. You have been asked to remove and replace four LPG dispensers (2 modules each with 2 dispensers) with upgraded model dispensers at a busy retail site that is open 24/7. What arrangements would you make, with both the site manager and within your organisation to complete the removal, installation and verification of the new dispensers while minimising the inconvenience to customers who will not be able to purchase LPG during the upgrade, and to ensure the most efficient use of resources? Give your answer as dot points. Include at least **four points**.

Satisfactory Incomplete Incorrect

12. What environmental factors might affect the performance of a LPG dispenser? Include **at least two** factors and describe controls to prevent them affecting the dispenser.

Satisfactory Incomplete Incorrect

13. Which of the following are legal units of volume in Australia? Check **all** that apply.

- a) Gallons
- b) Litres
- c) Cubic centimetre
- d) Kilogram
- e) Metre

Satisfactory Incomplete Incorrect

14. Name 5 of the principal metrological components of an LPG dispenser? – Briefly describe their function.

| Component | Function |
|-----------|----------|
|-----------|----------|

Satisfactory Incomplete Incorrect

Written assessment (Subclass 10.1 test method specific questions)

Complete the questions relevant to the test method/s for which you are being assessed.

10.1 Master meter test method

1. Is it acceptable to use a master meter that has been verified with a maximum nominal flowrate of 40 L/min to verify an LPG dispenser with a maximum achievable flowrate of 48 L/min? Explain your answer.

Satisfactory Incomplete Incorrect

2. Consider the Regulation 13 certificate of verification given on the next pages and answer the following questions that relate to it.

- a) What is the permanent distinguishing mark? Choose the single correct answer.

- i. Serial No: L110063
- ii. LMF – 1
- iii. RN122686
- iv. Serial No: L110032

Correct Incorrect

- b) What is the maximum nominal flowrate for which this master meter has been verified? Choose the single correct answer

- i. 40 L/min
- ii. 50 L/min
- iii. 7.5 L/min
- iv. 60 L/min

Correct Incorrect

- c) What is the measured meter factor at a nominal flowrate of 30 L/min? Choose the single correct answer.

- i. 1.0023
- ii. 1.00011
- iii. 1.0012
- iv. 1.00001

Correct Incorrect

- d) What meter factor would you use if the flowrate were 15 L/min? Choose the single correct answer.

- i. 1.00150
- ii. 1.00181
- iii. 1.00162
- iv. 1.00260

Correct Incorrect



Australian Government

**National Measurement
Institute**

**CERTIFICATE OF VERIFICATION OF A REFERENCE STANDARD OF
MEASUREMENT IN ACCORDANCE WITH REGULATION 13 OF THE *NATIONAL
MEASUREMENT REGULATIONS 1999* (CTH) IN ACCORDANCE WITH THE
NATIONAL MEASUREMENT ACT 1960 (CTH)**

Certificate Number RN122686

Description of standard of measurement: LPG Flowmeter, Prime model LFM-1

Permanent distinguishing marks: Serial No: L110063

Date of verification: 10 October 2012

This certificate is given for a period until: 10 April 2013

Value(s) of standard of measurement: As stated in Report RN122686 of the National Measurement Institute

Uncertainty of value(s): As stated in Report RN122686 of the National Measurement Institute

Values and uncertainties of relevant influence factors:
As stated in Report RN122686 of the National Measurement Institute

Signature:

Date: 22 October 2012

Name of Signatory: Dr John Man

Being a person with powers delegated by the Chief Metrologist acting under section 18D of the *National Measurement Act 1960* (Cth) in respect of Regulation 13 of the *National Measurement Regulations 1999* (Cth), I hereby certify that the above standard is verified as a reference standard of measurement in accordance with the Regulations.

Note: Report RN122686 of the National Measurement Institute forms part of this Certificate.



Australian Government
**National Measurement
Institute**

MEASUREMENT REPORT ON

**LPG Flowmeter, Prime model LFM-1
serial number: L110063**

The National Measurement Institute is responsible for Australia's units and standards of measurement.
The measurement results presented in this report are traceable to Australia's primary standards.

| | | |
|-------------------------|--------------------|----------------------------|
| Headquarters | PO Box 264 | Telephone: +61 2 8467 3600 |
| Bradfield Road | Lindfield NSW 2070 | Facsimile: +61 2 8467 3610 |
| West Lindfield NSW 2070 | Australia | |
| Australia | | |

For Further information contact: Simon Dignan Phone: +61 2 8467 3514

Ref: RN122686 File: CB/12/1309 Checked: *SD* Date: 11 October 2012

This report may not be published except in full unless permission for the publication of an approved extract has been obtained in writing from the Chief Metrologist, National Measurement Institute.

For: National Measurement Institute,
Trade Measurement, Brisbane
33 Kingtel Place
GEEBUNG QLD 4034

Reference: Quotation number Q122686.

Description: The instrument is a Prime model LFM-1 flowmeter
connected to an electronic indicator.

Maker: Prime

Serial Number: L110063 (on meter)

Date(s) of Test: 10 October 2012

Tests:

- 1) The meter factor, MF, of the meter was determined volumetrically against a master meter at 6 flow rates using propane where the number of flow rates were sufficient to characterise the performance curve for the meter over the specified range. During the tests the pressure at the meter was controlled to be approximately 250 kPa higher than the current equilibrium vapour pressure (EVP) of the fluid.
- 2) A curve was fitted to the data for the meter and a meter factor MF was calculated for each of the flow conditions, refer table 1, under conditions in table 2.
- 3) A back pressure test was performed.

Results:

Table 1: Measured Meter-Factor

| Nominal flow rate, (L/min) | Indicated flow rate, I, (L/min) [see Note 1] | Meter Factor MF [see Note 1] | Expanded Uncertainty (%) | Coverage factor <i>k</i> |
|------------------------------|---|-----------------------------------|--------------------------|--------------------------|
| 50 | 49.9 | 1.0012 | 0.16 | 2.0 |
| 40 | 40.0 | 1.0012 | 0.16 | 2.0 |
| 30 | 30.0 | 1.0012 | 0.19 | 2.1 |
| 18 | 18.0 | 1.0015 | 0.18 | 2.0 |
| 7.5 | 7.5 | 1.0026 | 0.12 | 2.0 |

Ref: RN122686

File: CB/12/1309

Checked: *SD*

Date: 11 October 2012.

Table 2: Test conditions

| | |
|-----------------------------------|-----------------------|
| Meter Pressure | 958 to 1075 kPa |
| Meter Temperature | 20.8 to 22.4 °C |
| Meter Pressure – Storage Pressure | 231 to 265 kPa |
| Fluid Density at 15°C | 516 kg/m ³ |

Back Pressure Test:

At a nominal flow rate of 18 L/minute, the pressure at the meter was increased to approximately 360 kPa greater than the EVP and the change in MF was within the repeatability of the meter.

Notes

1. The delivered-volume indicated by the calculator/indicator at the flow rate (I) attached to the meter should be multiplied by the meter factors (MF) given in table 1 to obtain the true delivered volume.
2. The uncertainty stated in this Report has been calculated in accordance with the principles in *JCGM 100:2008 – Evaluation of measurement data - Guide to the expression of uncertainty in measurement*, and gives an interval estimated to have a level of confidence of 95%. The uncertainty applies at the time of measurement only and takes no account of any drift or other effects that may apply afterwards. When estimating the uncertainty at any later time, other relevant information should also be considered, including, where possible, the history of the performance of the instrument and the manufacturer's specifications.
3. The stated uncertainty of calibration includes the effect of linear interpolation within the flow rate range covered in table 1.
4. The calibration was performed based on the methods described in CB/12/1309.
5. The tests were conducted using the supplied pipework.
6. The calibration was conducted at the NMI Londonderry Flow facility, 919 Londonderry Road, Londonderry NSW 2573.

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Mr Simon Dignan
for Dr P T H Fisk
Chief Metrologist

Ref: RN122686

File: CB/12/1309

Checked: *SD*

Date: 11 October 2012

10.1 Mass flowmeter test method

1. Is it acceptable to use a mass flow meter that has been verified with a maximum nominal flowrate of 40 L/min to verify an LPG dispenser with a maximum achievable flowrate of 48 L/min? Explain your reasoning.

Satisfactory Incomplete Incorrect

2. Consider the Regulation 13 certificate of verification given on the next pages and answer the following questions that relate to it.

a) What is the permanent distinguishing mark? Choose the single correct answer.

- i. Serial No: 482211 2003 (flow tube) and 3703154 (transmitter)
- ii. 2700R
- iii. RN150645
- iv. Q150645

Correct Incorrect

b) What is the maximum nominal flowrate for which this master meter has been verified? Choose the single correct answer.

- i. 388.6 Hz
- ii. 97 L/min
- iii. 240.360 Pul/L
- iv. 7.5 L/min

Correct Incorrect

c) What is the measured meter factor at a nominal flowrate of 30 L/min? Choose the single correct answer.

- i. 240.260
- ii. 0.9985
- iii. 0.9989
- iv. 2.0

Correct Incorrect

d) What meter factor would you use if the flowrate were 15 L/min? Choose the single correct answer.

- i. 0.99910
- ii. 0.99890
- iii. 0.99903
- iv. 0.99900

Correct Incorrect



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

Certificate of Verification of a Reference Standard of Measurement in accordance with Regulation 13 of the *National Measurement Regulations 1999* (Cth) in accordance with the *National Measurement Act 1960* (Cth)

Certificate Number: RN 150645

Description of standard of measurement: LPG Flowmeter, Micromotion model CMF050

Permanent distinguishing marks: Serial No: 482211 2003 (flow tube)
3703154 (transmitter)

Date of verification: 25 March 2015

Period of certificate: From date of verification until 25 March 2016

Value(s) of standard of measurement: As stated in Report RN150645 of the National Measurement Institute

Accuracy of verification: Uncertainty of value(s) as stated in Report RN150645 of the national Measurement Institute

Values and uncertainties of relevant influence factors: As stated in Report RN150645 of the National Measurement Institute

Signature: _____ **Date:** _____

Name of Signatory: Dr John Man

Being a person with powers delegated by the Chief Metrologist acting under section 18D of the *National Measurement Act 1960* (Cth) in respect of regulation 13 of the *National Measurement Regulations 1999* (Cth), I hereby certify that the above standard is verified as a reference standard of measurement in accordance with the regulations.

Note: Report RN 150645 of the National Measurement Institute forms part of this Certificate.

MEASUREMENT REPORT ON

**LPG Flowmeter, Micromotion model CMF050 flow tube with 2700R transmitter
serial number: 482211 2003 (flow tube), 3703154 (transmitter)**

TRAINING USE ONLY

For: National Measurement Institute,
Trade Measurement, Adelaide
8 West Thebarton Road
THEBARTON SA 5031

Reference: Quotation number Q150645.

Description: The instrument is an Micromotion model CMF050 flowmeter connected to an Micromotion model 2700R transmitter, serial number 3703154. The meter is part of an assembly with provision made for a thermometer and pressure gauge to be used for the conversion of the flowmeter indicated volume to reference conditions.

Maker: Micromotion

Serial Number: 482211 2003 (flow tube), 3703154 (transmitter)

Date(s) of Test: 24 March 2015 to 25 March 2015

Tests:

- 1) The K-factor, K , (pulses per litre) of the meter was determined volumetrically against a piston prover at 20 flow rates using Propane where the number of flow rates is sufficient to characterise the performance curve for the meter over the specified range. Each flow rate is the average of 5 runs with each run equal to one pass of the of the piston in the 40 L prover. The measured flow rate at both the Piston-Prover and Meter-Under-Test were both corrected to reference conditions using NMI's reference temperature and pressure sensors. The meter-under-test temperature and pressure were measured at the thermowell and line-pressure valve attached to the meter. During the tests the pressure at the meter was controlled to be approximately 225 kPa higher than the current equilibrium vapour pressure (EVP) of the fluid.
- 2) Based on this data, a suitable K-factor, $K_{\text{indicator}}$ was determined and entered into the indicator where the indicator is configured for single point k factor correction, refer table 1
- 3) A curve was fitted to the data for the meter and a meter factor $MF = K_{\text{indicator}}/K$ was calculated for each of the flow conditions (refer table 2) under conditions in table 3.
- 4) A back pressure test was performed.

- 5) The indicator system was checked at a nominal flow rate of 60 L/min by confirming that the indicator/calculator read the correct number of pulses from the meter and converted it to an equivalent metered volume using the entered K-factor.
- 6) The as-received K-factor(s) in the indicator and indicator correction mode was recorded, refer table 1.

Results:

Table 1: K-factor(s) stored in the indicator

| | Indicator K-factor correction Mode | $K_{\text{indicator}}$ |
|---|------------------------------------|------------------------|
| As received | Single point | 240.000 pulses/L |
| New value determined by this calibration and entered into indicator | Single point | 240.000 pulses/L |

Table 2: Measured Meter-Factor

| Nominal flow rate, (L/min) | Pulse Frequency (Hz) | Measured Pulses, K (Pul / L) | Uncertainty (%) | Coverage factor k | Indicated flow rate, I, (L/min) [see Note 1] | Meter Factor MF = $K_{\text{indicator}} / K$ [see Note 1] |
|----------------------------|----------------------|------------------------------|-----------------|---------------------|---|--|
| 97 | 388.6 | 240.360 | 0.09 | 2.0 | 97.1 | 0.9985 |
| 70 | 280.4 | 240.320 | 0.09 | 2.0 | 70.1 | 0.9987 |
| 30 | 120.1 | 240.260 | 0.09 | 2.0 | 30.0 | 0.9989 |
| 7.5 | 30.0 | 240.225 | 0.09 | 2.0 | 7.5 | 0.9991 |

Table 3: Test conditions

| | |
|-----------------------------------|-----------------------|
| Meter Pressure | 740 kPa to 816 kPa |
| Meter Temperature | 11.5 °C to 15.3 °C |
| Meter Pressure – Storage Pressure | 214 kPa to 248 kPa |
| Fluid Density at 15°C | 522 kg/m ³ |

Back Pressure Test:

At a nominal flow rate of 97 L/minute, the pressure at the meter was increased to approximately 365 kPa greater than the EVP and the change in K was within the repeatability of the meter.

Indicator/Calculator check:

At a nominal flow rate of 60L/minute, the indicator recorded correctly within 2 pulses of the nominally 100000 pulses provided by the meter, an error less than 0.002%.

Notes

1. The delivered-volume indicated by the calculator/indicator at the flow rate (I) attached to the meter should be multiplied by the meter factors (MF) given in table 2 to obtain the true delivered volume. This applies where K-factor linearisation are not applied and temperature and pressure compensation are not applied in the indicator.
2. The uncertainty stated in this Report has been calculated in accordance with the principles in *JCGM 100:2008 – Evaluation of measurement data - Guide to the expression of uncertainty in measurement*, and gives an interval estimated to have a level of confidence of 95%. The uncertainty applies at the time of measurement only and takes no account of any drift or other effects that may apply afterwards. When estimating the uncertainty at any later time, other relevant information should also be considered, including, where possible, the history of the performance of the instrument and the manufacturer's specifications.
3. The stated uncertainty of calibration includes the effect of linear interpolation within the flow rate range covered in table 2.
4. The calibration was performed based on the methods described in POM-LFF-8.1.1.
5. The quoted uncertainty is dominated by the Meter Under Test (MUT) repeatability and/or MUT deviation from a fitted curve.
6. The indicator linearisation and compensation functions were not tested.
7. The tests were conducted using the supplied pipework.
8. The calibration was conducted at the NMI Londonderry Flow facility, 919 Londonderry Road, Londonderry NSW 2573.

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Mr Simon Dignan
for Dr P T H Fisk
Chief Metrologist

10.1 Gravimetric test method

1. You are testing an LPG dispenser with a maximum approved flowrate of 60 L/min. The LPG has a density @ 15 °C of 510 kg/m³. The vessel you shall use to collect the LPG has an initial tare weight of approximately 41 kg and it can hold 100 L.
- a) Which of the following weighing instruments would be suitable to use in the testing? Assume the weighing instrument can tare off the weight of the receiving vessel. Choose the single correct answer.
- i. A class III 1 t platform scale with a 1 kg scale interval
 - ii. A class III 600 kg platform scale with a 200 g scale interval
 - iii. A class III 300 kg platform scale with a 100 g scale interval
 - iv. A class III 150 kg platform scale with a 10 g scale interval
 - v. All of the above
 - vi. None of the above
- Correct Incorrect
- b) What are the requirements for the weights used to test the weighing instrument? Check **all** that apply.
- i. All weights must have a current Regulation 13 certificate
 - ii. Uncertainties of weights used must be no more than 1/3 of the MPE of the weighing instrument
 - iii. All weights used must be inspectors' class 3 standard or better
 - iv. Reference weights used must meet the requirements of NITP 6.1-6.4
- Satisfactory Incomplete Incorrect
- c) When should the weighing instrument be tested? Choose the single correct answer.
- i. Provided it is a verified instrument, it is irrelevant when it was tested
 - ii. Immediately before using the instrument to test the dispenser
 - iii. Within the 24 hours prior to testing of the dispenser
 - iv. Within the 7 days prior to testing of the dispenser
- Correct Incorrect
- d) How would you test the weighing instrument? Choose the single correct answer.
- i. Complete all tests in NITP 6.1-6.4 up to the capacity of the instrument
 - ii. Apply weights to the instrument at loads equivalent to the weights of the empty receiving vessel and the loaded receiving vessel and determine the exact error at each point
 - iii. Testing not required provided the weighing instrument has been verified by a competent verifier.
 - iv. Complete the weighing performance, repeatability and eccentricity tests from NITP 6.1-6.4 up to the weight specified in NITP 10.1 clause 4.8.3(4)
- Correct Incorrect
- e) From the options below, what is the **minimum** weight of masses that can be used to test the instrument? Choose the single correct answer.
- i. 200 kg
 - ii. 150 kg
 - iii. 100 kg
 - iv. 60 kg
- Correct Incorrect

2. Consider the Regulation 13 certificate of verification given on the next pages and answer the following questions that relate to it:

a) What is the uncertainty for the 1000 g reference standard? Choose the single correct answer.

- i. ± 0.2 g
- ii. 0.002 g
- iii. $- 0.002$ g
- iv. ± 0.002 g

Correct

Incorrect

b) What is the certificate reference number? Choose the single correct answer.

- i. M070154
- ii. RN113458
- iii. ISO/IEC 17025
- iv. CB/11/2197

Correct

Incorrect

c) What verification method was used for these reference standards?

Correct

Incorrect

d) What is the identifying mark for the 5000 g reference standard that this certificate of verification relates to? Choose the single correct answer.

- i. 5000
- ii. M070154
- iii. NSC-K5C1
- iv. 5000.015

Correct

Incorrect

3. What is the difference between actual value and nominal value reference standards, and how does this change how you would use them when testing the weighing instrument used in testing LPG dispensers?

Satisfactory

Incomplete

Incorrect



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**CERTIFICATE OF VERIFICATION OF A REFERENCE STANDARD OF
MEASUREMENT IN ACCORDANCE WITH REGULATION 13 OF THE NATIONAL
MEASUREMENT REGULATIONS 1999 (CTH) IN ACCORDANCE WITH THE
NATIONAL MEASUREMENT ACT 1960 (CTH)**

Certificate Number RN113458

Description of standard of measurement: Set of stainless steel integral weights,
MASSCAL Australia, 20 kg to 1 kg, 14-piece

Permanent distinguishing marks: Serial No: M070154

Date of verification: 27 January 2012

This certificate is given for a period until: 27 January 2017

Value(s) of standard of measurement: As stated in Report RN113458 of the National
Measurement Institute

Uncertainty of value(s): As stated in Report RN113458 of the National
Measurement Institute

Values and uncertainties of relevant influence factors:
As stated in Report RN113458 of the National
Measurement Institute

Signature:

Date: 31 January 2012

Name of Signatory: Mr Umesh Kotwal

Being a person with powers delegated by the Chief Metrologist acting under section 18D of the *National Measurement Act 1960* (Cth) in respect of Regulation 13 of the *National Measurement Regulations 1999* (Cth), I hereby certify that the above standard is verified as a reference standard of measurement in accordance with the Regulations.

Note: Report RN113458 of the National Measurement Institute forms part of this Certificate.



Australian Government
National Measurement
Institute

COPY

MEASUREMENT REPORT ON

**Set of weights, 20 kg to 1 kg
Serial number: M070154**



Accredited for compliance with ISO/IEC 17025.
Accreditation Number 1.

The National Measurement Institute is responsible for Australia's units and standards of measurement.
The measurement results presented in this report are traceable to Australia's primary standards.

| | | |
|-------------------------|--------------------|----------------------------|
| Headquarters | PO Box 264 | Telephone: +61 2 8467 3600 |
| Bradfield Road | Lindfield NSW 2070 | Facsimile: +61 2 8467 3610 |
| West Lindfield NSW 2070 | Australia | |
| Australia | | |

For further information contact: Newton Daharera Phone: +61 2 8467 3872

Ref: RN113458 File: CB/11/2197 Checked: *DAH* Date: 27 January 2012

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COPY

For: National Measurement Institute, Londonderry Flow Facility
Bradfield Road
WEST LINDFIELD NSW 2070

Reference: Quotation number Q113458

Description: Set of stainless steel Integral weights, Masscal Australia,
20 kg to 1 kg, 14 piece

Category of Standard: Reference Standard of Mass

Class of Standard: Inspectors' Class 1

Serial Number: M070154

Reference Temperature: 20°C

Date(s) of Test: 27 January 2012

Table 1

| Markings | Denomination g | Verified Value g | +/- Uncertainty g |
|------------|-------------------|---------------------|----------------------|
| NSC-K1C1 | 1000 | 1000.002 | 0.002 |
| NSC-K2C1 | 2000 | 2000.002 | 0.004 |
| NSC-K5C1 | 5000 | 5000.015 | 0.008 |
| NSC-K10C1 | 10000 | 10000.039 | 0.015 |
| NSC-K20C1 | 20000 | 20000.019 | 0.030 |
| NSC-K20C2 | 20000 | 20000.028 | 0.030 |
| NSC-K20C3 | 20000 | 20000.039 | 0.030 |
| NSC-K20C4 | 20000 | 20000.028 | 0.030 |
| NSC-K20C5 | 20000 | 20000.044 | 0.030 |
| NSC-K20C6 | 20000 | 20000.036 | 0.030 |
| NSC-K20C7 | 20000 | 20000.021 | 0.030 |
| NSC-K20C8 | 20000 | 20000.049 | 0.030 |
| NSC-K20C9 | 20000 | 20000.045 | 0.030 |
| NSC-K20C10 | 20000 | 20000.051 | 0.030 |

Notes

- The uncertainty stated in this Report has been calculated in accordance with the principles in *JCGM 100 - Evaluation of measurement data - Guide to the expression of uncertainty in measurement*, and gives an interval estimated to have a level of confidence of 95%. Unless otherwise stated, a coverage factor of 2.0 has been used. The uncertainty applies at the time of measurement only and takes no account of any drift or other effects that may apply afterwards. When estimating the uncertainty at any later time, other relevant information should also be

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Checked: *DRH* Date: 27 January 2012

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considered, including, where possible, the history of the performance of the instrument and the manufacturer's specification.

1. The calibration was conducted at Trade Measurement Laboratory, Sydney, Bradfield Road, West Lindfield NSW 2070, using Test Method 8.2.1 – Mass Class 1.



Mr Umesh Kotwal
for Dr P T H Fisk
Acting Chief Metrologist



Mr Newton Dabarera
NATA approved signatory

Ref: RN113458

File: CB/11/2197

Checked: *DRH* . Date: 27 January 2012

Written assessment (18.1 Control systems specific questions)

Complete **ONLY** if you are being assessed for this subclass

1. You are verifying the instrument with approval number S436. Which of the following components is **NOT** acceptable for this pattern of console? Choose the single correct answer.

- a) Partner Tech model CD5220-II purchaser indicator line display.
- b) IBM 4610 model receipt printer.
- c) Postec PCC4 controller.
- d) Fujitsu model 3000L CD 15 customer display.
- e) Storeline POS console.

Correct Incorrect

2. Refer to the supplementary certificate of approval NMI S440. If you were conducting an initial verification of this control system, are there any additional checks required to ensure the uninterruptable power supply (UPS) complies with its certificate of approval? Check **all** that apply.

- a) Inspect the UPS to see that it is the correct model UPS 600.
- b) There are no specific checks required for the UPS.
- c) Disconnect the UPS and check that no new transactions can be authorised.
- d) Disconnect the main power supply from the UPS and check that a second delivery cannot be authorised until the first delivery has been cleared.
- e) Take the paper out of the printer and check that the LCD display gives an error message.

Satisfactory Incomplete Incorrect

3. In addition to the NITP, what other document/s specify additional tests required for the verification of control systems? Choose the single correct answer.

- a) NMI M7.
- b) The supplementary certificate approval for the control system
- c) The control system installation manual
- d) The servicing licensee's quality manual

Correct Incorrect

4. Refer to the supplementary certificate of approval NMI S422 to answer the following questions.

a) How many fuel dispensers can be connected to this system for self-service operation? Choose the single correct answer.

- i. 8
- ii. 16
- iii. 24
- iv. 32

Correct Incorrect

b) How many transactions can be authorised per fuel dispenser without clearing a stored transaction? Choose the single correct answer.

- i. 1
- ii. 2
- iii. 3
- iv. 4

Correct Incorrect

c) Can an Epson model TM-U220 receipt printer be used as a part of this control system? Provide an explanation for your answer below.

Satisfactory Incomplete Incorrect

d) Would it be acceptable to install this system at an unattended truck stop located in Birdsville, QLD with the console components located in a waterproof cabinet? Provide an explanation for your answer below. Include at least **two reasons** to justify your answer.

Satisfactory Incomplete Incorrect

5. Where would you place a verification mark on the control system approved as supplementary certificate of approval S548? Choose the single correct answer.

- a) On the Retailix Model Store Point POS.
- b) On the Retailix Forecourt Server (RFS).
- c) On the Forecourt Interface Box (FIB).
- d) On either of the two components detailed at 'a' and 'b' above.
- e) On both of the two components detailed at 'a' and 'b' above.
- f) On all the components at a, b and c above adjacent to the data plate.

Correct Incorrect

6. When installing a console, what external factors might you need to consider that could affect the performance of the console? Write your answer below, detailing at least **three factors**.

Satisfactory Incomplete Incorrect

7. During a routine service check of a console (NMI S555), you notice that the PIFI has been turned round so the customer cannot see it. Describe what would you do/say to the store manager? Include **at least two** points.

Satisfactory Incomplete Incorrect

8. You have just been employed by a licensee who holds a licence for instruments of licence subclasses 18.1, 5.1 and 5.2. You have a statement of attainment for instruments of subclass 5.1 and 5.2 and used to install consoles about 10 years ago but have yet to obtain your statement of attainment for 18.1. Your employer asks you to go and install and verify a console as a replacement for a defective system at a busy service station. It is an urgent job and the usual console verifier is on leave. What should you do? Choose the single correct answer.

- a) Install and verify the console using your verifier number.
- b) Install and verify the console using the other verifier's number.
- c) Tell your employer that you are not competent to verify the console.
- d) Install the console and leave without verifying it, the customer will know not to use it until a verification mark has been applied.

Correct Incorrect

9. Name 3 of the principal metrological components of a console? – Briefly describe their function.

| Component | Function |
|-----------|----------|
| | |
| | |
| | |

Satisfactory Incomplete Incorrect

10. Which of the following would trigger the need to re-verify a console? Check all that apply.

- a) Replacement of printer.
- b) Major upgrade to the metrologically relevant software.
- c) Replacement of the customer display with an identical model.
- d) All of the above

Satisfactory Incomplete Incorrect

Written assessment (Subclass 10.2 bulk LPG flowmeter common questions)

Complete **ONLY** if you are being assessed for this subclass. Complete this section for all 10.2 test methods.

1. What is the Maximum flow rate for the Smith Model S 250 mass bulk LPG flowmetering system listed in the certificate of approval number 10/2/7? Choose the single correct answer.

- a) 327 kg
- b) 66 kg/min
- c) 1633 kg/min
- d) 1020 kg/min

Correct Incorrect

2. Complete the table below with the MPE for the listed tests

| Test | Value of MPE |
|---|--------------|
| Verification accuracy | |
| Temperature conversion device | |
| Temperature setting accuracy | |
| Density setting accuracy | |
| Zero setting for a mechanical indicator | |

Satisfactory Incomplete Incorrect

3. The density setting of an LPG flow metering system is 518 kg/m³. The LPG density at 15°C is 507 kg/m³. You complete the test of the LPG metering system and confirm it meets all other requirements of the National Instrument Test Procedure. What action would you take? Choose the single correct answer.

- a) Adjust the density setting of the LPG flow metering system to ensure it is within MPE
- b) Seal the flowmetering system as required and apply a verification mark
- c) Apply a verification mark and make a note of the density setting on the test report
- d) None

Correct Incorrect

4. Which of the following repairs would trigger the need to reverify a bulk LPG flowmetering system? Check **all** that apply.

- a) Replacement of a printer.
- b) Adjustment of the calibration settings.
- c) Changes to the software version in the indicator.
- d) Repair of a faulty non-return valve.
- e) Replacement of the gas purger.

Satisfactory Incomplete Incorrect

5. Define density and explain in your own words what happens to LPG as the pressure decreases, and how that impacts its density.

Satisfactory Incomplete Incorrect

6. From the calibration table shown below, what is the true temperature for the thermometer if it reads 28°C? Choose the single correct answer. Show your calculations in the text box below.

- a) 28.06°C
- b) 28.24°C
- c) 28.10°C
- d) 28.00°C

| Denomination | True Value | Correction |
|--------------|------------|------------|
| 0°C | 0.4°C | 0.4°C |
| 5°C | 5.4°C | 0.4°C |
| 10°C | 10.4°C | 0.4°C |
| 15°C | 15.6°C | 0.6°C |
| 20°C | 20.6°C | 0.6°C |
| 25°C | 25.3°C | 0.3°C |
| 30°C | 30.0°C | 0.0°C |
| 35°C | 35.4°C | 0.0°C |
| 40°C | 39.8°C | -0.2°C |
| 45°C | 44.7°C | -0.3°C |
| 50°C | 50.1°C | 0.1°C |

Correct Incorrect

7. Where a single indicator is used for two or more bulk LPG flowmetering systems, how you would check that LPG cannot be delivered from the system under test without the measurement being shown on the indicator.

Satisfactory Incomplete Incorrect

8. What is the purpose of a non-return valve test? Choose the single correct answer.

- a) To ensure LPG doesn't leak from the transfer device when it is closed
- b) To prevent an explosion from leaking LPG
- c) To ensure that LPG does not flow backwards after the pump has stopped, leading to double measurement of LPG on the subsequent delivery
- d) To prevent LPG being delivered through another delivery point without being meter

Correct Incorrect

9. When testing a Bulk LPG Flowmetering system - NMI 10/2/3B, Minimum Measured Quantity 50 L, Qmax 450 L/min, Qmin 38 L/min, maximum achievable flow rate 385 L/min - what is the minimum delivery you should use for the accuracy test - based on this information alone? Choose the single correct answer.

- a) 450 L
- b) 100 L
- c) 385 L
- d) 150 L

Correct Incorrect

10. Describe the steps you would take to complete a meter creep test in your own words.

Satisfactory Incomplete Incorrect

11. For which instruments would you need to complete this test?

Satisfactory Incomplete Incorrect

12. The ticket shown below was produced from a printer from a Bulk LPG Flowmetering system NMI 10/2/3B, incorporating a calculator/indicator of approval number S170B.

| | | |
|--------------------------------------|-------|----------|
| Launceston Gas Supplies Pty Ltd | | |
| 42 Hope St | | |
| Launceston | | |
| 7250 | | |
| For all your domestic and commercial | | |
| gas needs | | |
| Tel 5550 9381 | | |
| 14 March 2021 | 14:13 | 458765 |
| Order No: 4214 | | |
| Driver: Jeff | LPG | 4350.7 L |

Is the ticket acceptable for verification? Provide your reasons.

Satisfactory Incomplete Incorrect

13. Describe in your own words how you would complete a pre-set accuracy check on a flowmetering system fitted with a pre-set facility.

Satisfactory Incomplete Incorrect

14. You are carrying out an annual accuracy check on a vehicle mounted flowmeter when you find the verification label is no longer present, just a small indication of where it was originally placed. You establish that the label had become worn during cleaning, and the driver had simply removed it. What should you do? Choose the single correct answer.
- a. Nothing, you are only responsible for carrying out accuracy checks.
 - b. Affix a new verification mark, using today's date, and tell the driver to be more careful when cleaning.
 - c. Re-verify the flowmeter, charging an additional extra fee, applying the new mark in the same position. Leave a notice of non-compliance regarding removal of the mark.
 - d. Advise the site manager that without a legible mark, the meter is unverified and the company could be fined; discuss the need to re-verify the flowmeter. Discuss options for positioning/securing any new verification mark and ways to protect the mark when it is being washed.

Correct Incorrect

15. What problems can you identify with the following scenario?

A verifier was asked to look into a problem with the pre-set keypad of an LPG bulk flowmetering system on an LPG tanker. The driver brought the tanker to the licensee's workshop. The verifier identified that some of the buttons on the pre-set keypad were not functioning correctly and the instrument did not stop at the pre-set amount. A new pre-set was required, but none were in stock, so the verifier told the driver that he would need to order parts and he would call him when the part had come in. The meter was measuring accurately otherwise, so he put the pre-set back together and the driver took the tanker away.

Satisfactory Incomplete Incorrect

16. What environmental factors might affect the performance of a bulk LPG flowmetering system? Include **at least two** factors and describe controls to prevent them affecting the system.

Satisfactory Incomplete Incorrect

17. Which of the following are legal units of volume in Australia? Check **all** that apply.

- a) Gallons
- b) Litres
- c) Cubic centimetre
- d) Kilogram
- e) Metre

Satisfactory Incomplete Incorrect

18. Name 5 of the principal metrological components of a bulk LPG flowmetering system? – Briefly describe their function.

| Component | Function |
|-----------|----------|
| | |
| | |
| | |
| | |
| | |
| | |

Satisfactory Incomplete Incorrect

Written assessment (Subclass 10.2 test method specific questions)

Complete the questions relevant to the test methods for which you are being assessed.

10.2 Master meter test method

1. Is it acceptable to use a master meter that has been verified with a maximum nominal flowrate of 360 L/min to verify an LPG flowmeter with a maximum achievable flowrate of 380 L/min? Explain your answer

Satisfactory Incomplete Incorrect

2. The following questions relate to the Regulation 13 certificate of verification provided on the following page. In each case, choose the single correct answer.

- a) What is the permanent distinguishing mark or serial number?

- i. Serial No: GU1661
- ii. EMH600
- iii. RN091428
- iv. Serial No: 0510R055

Correct Incorrect

- b) What is the maximum nominal flowrate for which this master meter has been verified?

- i. 62.7241 pulses/L
- ii. 141.124 pulses/L
- iii. 360 L/min
- iv. 359.9 L/min

Correct Incorrect

- c) What is the meter factor at a nominal flowrate of 200 L/min?

- i. 199.9
- ii. 0.10
- iii. 1.0005
- iv. 2.1

Correct Incorrect

- d) What meter factor would you use if the flowrate were 180 L/min?

- i. 1.0005
- ii. 1.0007
- iii. 1.0010
- iv. 2.1

Correct Incorrect



Australian Government
**National Measurement
Institute**

**CERTIFICATE OF VERIFICATION OF A REFERENCE STANDARD OF
MEASUREMENT IN ACCORDANCE WITH REGULATION 13 OF THE NATIONAL
MEASUREMENT REGULATIONS 1999 (Cth) IN ACCORDANCE WITH THE
NATIONAL MEASUREMENT ACT 1960 (Cth)**

Description of standard of measurement: Schlumberger 4MT flowmeter (serial number GU1661) connected to an Liquip EMH600 calculator/indicator, (serial number 0510R055)

Permanent distinguishing marks: Serial No: GU1661

Date of verification: 21 January 2010

Date of expiry of certificate: 21 January 2011

Value(s) of standard of measurement: As stated in Report RN091428 of the National Measurement Institute.

Uncertainty of value(s): As stated in Report RN091428 of the National Measurement Institute.

This uncertainty is calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a level of confidence of 95% at the time of verification.

Values, and uncertainties, of relevant influence factors:
As stated in Report RN091428 of the National Measurement Institute.

Signature:  **Date:** 1/2/2010

Name of signatory: Dr Mark Ballico

Being a person with powers delegated by the Chief Metrologist acting under Section 18D of the *National Measurement Act 1960* (Cth) in respect of Regulation 13 of the *National Measurement Regulations 1999* (Cth), I hereby certify that the above standard is verified as a reference standard of measurement in accordance with the Regulations.

Note: Report RN091428 of the National Measurement Institute forms part of this Certificate.



Australian Government
National Measurement
Institute

MEASUREMENT REPORT ON

LPG Flowmeter, Schlumberger model 4MT
serial number: GU1661

The National Measurement Institute is responsible for Australia's units and standards of measurement.
The measurement results presented in this report are traceable to Australia's primary standards.

| | | |
|-------------------------|--------------------|----------------------------|
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| West Lindfield NSW 2070 | Lindfield NSW 2070 | Facsimile: +61 2 8467 3610 |
| Australia | Australia | |

For Further information contact: Simon Dignan Phone: +612 8467 3514

Ref: RN091428 File: CB/10/0019 Checked: *SD* Date: 27 January 2010

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Results:

Table 1: K0 factor stored in the indicator (see note 5)

| | |
|--|------------------|
| As received | 62.7241 pulses/L |
| New value determined by this calibration, $K_{\text{indicator}}$ | 141.124 pulses/L |

Table 2: Measured Meter-Factor

| Nominal flow rate L/min | Indicated flow rate L/min | Meter Factor $MF = K0 / K$ (see Note 5) | Expanded Uncertainty % | k |
|----------------------------|------------------------------|---|---------------------------|-----|
| 90 | 89.7 | 1.0034 | 0.15 | 2.2 |
| 100 | 99.7 | 1.0028 | 0.14 | 2.2 |
| 150 | 149.9 | 1.0010 | 0.13 | 2.1 |
| 200 | 199.9 | 1.0005 | 0.10 | 2.1 |
| 250 | 249.9 | 1.0004 | 0.11 | 2.1 |
| 300 | 299.9 | 1.0004 | 0.10 | 2.1 |
| 350 | 349.9 | 1.0003 | 0.10 | 2.1 |
| 360 | 359.9 | 1.0002 | 0.09 | 2.1 |

Table 3: Test conditions

| | |
|--------------------------------------|-----------------------|
| Meter Pressure | 1162 to 1299 kPa |
| Meter Temperature | 25.5 to 31.2 °C |
| Meter Pressure – Storage Pressure | 193 to 209 kPa |
| Fluid Density at 15°C | 511 kg/m ³ |

Back Pressure Test:

At a nominal flow rate of 150L/minute, the pressure at the meter was increased to approximately 425 kPa greater than the EVP and the change in MF was within the repeatability of the meter.

Indicator/Calculator check:

At a nominal flow rate of 200L/minute, the indicator recorded correctly within less than 3 pulses of the nominally 25000 pulses provided by the meter, an error of less than 0.01%

Ref: RN091428

File: CB/10/0019

Checked: *SD*

Date: 27 January 2010

For: Liquip International Pty Ltd, Sydney
13 Hume Road
SMITHFIELD NSW 2164

Reference: Quotation number Q091428.

Description: The instrument is a Schlumberger 4MT flowmeter, (serial number GU1661) connected to a Liquip EMH600 calculator/indicator, (serial number 0510R055). The meter is part of an assembly with provision made for a thermometer and pressure gauge to be used for the conversion of the flowmeter indicated volume to reference conditions

Maker: Liquip

Serial Number: GU1661

Date(s) of Test: 21 January 2010

Tests:

- 1) The as-received K-factor in the indicator was recorded.
- 2) The K-factor (pulses per litre) of the meter was determined volumetrically against a piston prover using Propane test fluid at the specified flow rates. The measured flow rate at both the Piston-Prover and Meter-Under-Test were both corrected to reference conditions using NMI's reference temperature and pressure sensors. The meter-under-test temperature and pressure were measured at the thermowell and line-pressure valve attached to the meter. During the tests the pressure at the meter was controlled to be approximately 225 kPa higher than the current equilibrium vapour pressure (EVP) of the fluid.
- 3) Based on this data, a suitable K-factor, $K_{\text{indicator}}$ was determined and entered into the indicator.
- 4) A meter factor $MF = K_{\text{indicator}}/K$ was calculated for each of the flow conditions.
- 5) A back pressure test was performed.
- 6) The indicator system was checked at a nominal flow rate of 200 L/min by confirming that the indicator/calculator read the correct number of pulses from the turbine meter and converted it to an equivalent metered volume using the entered K-value.

Ref: RN091428

File: CB/10/0019

Checked: 

Date: 27 January 2010

Notes

1. The delivered-volume indicated by the calculator/indicator attached to the meter should be multiplied by the meter factors given in table 2 to obtain the true delivered volume.
2. The uncertainty stated in this report has been calculated in accordance with principles in the ISO Guide to the Expression of Uncertainty in Measurement, and gives an interval estimated to have a level of confidence of 95% using the specified coverage factor. The uncertainty applies at the time of measurement only and takes no account of any drift or other effects that may apply afterwards. When estimating the uncertainty at any later time, other relevant information should also be considered, including, where possible, the history of the performance of the instrument and the manufacturer's specifications.
3. The calibration was performed based on the methods described in CB/10/0019.
4. The quoted uncertainty is dominated by the Meter Under Test (MUT) repeatability and/or MUT deviation from a fitted curve.
5. For this instrument, the parameter in the EMH600 indicator that relates pulses to Litres is called 'K0'. Based on several experiments it was found that $K0 = K_{\text{indicator}} \times 6$. When K0 is set to 141.124, the correct $K_{\text{indicator}}$ value of 23.52 pul/L is applied within the EMH600 to the pulse output of the MUT. The MF in table 1 is applied (ie., multiplied) to the indicated value to give the corrected indicated value.

oooo0ooooo



Mr Simon Dignan
for Dr L M Besley
Chief Metrologist

Ref: RN091428

File: CB/10/0019

Checked: *SD*

Date: 27 January 2010

10.2 Gravimetric test method

1. You are testing a bulk LPG flowmetering system with a maximum approved flowrate of 500 L/min. The LPG has a density @ 15 °C of 510 kg/m³. You plan to use a small LPG fuel tanker as the receiving vessel, and weigh deliveries on a weighbridge. The tare weight of the empty vehicle is 7.28 t and it can hold up to 5 800 L of LPG. You intend that each delivery run will be around 500 L and anticipate completing 8-9 runs. You have sufficient Inspectors' Class 2 reference standard change point weights to determine the weight on the weighbridge to 0.1 of a scale interval. The weighbridge will be tested without using substitution.

- a) Which of the following would be suitable to use for the testing? Choose the single correct answer.
- i. A Class IIII 60 t weighbridge with a 50 kg scale interval
 - ii. A Class III 60 t weighbridge with a 20 kg scale interval
 - iii. A class III 30 t Weighbridge with a 10 kg scale interval
 - iv. All of the above
 - v. None of the above

Correct Incorrect

- b) What could you do to enable you to use one of the weighbridges detailed above?

Satisfactory Incomplete Incorrect

- c) What are the requirements for the weights used to test the weighing instrument? Check **all** that apply.
- i. All weights must have a current Regulation 13 certificate
 - ii. Combined uncertainties and variations of weights used must be no more than 1/3 of the MPE of the weighing instrument at the load
 - iii. All weights used must be inspectors' class 3 standard or better
 - iv. Reference weights used must meet the requirements of NITP 6.1-6.4

Satisfactory Incomplete Incorrect

- d) When should you test the weighing instrument? Choose the single correct answer.
- i. Provided it is a verified instrument, it is irrelevant when it was tested
 - ii. Immediately before using the instrument to test the flowmetering system
 - iii. Within the 24 hours prior to testing of the flowmetering system
 - iv. Within the 7 days prior to testing of the flowmetering system

Correct Incorrect

e) How would you test the weighing instrument? Choose the single correct answer.

- i. Complete all tests in NITP 6.1-6.4 up to the capacity of the instrument
- ii. Apply weights to the instrument at loads equivalent to the weights of the empty receiving vessel and the loaded receiving vessel and determine the exact error at each point.
- iii. Testing is not required, provided the weighing instrument has been verified by a competent verifier.
- iv. Complete sufficient tests to ensure the instrument will enable determination of the weight of the quantities of LPG delivered to an accuracy of at least 1/3 of the MPE, for the volume to be delivered.

Correct Incorrect

2. Consider the Regulation 13 certificate of verification given on the following pages **and** the legislation and answer the following questions that relate to it.

a) What maximum permissible uncertainty would apply to the 500 kg standards? Choose the single correct answer.

- i. ± 1 g
- ii. $\pm 10\ 000$ mg
- iii. $\pm 53\ 333$ mg
- iv. $\pm 26\ 667$ mg

Correct Incorrect

b) What is the certificate reference number? Choose the single correct answer.

- i. RN111555
- ii. RN150860A
- iii. RN150860
- iv. TMQ-332

Correct Incorrect

c) What are the identifying marks for the reference standards that this certificate of verification relates to? Choose the single correct answer.

- i. NTM 55–NTM 77 for the 1000 kg weights and NTM 78 and 79 for the 500 kg weights
- ii. Box no. 23607b and G07 0577
- iii. No. RN150860
- iv. RN15806A

Correct Incorrect

3. What is the difference between actual value and nominal value reference standards, and how does this change how you would use them when testing the weighing instrument used in testing bulk LPG flowmeters?

Satisfactory Incomplete Incorrect



Australian Government
National Measurement
Institute

Certificate of Verification of a Reference Standard of Measurement in accordance with Regulation 13 of the *National Measurement Regulations 1999 (Cth)* in accordance with the *National Measurement Act 1960 (Cth)*

Certificate Number RN150860A

Replacement for Certificate Number RN150860 dated 1 April 2015 which has been cancelled.

Description of standard of measurement: Inspectors' Class 3 standard of mass:
Set of cast iron rectangular weights,
23 × 1000 kg and 2 × 500 kg, 25 pieces

Permanent distinguishing marks: 1000 kg - NTM 55 to NTM 77,
500 kg - NTM 78 and NTM 79

Date of verification: 31 March 2015

Period of certificate: From date of verification until
31 December 2016

Value(s) of standard of measurement and accuracy of verification:
Deemed equal to the denomination, in accordance
with Regulations 30 and 31

Signature: *J.F. Buckley*

Name: Mr Greg Buckley

Date: *30 March 2016*

Being a person with powers delegated by the Chief Metrologist acting under section 18D of the *National Measurement Act 1960 (Cth)* in respect of regulation 13 of the *National Measurement Regulations 1999 (Cth)*, I hereby certify that the above standard is verified as a reference standard of measurement in accordance with the regulations.

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Test Method: NTM14.1

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Headquarters:
PO Box 264
Lindfield NSW 2070
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Telephone: +61 2 8467 3600

Signature: *J.F. Buckley*

Name: Mr Greg Buckley

NMI approved signatory

Date: *30 March 2016*



Accredited for compliance with ISO/IEC 17025.
Accreditation Number 1.

The measurement results presented in this document are traceable to Australian standards.

Verification form task

Download a certificate of verification or notice of non-verification of a measuring instrument form ([Form 6](#)) from the [verifying measuring instruments](#) page of the industry.gov.au website **for each task**.

DO NOT print the form out.

Complete **all required fields** into the **electronic form** using the information given below, including the appropriate instrument performance code.

Complete one form for each of the subclasses you are being assessed for.

Once you have completed the form/s save it/them, named as described in the [instructions](#), and include with your submitted recognition kit.

Satisfactory Incomplete Incorrect

For subclass 10.1

- Verification carried out at Avalon Fuel Stop at 4 Western HWY, Avalon, 3999. ABN424256567878.
- Verification carried out on the 14/6/21 by Jeff Smith Verifier number VR-00987.
- Licensee is FuelFil Pty Ltd SL-0435. Licensee's Mark is ABC. Licensee's ABN is 111122223333
- Instrument Verified is a Gilbarco Model T186Y2 LPG Fuel dispenser, approval number 10/1/18, serial number S654321
- Instrument was verified following calibration adjustment after the instrument was rejected by a trade measurement inspector.

Satisfactory Incomplete Incorrect

For subclass 10.2

- Verification carried out at Emirates LPG Supplies at Lot 178-210, Prince of Wales Drive, Port Botany, 2036. ABN 232425262728
- Verification carried out on the 1/7/21 by Jeff Smith Verifier number VR-00987.
- Licensee is FuelFil Pty Ltd SL-0435. Licensee's Mark is ABC. Licensee's ABN is 111122223333
- Instrument Verified is a Liquip Model VTM-150A bulk LPG flowmeter, approval number 10/2/17, serial number P132465
- Instrument was verified at the request of the customer, within MPE and following adjustment.

Satisfactory Incomplete Incorrect

For subclass 18.1

- Verification carried out at Avalon Fuel Stop at 4 Western HWY, Avalon, 3999. ABN424256567878.
- Verification carried out on the 18/5/21 by Jeff Smith verifier number VR-00987.
- Licensee is FuelFil Pty Ltd SL-0435. Licensee's Mark is ABC. Licensee's ABN is 111122223333.
- Instrument Verified is a Datafuel Model DF9000 Control System for Fuel Dispensers for Motor Vehicles, supplementary approval number NMI S651, serial number S134258, connected to eight Gilbarco Model T334EG Fleetline Mk4 fuel dispensers and 2 Gilbarco Model T921A1ND SK700-2 LPG Fuel dispensers.
- Instrument was verified following installation **AND** simultaneous removal of a similar model console, serial number S100254.

Satisfactory Incomplete Incorrect

Test report questions

Complete any test report questions specific to the subclass/es of instrument and test methods you wish to be assessed for. (None required for subclass 18.1)

Test report question (Subclass 10.1) tested using a master meter

Complete the relevant parts of the [test report 1 for LPG dispensers](#) using the information provided. Where any calculations are needed to complete any parts of the test report, then complete them so you can fill out all relevant parts of the test report. **At the bottom of the form, state whether the instrument has passed or failed and give reasons for any failure.**

If any test results are not given below, assume that all tests required for INITIAL verification have been completed and passed and fill out the form appropriately. For example, if there is no information regarding a zero-setting test, and this test is required, assume it has been completed and check the relevant part of the form.

If you do not currently have a verifier number, use the verifier number VR-09999.

Details:

Verification carried out at Avalon Fuel Stop at 4 Western HWY, Avalon, 3999

Instrument owned by Phase 10 Pty Ltd, 1234 Queen Street, Brisbane 4000

Contact person – General Manager Ricardo Valenti

Instrument verified on 15 February 2021

Instrument Verified is a Gilbarco Model T186Y2 LPG Fuel dispenser, approval number 10/1/18, serial number S123456

Instrument was verified following a replacement of a faulty circuit board, detected after a breakdown.

Instrument data:

Visual inspection: All components are as per certificate of approval and the instrument is in good condition, with no traceable leaks.

Data plate markings:

Manufacturer's name or mark – Gilbarco

Model - T186Y2

Environmental class - Class N

Serial number – S123456

Approval number - NSC 10/1/18

Year of manufacture - 2006

Maximum flow rate – 40 L/min

Minimum flow rate – 8 L/min

Maximum operating pressure – 2450 kPa

Nature of liquids to be measured - LPG

Approved for LPG density range – 510-570 kg/m³

Maximum liquid temperature – 55°C

Minimum liquid temperature – -10 °C

Accuracy class – Class 1.0

Reference standard details:

Make and Model – Prime, LFM-1

Serial No. - L48755

Flowrate range 5-50 L/min

Reg. 13 certificate Number TRH2947764

Expiry 13.12.21

Measured meter factors (MF_{MM}) for the master meter used:

| Product LPG | Indicated flow rate (Litres/minute) | | Master Meter Correction Factors | |
|----------------|-------------------------------------|--|---------------------------------|--|
| | 8.9 | | 1.0089 | |
| | 13.9 | | 1.0082 | |
| | 19.8 | | 1.0076 | |
| | 27.8 | | 1.0070 | |
| | 35.8 | | 1.0067 | |
| | 41.7 | | 1.0065 | |

Test results:

For the purpose of this assessment, instrument includes a switch that allows compensated and uncompensated values to be viewed.

T_{MM}, P_{MM} and T_{FD} as given below are all 'corrected' values.

Totaliser at the start – 12374548 L; at end 12374898 L

Density displayed by dispenser – 0.525°C

Temperature displayed by dispenser – 12.5°C

Hydrometer readings:

| Observed P _e | Corrected P _e | Observed Temp | Corrected Temp | Observed density | Corrected density |
|-------------------------|--------------------------|---------------|----------------|------------------|-------------------|
| 530 kPa | 540 kPa | 11.9°C | 12 °C | 0.532 kg/L | 0.532 kg/L |

Maximum achievable flow rate 39 L/min

Flow rate for slow run – 10 L/min

Readings at max. achievable flow rate:

| V _{MM} (L) | V _{FD} (L) | P _{MM} (kPa) | T _{MM} (°C) | T _{FD} (°C) |
|---------------------|---------------------|-----------------------|----------------------|----------------------|
| 68.58 | 69.23 | 1140 | 12.0 | 12.6 |
| 70.13 | 70.69 | 1180 | 12.6 | 13.1 |
| 67.71 | 68.32 | 1200 | 12.8 | 13.4 |
| 73.00 | 73.24 | 1200 | 12.9 | 13.7 |

Compensated readings:

| V _{FD} (L) | V _{FD15} (L) | T _{FD} (°C) |
|---------------------|-----------------------|----------------------|
| 69.23 | 69.61 | 12.6 |

Readings at min. achievable flow rate 10 L/min:

| V _{MM} (L) | V _{FD} (L) | P _{MM} (kPa) | T _{MM} (°C) | T _{FD} (°C) |
|---------------------|---------------------|-----------------------|----------------------|----------------------|
| 67.73 | 68.57 | 1380 | 12.4 | 13.1 |

Test report 1 for LPG dispensers

Test report reference number

Date of test

Type of test (tick one)

Verification

In-service inspection

For in-service inspection or re-verification, record the verification mark:

Name of owner/user

Address of owner/user

Name of contact person on premises

Trading Name

Address of instrument location

Description of dispenser

Manufacturer

Model

Dispenser number(s)

Dispenser serial number

Certificate(s) of approval number

LPG density range dispenser approved to deliver

Minimum flowrate

Maximum flowrate

Details of the Reference Standards of Measurement (clause 2)

| Reference standards | |
|-------------------------------------|--|
| Make | |
| Model | |
| Serial number | |
| Flowrate range/weight | |
| Regulation 13/37 certificate number | |
| Certificate expiry date | |

Test report 1 for LPG dispensers

| General Characteristics (clause 3.3) | Yes, no or N/A | |
|--|----------------|------|
| Does the dispenser comply with its Certificate(s) of Approval? | | |
| Is the dispenser being used in an appropriate manner? | | |
| Are all mandatory descriptive markings clearly and permanently marked on the data plate? | | |
| Is the data plate fixed on the dispenser? | | |
| Is the dispenser complete? | | |
| Is the dispenser clean? | | |
| Is the dispenser operational? | | |
| Is the operation of the dispenser free of any apparent obstructions? | | |
| Is the dispenser firmly fixed on its foundations? | | |
| Are all external panels secure? | | |
| Are the cover windows broken? | | |
| Does the operator (and where applicable, the customer) have a clear and unobstructed view of the indicating device and the entire measuring process? | | |
| Do the indications of volume, unit price and total price correctly correspond with the selected hose? | | |
| Are all indications clearly visible under all conditions day and night? | | |
| Are all hoses in a serviceable condition, e.g. not badly chafed, split, or worn through to the fabric? | | |
| Are there any leaks? | | |
| For self-service systems, do the dispenser number(s) correctly correspond with the console? | | |
| <hr/> | | |
| Checking facility for electronic indicating devices (clause 4.1) | Pass | Fail |
| Zero setting (clause 4.2) | Pass | Fail |
| Price computing (clause 4.3) | Pass | Fail |
| Interlock (clause 4.4) | Pass | Fail |
| Density and temperature settings (clause 4.5) | Pass | Fail |
| Pre-set indications (clause 4.6) | Pass | Fail |

Test Report 1-1 for LPG dispensers with V_{FD}/V_{FD15} Switch which are tested volumetrically using a master meter

| Master meter serial number | | Density displayed by dispenser | | | kg/L | | Temperature displayed by dispenser (T _{FDI}) | | °C | | |
|--|----------------------------|--------------------------------|------------------|-------------------------|------------------|-------|--|---------------------|-------|--------------------------------------|------|
| Hydrometer readings | Observed P _e = | kPa | | Observed temperature = | | °C | | Observed density = | kg/L | Density at 15°C D ₁₅ = | kg/L |
| | Corrected P _e = | kPa | | Corrected temperature = | | °C | | Corrected density = | kg/L | | |
| Totaliser at the end | L | Total vol used | Delivery 1 | Delivery 2 | Delivery 3 | Spare | Compensated with V _{FD} /V _{FD15} switch | Delivery 1 | Spare | | |
| Totaliser at the start | L | L | Q _{max} | Q _{max} | Q _{max} | | | Q _{min} | | | |
| T _{MM} | | | °C | °C | °C | °C | | °C | °C | | |
| P _{MM} | | | kPa | kPa | kPa | kPa | | kPa | kPa | | |
| D _p | | | kPa | kPa | kPa | kPa | | kPa | kPa | | |
| V _{MM} | | | L | L | L | L | | L | L | | |
| Maximum achievable flow rate | | | L/min | L/min | L/min | L/min | | L/min | L/min | | |
| MF _{MM} | | | | | | | | | | | |
| C _{tMM} (using density at 15°C, T _{MM}) | | | | | | | | | | | |
| C _{pMM} (using P _e , density at 15°C, T _{MM} , P _{MM}) | | | | | | | | | | | |
| V _{REF} ♦ (V _{MM} × C _{tMM} × C _{pMM} × MF _{MM}) | | | L | L | L | L | | L | L | | |
| T _{FD} | | | °C | °C | °C | °C | °C | °C | °C | | |
| T _{FD} - T _{FDI} | | | °C | °C | °C | °C | °C | °C | °C | | |
| V _{FD} | | | L | L | L | L | L | L | L | | |
| V _{FD15} | | | | | | | L | | | | |
| C _{tFD} (using density at 15°C, T _{FD}) | | | | | | | | | | | |
| V _{FD,c} (V _{FD} × C _{tFD}) | | | L | L | L | L | L | L | L | | |
| E _{FD} [(V _{FD,c} - V _{REF})/V _{REF} × 100] | | | % | % | % | % | | % | % | | |
| E _C [(V _{FD15} - V _{FD,c})/V _{FD,c} × 100] | | | | | | | E _C = | % | | | |

♦ The correction factor MF_{MM} is the meter factor obtained from a traceable measurement report.

Inspector's name

Identification number

Comments

Test report question (subclass 10.1) tested using a mass flowmeter

Complete the relevant parts of the [test report 1 for LPG dispensers](#) using the information provided. Where any calculations are needed to complete any parts of the test report, then complete them so you can fill out all relevant parts of the test report. **At the bottom of the form, state whether the instrument has passed or failed and give reasons for any failure.**

If any test results are not given below, assume all tests required for INITIAL verification have been completed and passed and fill out the form appropriately. For example, if there is no information regarding a zero-setting test, and this test is required, assume it has been completed and check the relevant part of the form.

If you do not currently have a verifier number, use the verifier number VR-09999.

Details:

Verification carried out at Avalon Fuel Stop at 4 Western HWY, Avalon, 3999

Instrument owned by Phase 10 Pty Ltd, 1234 Queen Street, Brisbane 4000

Contact person – General Manager Ricardo Valenti

Instrument verified on 1st May 2021

Instrument Verified is a Compac Model L LPG Fuel dispenser, approval number 10/1/28, serial number S654321

Instrument was verified following installation.

Instrument data:

Visual inspection: All components are as per certificate of approval and the instrument is in good condition, with no traceable leaks.

Data plate markings:

Manufacturer's name/ mark – Compac Industries Ltd

Model - L

Serial number – S123456

Approval number - NMI 10/1/28

Year of manufacture - 2016

Maximum flow rate – 50 L/min

Minimum flow rate – 4 L/min

Maximum operating pressure P_{max} – 2600 kPa

Minimum pressure P_{min} – 200 kPa above vapour pressure

Approved for LPG density range (at 15°C) – 505-570 kg/m³

Maximum liquid temperature – 50°C

Minimum liquid temperature – -10°C

Accuracy class – Class 1.0

Environmental class - Class C

Reference standard details:

Make and model – Micromotion, CMF050

Serial No. 482211 2003 & 3703154

Flowrate range 5-100 L/min

Reg 13 certificate Number RN289933B

Expiry 13.1.21

Measured meter factors (MF_{MFM}) for the mass flowmeter used:

| Product LPG | Indicated flow rate (Litres/minute) | Mass flowmeter Correction Factors |
|----------------|-------------------------------------|-----------------------------------|
| | 7.5 | 0.9991 |
| | 30.0 | 0.9989 |
| | 70.1 | 0.9987 |
| | 97.1 | 0.9985 |

Test results:

For the purpose of this assessment, instrument includes a switch that allows compensated and uncompensated values to be viewed.

T_{MFM} , P_{MFM} and T_{FD} as given below are all 'corrected' values.

Totaliser at the start – 473256 L; at end 473492 L

Density displayed by dispenser – 0.535°C

Temperature displayed by dispenser – 18.5°C

Maximum achievable flow rate 42 L/min

Flow rate for slow run – 8 L/min

Hydrometer Readings:

| Observed Temp | Corrected Temp | Observed density | Corrected density |
|---------------|----------------|------------------|-------------------|
| 19.2°C | 19.1 °C | 0.534 kg/L | 0.534 kg/L |

Readings at max. achievable flow rate:

| M_{MFM} (kg) | V_{FD} (L) | P_{MFM} (kPa) | T_{MFM} (°C) | T_{FD} (°C) |
|----------------|--------------|-----------------|----------------|---------------|
| 29.02 | 54.41 | 1220 | 19.5 | 18.9 |
| 30.85 | 58.23 | 1220 | 19.8 | 19.2 |
| 30.07 | 56.34 | 1240 | 19.9 | 19.2 |

Compensated readings:

| V_{FD} (L) | V_{FD15} (L) | T_{FD} (°C) |
|--------------|----------------|---------------|
| 54.41 | 54.06 | 18.9 |

Readings at min. achievable flow rate 10 L/min:

| M_{MFM} (kg) | V_{FD} (L) | P_{MFM} (kPa) | T_{MFM} (°C) | T_{FD} (°C) |
|----------------|--------------|-----------------|----------------|---------------|
| 31.52 | 58.85 | 1460 | 19.7 | 19.1 |

Test report 1 for LPG dispensers

Test report reference number Date of test

Type of test (tick one) Verification In-service inspection

For in-service inspection or re-verification, record the verification mark:

Name of owner/user

Address of owner/user

Name of contact person on premises

Trading Name

Address of instrument location

Description of dispenser

Manufacturer Model

Dispenser number(s)

Dispenser serial number Certificate(s) of approval number

LPG density range dispenser approved to deliver

Minimum flowrate Maximum flowrate

Details of the Reference Standards of Measurement (clause 2)

| Reference standards | |
|-------------------------------------|--|
| Make | |
| Model | |
| Serial number | |
| Flowrate range/weight | |
| Regulation 13/37 certificate number | |
| Certificate expiry date | |

Test report 1 for LPG dispensers

| General Characteristics (clause 3.3) | Yes, no or N/A | |
|--|----------------|------|
| Does the dispenser comply with its Certificate(s) of Approval? | | |
| Is the dispenser being used in an appropriate manner? | | |
| Are all mandatory descriptive markings clearly and permanently marked on the data plate? | | |
| Is the data plate fixed on the dispenser? | | |
| Is the dispenser complete? | | |
| Is the dispenser clean? | | |
| Is the dispenser operational? | | |
| Is the operation of the dispenser free of any apparent obstructions? | | |
| Is the dispenser firmly fixed on its foundations? | | |
| Are all external panels secure? | | |
| Are the cover windows broken? | | |
| Does the operator (and where applicable, the customer) have a clear and unobstructed view of the indicating device and the entire measuring process? | | |
| Do the indications of volume, unit price and total price correctly correspond with the selected hose? | | |
| Are all indications clearly visible under all conditions day and night? | | |
| Are all hoses in a serviceable condition, e.g. not badly chafed, split, or worn through to the fabric? | | |
| Are there any leaks? | | |
| For self-service systems, do the dispenser number(s) correctly correspond with the console? | | |
| | | |
| Checking facility for electronic indicating devices (clause 4.1) | Pass | Fail |
| Zero setting (clause 4.2) | Pass | Fail |
| Price computing (clause 4.3) | Pass | Fail |
| Interlock (clause 4.4) | Pass | Fail |
| Density and temperature settings (clause 4.5) | Pass | Fail |
| Pre-set indications (clause 4.6) | Pass | Fail |

Test report 1 for LPG dispensers

Test Report 1-3 for LPG Dispensers with VFD/VFD15 Switch which are tested volumetrically using a mass flowmeter

Mass flowmeter serial number Density displayed by dispenser kg/L Temperature displayed by dispenser °C

| Hydrometer readings | Observed temperature = °C | | | | | | Observed density = kg/L | Density at 15°C | |
|------------------------------|--|---------------------|------------------|------------------|------------------|-------|---|------------------------|-------|
| | Corrected temperature = °C | | | | | | Corrected density = kg/L | D ₁₅ = kg/L | |
| Totaliser at the end | L | Total vol used L | Delivery 1 | Delivery 2 | Delivery 3 | Spare | Compensated with V _{FD} /V _{FD15} switch | Delivery 1 | Spare |
| Totaliser at the start | L | | Q _{max} | Q _{max} | Q _{max} | | | Q _{min} | |
| M _{MFM} | | | kg | kg | kg | kg | | kg | kg |
| P _{MFM} | | | kPa | kPa | kPa | kPa | | kPa | kPa |
| T _{MFM} | | | °C | °C | °C | °C | | °C | °C |
| MF _{MFM} | | | | | | | | | |
| V _{REF} | (M _{MFM} × MF _{MFM}) / D ₁₅ | | L | L | L | L | | L | L |
| Maximum achievable flow rate | | | L/min | L/min | L/min | L/min | | L/min | L/min |
| T _{FD} | | | °C | °C | °C | °C | °C | °C | °C |
| V _{FD} | | | L | L | L | L | L | L | L |
| V _{FD15} | | | | | | | L | | |
| C _{IFD} | (using density at 15°C, T _{FD}) | | | | | | | | |
| V _{FD,c} | (V _{FD} × C _{IFD}) | | L | L | L | L | L | L | L |
| E _{FD} | [(V _{FD,c} - V _{REF}) / V _{REF} × 100] | | % | % | % | % | | % | % |
| E _C | [(V _{FD15} - V _{FD,c}) / V _{FD,c} × 100] | | | | | | E _C = % | | |

Inspector's/verifier's name

Identification number

Comments

Subclass 10.1 tested gravimetrically

Complete the relevant parts of the [test report 1 for LPG dispensers](#) using the information provided. Where any calculations are needed to complete any parts of the test report, then complete them so you can fill out all relevant parts of the test report. **At the bottom of the form, state whether the instrument has passed or failed and give reasons for any failure.**

If any test results are not given below, assume that all tests required for INITIAL verification have been completed and passed and fill out the form appropriately. For example, if there is no information regarding a zero-setting test, and this test is required, assume it has been completed and check the relevant part of the form.

If you do not currently have a verifier number, use the verifier number VR-09999.

Details:

Verification carried out at Avalon Fuel Stop at 4 Western HWY, Avalon, 3999

Instrument owned by Phase 10 Pty Ltd, 1234 Queen Street, Brisbane 4000

Contact person – General Manager Ricardo Valenti

Instrument verified on 7 June 2021

Instrument Verified is a Compac Model L LPG Fuel dispenser, approval number 10/1/28, serial number S123456

Instrument was verified following installation.

Instrument data:

Visual inspection: All components are as per certificate of approval and the instrument is in good condition, with no traceable leaks.

Data plate markings:

Manufacturer's name or mark – Compac Industries Ltd

Model - L

Serial number – S123456

Approval number - NMI 10/1/28

Year of manufacture - 2016

Maximum flow rate – 50 L/min

Minimum flow rate– 4 L/min

Maximum operating pressure P_{max} – 2600 kPa

Minimum pressure P_{min} – 200 kPa above vapour pressure

Approved for LPG density range (at 15°C) – 505-570 kg/m³

Maximum liquid temperature – 50°C

Minimum liquid temperature – -10°C

Accuracy class – Class 1.0

Environmental class - Class C

Reference standard details:

Include details of your own reference standards for this part of the form.

Test results:

For the purpose of this assessment, instrument includes a switch that allows compensated and uncompensated values to be viewed.

T_{FD} values, as given below, are all 'corrected' values.

Totaliser at the start – 473256 L; at end 473492 L

Density displayed by dispenser – 0.525°C

Temperature displayed by dispenser – 18.5°C

Maximum achievable flow rate 42 L/min

Flow rate for slow run – 8 L/min

Hydrometer Readings:

| Observed Temp | Corrected Temp | Observed density | Corrected density |
|---------------|----------------|------------------|-------------------|
| 19.2°C | 19.1 °C | 0.534 kg/L | 0.534 kg/L |

Readings at max. achievable flow rate:

| Mass of LPG (kg) | V_{FD} (L) | T_{FD} (°C) |
|------------------|--------------|---------------|
| 29.02 | 54.42 | 18.9 |
| 30.85 | 58.12 | 19.2 |
| 30.07 | 56.43 | 19.2 |

Compensated readings:

| V_{FD} (L) | V_{FD15} (L) | T_{FD} (°C) |
|--------------|----------------|---------------|
| 54.42 | 54.06 | 18.9 |

Readings at min. achievable flow rate 10 L/min:

| Mass of LPG | V_{FD} (L) | T_{FD} (°C) |
|-------------|--------------|---------------|
| 31.52 | 58.62 | 19.1 |

Test report 1 for LPG dispensers

Test report reference number

Date of test

Type of test (tick one)

Verification

In-service inspection

For in-service inspection or re-verification, record the verification mark:

Name of owner/user

Address of owner/user

Name of contact person on premises

Trading Name

Address of instrument location

Description of dispenser

Manufacturer

Model

Dispenser number(s)

Dispenser serial number

Certificate(s) of approval number

LPG density range dispenser approved to deliver

Minimum flowrate

Maximum flowrate

Details of the Reference Standards of Measurement (clause 2)

| Reference standards | |
|-------------------------------------|--|
| Make | |
| Model | |
| Serial number | |
| Flowrate range/weight | |
| Regulation 13/37 certificate number | |
| Certificate expiry date | |

Test report 1 for LPG dispensers

| General Characteristics (clause 3.3) | Yes, no or N/A | |
|--|----------------|------|
| Does the dispenser comply with its Certificate(s) of Approval? | | |
| Is the dispenser being used in an appropriate manner? | | |
| Are all mandatory descriptive markings clearly and permanently marked on the data plate? | | |
| Is the data plate fixed on the dispenser? | | |
| Is the dispenser complete? | | |
| Is the dispenser clean? | | |
| Is the dispenser operational? | | |
| Is the operation of the dispenser free of any apparent obstructions? | | |
| Is the dispenser firmly fixed on its foundations? | | |
| Are all external panels secure? | | |
| Are the cover windows broken? | | |
| Does the operator (and where applicable, the customer) have a clear and unobstructed view of the indicating device and the entire measuring process? | | |
| Do the indications of volume, unit price and total price correctly correspond with the selected hose? | | |
| Are all indications clearly visible under all conditions day and night? | | |
| Are all hoses in a serviceable condition, e.g. not badly chafed, split, or worn through to the fabric? | | |
| Are there any leaks? | | |
| For self-service systems, do the dispenser number(s) correctly correspond with the console? | | |
| Checking facility for electronic indicating devices (clause 4.1) | Pass | Fail |
| Zero setting (clause 4.2) | Pass | Fail |
| Price computing (clause 4.3) | Pass | Fail |
| Interlock (clause 4.4) | Pass | Fail |
| Density and temperature settings (clause 4.5) | Pass | Fail |
| Pre-set indications (clause 4.6) | Pass | Fail |

Test Report 1-5 for LPG dispensers with V_{FD}/V_{FD15} switch which are tested gravimetrically

Density displayed by dispenser

kg/L

Temperature displayed by dispenser

°C

| | | | | | | | | | |
|--|----------------------------|---------------------|--------------------------------|--------------------------------|--------------------------------|-------|--|--------------------------------|-------|
| Hydrometer readings | Observed temperature = °C | | | | | | Observed density = kg/L | Density at 15°C | |
| | Corrected temperature = °C | | | | | | Corrected density = kg/L | D ₁₅ = kg/L | |
| Totaliser at the end | L | Total vol used L | Delivery 1 Q _{max} | Delivery 2 Q _{max} | Delivery 3 Q _{max} | Spare | Compensated with V_{FD}/V_{FD15} switch | Delivery 1 Q _{min} | Spare |
| Totaliser at the start | L | | | | | | | | |
| Mass of LPG | | | kg | kg | kg | kg | | kg | kg |
| V_{REF} [mass (kg) of LPG/density at 15°C] | | | L | L | L | L | | L | L |
| Maximum achievable flow rate | | | L/min | L/min | L/min | L/min | | L/min | L/min |
| T_{FD} | | | °C | °C | °C | °C | °C | °C | °C |
| V_{FD} | | | L | L | L | L | L | L | L |
| V_{FD15} | | | | | | | L | | |
| C_{HFD} (using density at 15°C, T_{FD}) | | | | | | | | | |
| $V_{FD,c}$ ($V_{FD} \times C_{HFD}$) | | | L | L | L | L | L | L | L |
| E_{FD} [$(V_{FD,c} - V_{REF})/V_{REF} \times 100$] | | | % | % | % | % | | % | % |
| E_C [$(V_{FD15} - V_{FD,c})/V_{FD,c} \times 100$] | | | | | | | $E_C =$ % | | |

Inspector's/verifier's name

Identification number

Comments

Subclass 10.2 tested using a master meter

Complete the relevant parts of the [test report for bulk LPG flowmetering systems](#) using the information provided. Where any calculations are needed to complete any parts of the test report, then complete them so you can fill out all relevant parts of the test report. **At the bottom of the form, state whether the instrument has passed or failed and give reasons for any failure.**

If any test results are not given below, assume that all tests required for INITIAL verification have been completed and passed and fill out the form appropriately. For example, if there is no information regarding a zero-setting test, and this test is required, assume it has been completed and check the relevant part of the form.

If you do not currently have a verifier number, use the verifier number VR-09999.

Details:

Verification carried out at Emirates LPG Supplies at 178-210, Prince of Wales Drive, Port Botany, 2036.

Instrument owned by Emirates LPG Ltd, 1234 George Street, Sydney 2000

Contact person – General Manager Rashid Hamdan

Instrument verified on 24th June 2021

Instrument verified is a Liquip Model VTM bulk LPG flowmeter, approval number 10/2/17, serial number J123465

Instrument was verified at the request of the customer, within MPE and following adjustment.

Instrument data:

Visual inspection: All components are as per certificate of approval and the instrument is in good condition, with no traceable leaks.

Data plate markings:

Manufacturer's name or mark – Liquip

Meter model – VTM-150A

Serial number – P132465

Approval number - NMI 10/2/17

Year of manufacture - 2015

Minimum flow rate – 100 L/min

Maximum flow rate – 500 L/min

Density range at 15°C – 505-580 kg/m³

Nominal k-factor (pulses/litre) – 23.52 pul/L

Environmental classes – Class I

Accuracy class – 1.0

Maximum operating pressure – 1900 kPa

Minimum operating pressure – 1200 kPa

Minimum delivery – 100 L

Reference standard details:

Make and Model – Schlumberger 4MT

Serial No. – GU1661

Flowrate range 90-360 L/min

Reg. 13 certificate Number – RN124742

Expiry 1/3/21

Measured meter factors (MF_{MM}) for the master meter used:

| Product LPG | Indicated flow rate (Litres/minute) | Master Meter Correction Factors |
|----------------|-------------------------------------|---------------------------------|
| | 89.7 | 1.0034 |
| | 99.7 | 1.0028 |
| | 149.9 | 1.0005 |
| | 199.9 | 1.0004 |
| | 249.9 | 1.0004 |
| | 349.9 | 1.0003 |

Test results:

T_{MM}, P_{MM} and T_{FS} as given below are all 'corrected' values.

Totaliser at the start – 12374548 L; at end 12376991 L

Density displayed by system – 0.510 kg/L

Temperature displayed by system – 25°C

Hydrometer readings:

| Observed P _e | Corrected P _e | Observed Temp | Corrected Temp | Observed density | Corrected density |
|-------------------------|--------------------------|---------------|----------------|------------------|-------------------|
| 870 kPa | 860 kPa | 22.6°C | 22.5 °C | 0.4996 kg/L | 0.500 kg/L |

Readings at max. achievable flow rate 280 L/min:

| V _{MM} (L) | V _{FS} (L) | P _{MM} (kPa) | T _{MM} (°C) | T _{FS} (°C) |
|---------------------|---------------------|-----------------------|----------------------|----------------------|
| 301.6 | 303.1 | 1630 | 22.5 | 22.3 |
| 306.9 | 311.9 | 1650 | 22.5 | 22.4 |
| 316.6 | 317.9 | 1650 | 22.7 | 22.4 |

Compensated readings at max. achievable flow rate 280 L/min:

| V _{MM} (L) | V _{FS15} (L) | P _{MM} (kPa) | T _{MM} (°C) | T _{FS} (°C) |
|---------------------|-----------------------|-----------------------|----------------------|----------------------|
| 298.2 | 289.9 | 1650 | 22.6 | 22.8 |
| 298.2 | 298.9 | 1650 | 22.6 | 22.8 |
| 305.8 | 297.6 | 1630 | 22.4 | 22.9 |

Readings at min. achievable flow rate 110 L/min:

| V _{MM} (L) | V _{FS} (L) | P _{MM} (kPa) | T _{MM} (°C) | T _{FS} (°C) |
|---------------------|---------------------|-----------------------|----------------------|----------------------|
| 301.8 | 300.4 | 1660 | 22.7 | 22.3 |

Readings during meter creep test:

| V _{MM} (L) | V _{FS} (L) | P _{MM} (kPa) | T _{MM} (°C) | T _{FS} (°C) |
|---------------------|---------------------|-----------------------|----------------------|----------------------|
| 316.6 | 322.4 | 1650 | 22.7 | 22.4 |

Test report for LPG flowmetering systems

Test report reference number

Date of test

Type of test (tick one)

Verification

Certification

In-service inspection

For in-service inspection record the verification/certification mark

Trading name

Address of test site

Name of contact at test site (if applicable)

Manufacturer

Model

Serial number/s

Certificate/s of approval number/s

Vehicle registration (if applicable)

LPG density range

Minimum flow rate (Q_{\min})

L/min

Maximum flow rate (Q_{\max})

L/min

Nominal flow rate (if applicable)

L/min

Minimum measured quantity

Reading of the non-resettable totaliser (if applicable)

Software version and indicator model in use (if applicable)

| | | | |
|--|-----|----|-----|
| Does the flowmetering system comply with its certificate/s of approval? | Yes | No | |
| Are all mandatory descriptive markings clearly and permanently marked on a data plate which is fixed to the flowmetering system? | Yes | No | |
| Are all permanently attached components fixed rigidly? | Yes | No | |
| Are the indications legible and clearly visible under all conditions? | Yes | No | |
| Are the hoses, if any, in a serviceable condition? | Yes | No | N/a |
| Are there any leaks? | Yes | No | |

| | | | |
|---|-------------|-------------|-----|
| Indicating devices (clause 4.1) | Pass | Fail | |
| Zero setting (clause 4.2) | Pass | Fail | N/a |
| Non-return valve (clause 4.3) | Pass | Fail | N/a |
| Interlock (clause 4.4) | Pass | Fail | N/a |
| Maximum flow rate (clause 4.5) | Pass | Fail | |
| Accuracy volumetric method (clause 4.7.1) on Test Report (a) | Pass | Fail | N/a |
| Accuracy gravimetric method (clause 4.7.2) on Test Report (b) | Pass | Fail | N/a |
| Conversion device (clause 4.8) | Pass | Fail | N/a |
| Repeatability (clause 4.9) | Pass | Fail | N/a |
| Meter creep (clause 4.10) and Test Report (a) OR (b) | Pass | Fail | N/a |
| Pre-set indications (clause 4.11.1) | Pass | Fail | N/a |
| Accuracy of pre-set (clause 4.11.2) | Pass | Fail | N/a |
| Printing device (clause 4.12) | Pass | Fail | |
| Overall result | Pass | Fail | |

i. Volumetric testing

| | | | | | | | | | | | |
|--|-------------------|--|-------------|---------------------|----------------------------------|--|--|--------|--------|--|-----|
| Master meter serial number = | | Density displayed by flowmetering system = | | | kg/L | Temperature displayed by flowmetering system = | | | °C | | |
| Hydrometer readings (clause 4.6) | Pressure | | Temperature | | Density | | Density at 15°C | | | | |
| | Observed | Corrected | Observed | Corrected | Observed | Corrected | D ₁₅ = | | | | |
| | kPa | kPa | °C | °C | kg/L | kg/L | | | | | |
| Totaliser at the end = | L | Q _{max} (clause 4.7) | | | Q _{min} (clause 4.7) | Meter creep (clause 4.10) | Compensated Q _{max} (clause 4.8) | | | Linearisation correction (clause 4.7) | |
| Totaliser at the start = | L | Test 1 | Test 2 | Test 3 | | | Test 1 | Test 2 | Test 3 | L 1 | L 2 |
| Total volume used = | L | | | | | | | | | | |
| Maximum achievable flow rate (L/min) | | | | | | | | | | | |
| T _{FS} (°C) | | | | | | | | | | | |
| T _{MM} (°C) | | | | | | | | | | | |
| P _{MM} (kPa) | | | | | | | | | | | |
| V _{MM} (L) | | | | | | | | | | | |
| V _{FS} (L) | | | | | | | | | | | |
| V _{FS15} (L) | | | | | | | | | | | |
| C _{IFS} ♣ (using D ₁₅ , T _{FS} , Table 54) | | | | | | | 1.000* | 1.000* | 1.000* | | |
| C _{IMM} ♣ (using D ₁₅ , T _{MM} , Table 54) | | | | | | | | | | | |
| C _{PIIMM} (using P _e , D ₁₅ , T _{MM} , P _{MM}) | | | | | | | | | | | |
| MF _{MM} | | | | | | | | | | | |
| V _{REF15} ♦ = [V _{MM} × C _{IMM} × C _{PIIMM} × MF _{MM}] (L) | | | | | | | | | | | |
| V _{FS,c} = [V _{FS} × C _{IFS}] | | | | | | | | | | | |
| E _{FS} = [(V _{FS,c} - V _{REF15})/V _{REF15} × 100] | | | | | | | | | | | |
| E _{FS15} = [(V _{FS,c} - V _{REF15})/V _{REF15} × 100] | | | | | | | | | | | |
| | E _{AV} = | | | E _{AV,c} = | | | | | | | |
| E _C = (E _{AV,c} - E _{AV}) | | | | | | | | | | | |

♣ If the difference between T_{FS} and T_{MM} is <0.5°C, the conversion factors can be set to unity (see Appendix B).

♦ The correction factor MF_{MM} is the meter factor obtained from a traceable measurement report.

* For compensated delivery the conversion factor C_{IFS} must be set to unity.

Inspector's/verifier's name

Identification number

Comments

Subclass 10.2 tested gravimetrically

Complete the relevant parts of the [test report for bulk LPG flowmetering systems](#) using the information provided. Where any calculations are needed to complete any parts of the test report, then complete them so you can fill out all relevant parts of the test report form. **At the bottom of the form, state whether the instrument has passed or failed and give reasons for any failure.**

If any tests are not given below, assume that all tests required for INITIAL verification have been completed and passed and fill out the form appropriately. For example, if there is no information regarding a zero-setting test, and this test is required, assume it has been completed and check the relevant part of the form.

If you do not currently have a verifier number, use the verifier number VR-09999.

Details:

Verification carried out at Emirates LPG Supplies at 178-210, Prince of Wales Drive, Port Botany, 2036.

Instrument owned by Emirates LPG Ltd, 1234 George Street, Sydney 2000

Contact person – General Manager Rashid Hamdan

Instrument verified on 12th April 2021

Instrument verified is a Liquip Model VTM bulk LPG flowmeter, approval number 10/2/17, serial number LP1331465

Instrument was verified at the request of the customer, within MPE and following adjustment.

Instrument data:

Visual inspection: All components are as per certificate of approval and the instrument is in good condition, with no traceable leaks

Data plate markings:

Manufacturer's name or mark – Liquip

Meter model – VTM-150A

Serial number – P132465

Approval number - NMI 10/2/17

Year of manufacture - 2015

Minimum flow rate – 100 L/min

Maximum flow rate – 500 L/min

Density range at 15°C – 505-580 kg/m³

Nominal k-factor (pulses/litre) – 23.52 pul/L

Environmental classes – Class I

Accuracy class – 1.0

Maximum operating pressure – 1900 kPa

Minimum operating pressure – 1200 kPa

Minimum delivery – 100 L

Test results:

T_{MM}, P_{MM} and T_{FS} as given below are all 'corrected' values.

Totaliser at the start – 12374548 L; at end 12376991 L

Density displayed by system – 0.510 kg/L

Temperature displayed by system – 25°C

D₁₅ = 0.512 kg/L

Hydrometer readings:

| Observed Temp | Corrected Temp | Observed density | Corrected density |
|---------------|----------------|------------------|-------------------|
| 22.6°C | 22.5 °C | 0.4996 kg/L | 0.500 kg/L |

Readings at max. achievable flow rate 250 L/min:

| Mass of LPG (kg) | V _{FS} (L) | T _{FS} (°C) |
|------------------|---------------------|----------------------|
| 151.02 | 303.1 | 22.3 |
| 155.39 | 311.9 | 22.4 |
| 158.45 | 317.9 | 22.4 |

Compensated readings at max. achievable flow rate 250 L/min:

| Mass of LPG (kg) | V _{FS15} (L) | T _{FS} (°C) |
|------------------|-----------------------|----------------------|
| 149.29 | 289.9 | 22.8 |
| 153.63 | 298.9 | 22.8 |
| 153.19 | 297.6 | 22.9 |

Readings at min. achievable flow rate 120 L/min:

| Mass of LPG (kg) | V _{FS} (L) | T _{FS} (°C) |
|------------------|---------------------|----------------------|
| 149.68 | 300.4 | 22.3 |

Readings during meter creep test:

| Mass of LPG (kg) | V _{FS} (L) | T _{FS} (°C) |
|------------------|---------------------|----------------------|
| 158.45 | 322.4 | 22.4 |

Test report for LPG flowmetering systems

Test report reference number

Date of test

Type of test (tick one)

Verification

Certification

In-service inspection

For in-service inspection record the verification/certification mark

Trading name

Address of test site

Name of contact at test site (if applicable)

Manufacturer

Model

Serial number/s

Certificate/s of approval number/s

Vehicle registration (if applicable)

LPG density range

Minimum flow rate (Q_{min})

L/min

Maximum flow rate (Q_{max})

L/min

Nominal flow rate (if applicable)

L/min

Minimum measured quantity

Reading of the non-resettable totaliser (if applicable)

Software version and indicator model in use (if applicable)

| | | | |
|--|-----|----|-----|
| Does the flowmetering system comply with its certificate/s of approval? | Yes | No | |
| Are all mandatory descriptive markings clearly and permanently marked on a data plate which is fixed to the flowmetering system? | Yes | No | |
| Are all permanently attached components fixed rigidly? | Yes | No | |
| Are the indications legible and clearly visible under all conditions? | Yes | No | |
| Are the hoses, if any, in a serviceable condition? | Yes | No | N/a |
| Are there any leaks? | Yes | No | |

| | | | |
|---|-------------|-------------|-----|
| Indicating devices (clause 4.1) | Pass | Fail | |
| Zero setting (clause 4.2) | Pass | Fail | N/a |
| Non-return valve (clause 4.3) | Pass | Fail | N/a |
| Interlock (clause 4.4) | Pass | Fail | N/a |
| Maximum flow rate (clause 4.5) | Pass | Fail | |
| Accuracy volumetric method (clause 4.7.1) on Test Report (a) | Pass | Fail | N/a |
| Accuracy gravimetric method (clause 4.7.2) on Test Report (b) | Pass | Fail | N/a |
| Conversion device (clause 4.8) | Pass | Fail | N/a |
| Repeatability (clause 4.9) | Pass | Fail | N/a |
| Meter creep (clause 4.10) and Test Report (a) OR (b) | Pass | Fail | N/a |
| Pre-set indications (clause 4.11.1) | Pass | Fail | N/a |
| Accuracy of pre-set (clause 4.11.2) | Pass | Fail | N/a |
| Printing device (clause 4.12) | Pass | Fail | |
| Overall result | Pass | Fail | |

(b) Gravimetric testing

| | | | | | | | | | | | | |
|--|-------------|-------------------------------|-----------|--------|--|---------------------------|--------------------------|--------|-------------------|---------------------------------------|-----|-----|
| Density displayed by flowmetering system = | | | | kg/L | Temperature displayed by flowmetering system = | | | | °C | | | |
| Hydrometer readings (clause 4.6) | Temperature | | | | Density | | | | Density at 15°C | | | |
| | Observed | | Corrected | | Observed | | Corrected | | D ₁₅ = | | | |
| | °C | | °C | | kg/L | | kg/L | | | | | |
| Totaliser at the end = | L | Q _{max} (clause 4.7) | | | Q _{min} (clause 4.7) | Meter creep (clause 4.10) | Compensated (clause 4.8) | | | Linearisation correction (clause 4.7) | | |
| Totaliser at the start = | L | Test 1 | Test 2 | Test 3 | | | Test 1 | Test 2 | Test 3 | L 1 | L 2 | L 3 |
| Total volume used = | L | | | | | | | | | | | |
| Maximum achievable flow rate (L/min) | | | | | | | | | | | | |
| Mass of LPG (kg) | | | | | | | | | | | | |
| T _{FS} (°C) | | | | | | | | | | | | |
| V _{FS} (L) | | | | | | | | | | | | |
| V _{FS15} (L) | | | | | | | | | | | | |
| V _{REF15} (L) | | | | | | | | | | | | |
| C _{IF5} (using D ₁₅ , T _{FS} Table 54) | | | | | | | 1.000* | 1.000* | 1.000* | | | |
| V _{FS,c} = (V _{FS} × C _{IF5}) | | | | | | | | | | | | |
| E _{FS} = [(V _{FS,c} - V _{REF15})/V _{REF15} × 100] | | | | | | | | | | | | |
| E _{FS15} = [(V _{FS,c} - V _{REF15})/V _{REF15} × 100] | | | | | | | | | | | | |
| | | E _{AV} = | | | | | E _{AV,c} = | | | | | |
| E _C = (E _{AV,c} - E _{AV}) | | | | | | | | | | | | |

* For compensated delivery the conversion factor C_{IF5} must be set to unity.

Inspector's/verifier's name

Identification number

Comments

Workplace test reports and documents

In your workplace, you need to develop your skills by testing instruments in accordance with the national instrument test procedures, preferably under the supervision of an experienced, competent verifier. When completing tests, record your results, the details of the instruments tested, and any reference standards/equipment used, in test reports as used in your workplace. Show any calculations you use during the process.

Wherever possible, include reports for testing different types of instruments, and non-compliant instruments, to demonstrate your knowledge of the requirements.

If you have access to an experienced verifier, ask them to sign each test report (and any printed documents) relating to the instrument/s they have observed you testing, to indicate you completed the tests in accordance with the relevant NITP, before scanning the reports for submission.

For subclasses 10.1 and 10.2

From the pool of test reports you have produced, select a minimum of **one** report with accompanying calculations representing your best work and demonstrating your understanding of the test procedures and processes required for **initial verification** of the instrument/s.

Indicate where you would apply the verification mark to each instrument tested.

Be sure to include at least one (1) report for each subclass and test method being assessed.

You must provide an additional report/s from the test/s you complete when doing your observation.

Scan the test reports and include them with your completed recognition kit, named as described in the [instructions](#).

For subclass 18.1

You must provide **three (3) test reports** in total, along with any documents printed during testing of these instruments. **Be sure that the format of your test report is based on the [current](#) example test report for consoles given in NITP [5.1](#).**

From the pool of reports you have produced, submit a minimum of **two** reports, with accompanying calculations, representing your best work and demonstrating your understanding of the test procedures and processes required for **initial verification** of consoles. **Include copies of any printed documents produced during testing for each console.**

Indicate on the report where you would apply the verification mark to each instrument tested.

You must provide a **third test report** from the test you complete when doing your observation/video.

Scan the test reports and printed documents and include them with your completed recognition kit, named as described in the [instructions](#).

Once you have completed all your written assessments and test reports, ask the relevant person/s to complete one or more of the following third party forms before emailing your whole kit and additional documents/videos to the NMI Administrator.

Third party report (experienced verifier)

Applicant:

Use this report ONLY if you hold the relevant statement/s of attainment for the skill set/unit of competency and subclass/es being assessed. For example, if you do not have a statement of attainment that includes 18.1, another verifier who holds the relevant statement of attainment should also complete a copy of this form, referring to this part of the kit.

Persons providing a report must have directly supervised the applicant during training and completion of the simulated verifications for which the applicant is providing test reports.

You must complete all pages of this report; in particular, you must include written comments to support your responses in the checklist (other than where N/A). It is essential that you detail your observations of how the applicant ensured safety for self and others and how clearly and effectively the applicant communicated with clients/colleagues.

We thank you for your contribution. The applicant's assessor may need to contact you to clarify your responses or to gain additional information.

Are you a verifier or inspector or trade measurement? **Yes** **No**

Verifier/inspector number:

What subclass/es of instrument are indicated on the statement/s of attainment you hold? (e.g. 10.1 & 18.1)

Have you verified instruments of these subclasses within the last 18 months **Yes** **No**

State approximate numbers verified of each subclass:

Describe briefly your level of experience in testing and verifying instruments of the subclasses for which the applicant is being assessed. For example, how long have you been working with these instruments and in what ways (repairs, installation, verification).

During the last 12 months I have personally observed the applicant test the undermentioned instruments/panels (including those detailed in the test reports I have signed) without assistance, and in accordance with the National Instrument Test Procedures, paying close attention to detail and accuracy, while correctly selecting, using and handling the appropriate reference standards/test equipment:

| | Yes | No | If yes, number of instruments tested |
|--|-----|----|--------------------------------------|
| 10.1 LPG Dispensers – tested using a master meter | | | |
| 10.1 LPG Dispensers – tested using a mass flowmeter | | | |
| 10.1 LPG Dispensers – tested gravimetrically | | | |
| 10.2 Bulk LPG flowmetering systems – tested using a master meter | | | |
| 10.2 Bulk LPG flowmetering systems – tested gravimetrically | | | |
| 18.1 Control systems for liquid- measuring systems (panels) | | | |

In addition, the applicant has demonstrated to me on at least two occasions (in a simulated environment) how a verification mark should be made and where it should be applied to instruments of this/these subclass/es

Third party report (experienced verifier)

| Have you observed the applicant: | Yes | No | Not applicable/not able to comment |
|--|-----|----|------------------------------------|
| <ul style="list-style-type: none">liaise effectively with traders when organising site visits to ensure any assistance/equipment is provided, and to minimise impacts on traders, customers and employees – in accordance with company expectations? What interactions have you observed? | | | |
| <ul style="list-style-type: none">explain verification procedures and outcomes clearly and effectively to traders, including respectfully communicating any inadequacies in the way traders use instrument/s? Give at least two examples? | | | |
| <ul style="list-style-type: none">correctly select, and ensure the suitability of, reference standards/test equipment for the specific task, as required by the relevant national instrument test procedures? How did they do this? | | | |
| <ul style="list-style-type: none">maintain the integrity of reference standards/test equipment during their storage, transport and use to ensure they are suitable for use? What did you observe? | | | |
| <ul style="list-style-type: none">identify, access and correctly interpret and apply certificates of approval and certificates of verification (e.g. Reg. 13s)? Give an example of how they did this. | | | |

Third party report (experienced verifier)

Have you observed the applicant:

Yes

No

Not applicable/not
able to comment

-
- identify, access and correctly interpret and apply relevant test procedures when testing instruments? **When did you observe this?**
-

-
- evaluate the impact of the **operating environment** on the performance of the **instrument/standards/test equipment** and make any adjustments to ensure there was no impact? **Provide an example of when and how they did this.**
-

-
- identify local hazards and apply appropriate safety precautions as relevant to the hazard/s in accordance with local legislation and company procedures? Include in your comments:
 - how they ensure safety for self and others when testing instruments
 - examples of compliance with local induction requirements (if applicable)
 - how they establish access to first aid at a site.**Include an example of what you observed them do at a site.**
-

-
- correctly apply calculations to determine the verification result, as required by the national instrument test procedures?
-

-
- correctly identify and apply the correct maximum permissible errors for each individual test, as determined by national trade measurement legislation and the national instrument test procedures?
-

Third party report (experienced verifier)

| Have you observed the applicant: | Yes | No | Not applicable/not able to comment |
|---|--------------|----|------------------------------------|
| <ul style="list-style-type: none">analyse test results to determine whether an instrument could be marked for trade use, in accordance with the national instrument test procedures? | | | |
| <ul style="list-style-type: none">record, report and maintain test results and findings clearly, accurately, securely and in accordance with company policy? Provide details of how they did this. | | | |
| <ul style="list-style-type: none">correctly assess for compliance any auxiliary printing and indicating devices (non-POS/console) attached to measuring instruments? Detail the device and the instrument it was attached to. | | | |
| <ul style="list-style-type: none">solve routine or unexpected problems and seek advice, when required? Provide at least one example. | | | |
| Detail the approximate date range during which you have observed the applicant as detailed above: | From: | | To: |
| The applicant has demonstrated oral and written language and numeracy skills to a standard expected for this role in our organisation. | Yes | | No |
| Name of third party: | | | Date: |
| Telephone number of third party: | | | |

Third party report (non-verifier)

(This form is only for use where the applicant has not been supervised/trained by an experienced verifier of instruments relating to this kit)

Applicant:

Use this form if you have worked with the applicant but do NOT hold statements of attainment for this skill set (and unit of competency, if applicable)/subclasses.

You must complete all pages of this report. In particular, you must include written comments to support your responses in the checklist (other than where N/A), including details of how the applicant ensured safety for self and others and how clearly and effectively the applicant communicated with clients/colleagues. We thank you for your contribution. The applicant's assessor may need to contact you to clarify your responses, or to gain additional information.

Describe briefly your working relationship to the applicant and the types of work activities you have observed the applicant undertake:

| Have you observed the applicant: | Yes | No | Not applicable or not able to comment |
|---|-----|----|---------------------------------------|
| <ul style="list-style-type: none">liaise effectively with traders when organising site visits to ensure any assistance/equipment is provided, and to minimise impacts on traders, customers and employees – in accordance with company expectations? Provide at least one example. | | | |
| <ul style="list-style-type: none">communicate clearly, effectively and respectfully with clients and colleagues? Give at least two examples. | | | |

Third party report (non-verifier)

| Have you observed the applicant: | Yes | No | Not applicable or not able to comment |
|----------------------------------|-----|----|---------------------------------------|
|----------------------------------|-----|----|---------------------------------------|

- identify local hazards and apply appropriate safety precautions as relevant to the hazard/s, in accordance with local legislation and company procedures? Include in your comments:
 - how they ensure safety for self and others when testing instruments
 - examples of compliance with local induction requirements
 - how they establish access to first aid

Include an example of what you observed them do at a site.

- record, report and maintain test results and findings clearly, accurately and securely and in accordance with company policy?

Provide details of how they did this.

- solve routine or unexpected problems and seek advice, when required? **Provide at least one example**

Detail the approximate date window during which you have observed the applicant as detailed above:

From:

To:

The applicant has demonstrated oral and written language skills and numeracy skills to a standard expected for this role in our organisation.

Yes

No

Name of third party:

Date:

Telephone number of third party:

Record of assessor's conversation with third party (if required)

The assessor will speak to any third party/s where they have not provided sufficient confirmation of the performance of the applicant they have observed. This form will be used to record the outcomes of any conversation between the assessor and a third party.

Name/s of third party/ies

Assessor's name:

Date:

Outcome of assessor's review of applicant's test reports/printed documents

Applicant:

As part of your assessment, your assessor will use this form to record the accuracy of your submitted workplace documents.

Assessor: Use the check boxes to record if the documents have been completed/evaluated satisfactorily.

| Instrument subclass | Satisfactory | Unsatisfactory | Not applicable |
|---|--------------|----------------|----------------|
| 10.1 LPG dispensers tested: <ul style="list-style-type: none">- using a master meter- using a mass flowmeter- gravimetrically | | | |
| 10.2 Bulk LPG flowmetering systems tested: <ul style="list-style-type: none">- using a master meter- gravimetrically | | | |
| 18.1 Control systems for liquid-measuring systems | | | |

Please provide comments to support your findings on the submitted documents. Where videos are provided, use the skills observation report form for your comments.

Assessor's name:

Date:

Record of conversation with the applicant (to be completed by the assessor)

Applicant:

As part of your assessment, you will have a conversation with your assessor who may ask questions to clarify your knowledge in the following areas. Your assessor will use this checklist to record your responses.

Assessor: Use the check boxes to record the competency areas where you have asked questions. **You need not ask questions for all areas**, particularly where satisfactory evidence of competence has already been provided. You should include a list of questions asked, with expected answers and responses given, in a separate Word document. Note each correct answer provided or detail any incorrect response.

| | Satisfactory | Unsatisfactory | Not asked/not required |
|---|--------------|----------------|------------------------|
| • Preparation, planning and communication with trader | | | |
| • Using and maintaining reference standards and/or test equipment | | | |
| • Certificates of approval | | | |
| • Operating environment | | | |
| • Work, health and safety including use of SDS/SWMS | | | |
| • Maximum permissible errors | | | |
| • Test procedures | | | |
| • Test points | | | |
| • Analysis of test results | | | |
| • Marking instruments and verification documentation | | | |
| • Auxiliary devices | | | |
| • Reporting test results | | | |
| • Inappropriate use of instruments by trader | | | |
| • Servicing licence documentation and procedures including maintaining confidentiality and security of data | | | |

Applicant's ID checked at interview:

Assessor's name:

Date:

Skills observation report to be completed by the assessor or an NMI-appointed skills observer (SO)

Name of applicant:

Skill set/unit of competency being assessed:

Subclass of instrument being observed:

Name of observer:

SO

Assessor

Contact number for skills observer:

Applicant's photo ID viewed by observer

Type of ID viewed:

Test report attached

Time at observation site:

As part of your assessment, you will need to demonstrate completing a simulated initial verification of at least one instrument/measure in a real or simulated workplace environment. This is a requirement of the performance evidence you must demonstrate for this skill set/unit of competency. During the observation, you should complete a test report for each instrument/measure tested and provide a copy of this to the person completing the skills observation. See also the [Instructions for observation assessments](#).

Your assessor, or an NMI-appointed skills observer, will observe you. They will contact you to discuss arrangements for this part of your assessment.

During the observation, the assessor/observer will use this checklist to record your skills in verifying measuring instruments/measures in accordance with legal requirements. They will also be noting how you:

- interact with businesses and their employees before, during and after completing testing
- assess and manage safety during the task
- store, use and handle any reference standards or equipment used (where applicable)
- consider any real or potential environmental impacts on the instrument/measure under test (and the standards and equipment used in testing) and take any necessary steps to account for any impacts
- identify, access and interpret relevant documentation
- record, analyse and report the findings of testing
- communicate the results of testing and any other factors relevant to the usage of instruments/measures
- identify the location for, and simulate the application of, a verification mark

For subclasses 6.1-6.3 and some simple measures/measuring instruments, you may be invited to complete the observation in the trade measurement office in your local city.

For skills observations for other instrument/measure types, or where you do not live in a major city, we will ask you to arrange a site local to you, where a suitable instrument/measure is available. We will contact you with further instructions.

Skills observation report to be completed by the assessor or a skills observer (SO)

Observer: Use the check boxes to record your conclusions regarding each of the specific items detailed in the following list, where applicable. You must record additional notes and comments that are relevant to, and support, your conclusions, under each item. Essentially, you should describe what you have observed that supports the finding you have checked (what the applicant did).

NOTE: Items 2, 3, 4, 5, 6 and 9 not applicable for subclasses 18.1 and 18.2.

(Use one form per instrument observed)

I have observed the applicant complete a simulated verification test on the following instrument/measure and simulate applying a verification mark:

(Instrument/measure tested:

Reference standards/equipment used:

Date/s observed:

Location:

| Did the applicant: | Yes | No | Not applicable |
|--|------------|-----------|-----------------------|
| 1. liaise and communicate effectively with the trader prior to, during and after testing to ensure verification testing was carried out safely and with minimal disruption to the trader's business? | | | |
| 2. select and validate the suitability of reference standards/equipment for the specific verification task? | | | |
| 3. determine whether reference standards/equipment were suitable for use for the verification task/not defective? | | | |

Name of assessor/SO:

Date:

Skills observation report to be completed by the assessor or a skills observer (SO)

Did the applicant: **Yes** **No** **Not applicable**

4. maintain the integrity of reference standards/equipment during their transport, storage and use?

5. use the reference standards/equipment in the correct manner?

6. evaluate and (where required) adjust the impact of the operating environment on the performance of the standards/equipment?

7. evaluate and (where required) adjust the impact of the operating environment on the performance of the instrument/measure?

8. apply appropriate safety precautions and conduct testing safely?

Name of assessor/SO:

Date:

Skills observation report to be completed by the assessor or a skills observer (SO)

Did the applicant:

Yes

No

Not applicable

9. identify, access, interpret and apply certificates of verification for reference standards/equipment?

10. identify, access, interpret and apply certificates of approval?

11. identify, access, interpret and apply relevant test procedures?

12. use specified calculations to determine the performance result?

13. apply appropriate maximum permissible errors?

Name of assessor/SO:

Date:

Skills observation report to be completed by the assessor or a skills observer (SO)

| Did the applicant: | Yes | No | Not applicable |
|--------------------|-----|----|----------------|
|--------------------|-----|----|----------------|

14. analyse test results to determine whether the measure could be marked for trade use?

15. report results and findings clearly and accurately?

16. demonstrate how to apply the verification mark?

17. identify and communicate any inadequacies in trader's use of the instrument/measure?

Name of assessor/SO:

Date: