

BUREAU OF STANDARDS

Effective Date:

Section No. 4

Version: 1.0

Procedure No. 6

TITLE: LP Gas Meter Calibration Testing

PURPOSE: This document details the procedures used to perform meter calibration testing of Liquefied Petroleum Gas (LP Gas) liquid measuring devices by bureau inspectors and the policies associated with this procedure.

These testing procedures for LP Gas liquid measuring devices follow the guidance of NIST EPO 26. All data and observations will be recorded on the inspection worksheet created during **Procedure 1.0 Weekly Schedule**. Worksheets must be uploaded into DOCS upon completion of the inspection.

1.0. Pre-Inspection

- 1.1 Inspectors must verify their Test Vessels (Provers) have been calibrated by the State Metrology Lab within the last twelve months and visually inspect them every day for any damage that would affect accuracy and safety.
- 1.2 Check data bases for inspections due (risk factor in DOCS). Print out an inspection report, if required, and meter worksheet(s). Check and make note of the status of licenses and permits. For truck meter inspections, contact the owner the week before to set up a day and time. This is in order to give them time to coordinate the availability of the trucks and drivers. Usually, retail LP gas dispenser operators/owners do not require notification of the pending inspection.
- 1.3 Arrive at facility and check in with the person responsible for the device(s). Inform person of the reason why your there and the process of the inspection. Request to see the LP Gas license and Weights and Measure permit for the facility. W&M permits are required to be displayed. Follow **Procedure 3.12 W&M Permit Enforcement** for missing or expired W&M permits.
- 1.4 If required, conduct an LP Gas safety inspection. If safety issues are present that require the unit to be placed in a “Stop Use Order” condition, then a meter calibration test will not be conducted. Cancel the scheduled inspection in the “weekly schedule” in DOCS. If no safety issues are present, then proceed with meter calibration testing.
- 1.5 Check accessibility for meter testing. Verify that the “vapor return valve” on the retail dispenser storage tank is accessible. Check availability of electrical power to run prover pump. **NOTE: Do not route extension cords through or near gas station dispenser**

islands. Check level of product in tank. If all three are available, then proceed with prover set up.

- 1.6 Record meter ID plate information and beginning totalizer reading on worksheet. A mirror and flashlight may be needed for ID plate.

2.0. Prover Setup

- 2.1. Set up prover trailer near unit to be tested. Position the trailer for an optimum view of meter register and use of hoses. Take in consideration of any and all vehicle traffic. Set up cones, barricades and/or vehicle to block customer traffic to provide a safe area for testing. **NOTE: Do not route extension cords through or near gas station dispenser islands.** Truck meters can be tested at one central location at the owner's facility. Ask owner for best location to set up prover for testing truck meters. A driver for a LP Gas truck will be required to operate truck for the inspector.
- 2.2. Once prover is in desired position it then can be leveled. Adjust jacks to acquire a level condition on both level gauges for the prover being used. (Note: Check levels again after filling prover)
- 2.3. Run prover pump electrical cord to nearest 120V electrical receptacle. The use of extension cords may be required along with the prover pump electrical cord. **NOTE: Do not route extension cords through or near gas station dispenser islands.** Place a safety cone over any connectors that could be run over by vehicles. Avoid traffic if possible.
- 2.4. Connect vapor and liquid return hoses to the appropriate fittings on tank. A vapor adaptor will be required on dispenser tanks. A truck tank (barrel) will require an adaptor for the liquid return. Open valves and check for leaks. Leave valves on prover closed.
- 2.5. Determine appropriate prover for meter testing. Ensure tank pump supply valve is open. Connect meter outlet delivery hose to appropriate prover inlet valve. While leaving prover inlet valve closed, open meter delivery hose end valve. Check for leaks.
- 2.6. Determine if LP Gas meter is "temperature compensated" or "non-compensated". All truck meters will be "temperature compensated". Check appropriate box on worksheet. According to NIST HB-130, method of sale regulation, section 2.21. All LP Gas meters rated greater than 20 GPM are required to have a temperature compensator. State meter testing of LP Gas meters will be in an "as found" condition. Do not deactivate temperature compensators until testing for repeatability.

3.0. Stationary Retail LP Gas Meter Testing,

- 3.1. Remove cap from meter thermo well and fill with antifreeze. Turn on and insert thermometer into meter thermo well.

- 3.2. Set prover liquid level in bottom sight glass to “zero”. This may be done by filling or pumping down prover as needed. Reset meter register/display to “zero”.
- NOTE: Test temperature compensated meters in an “as found” condition, do not deactivate temperature compensators until repeating the test. Compare the uncompensated volume indicated/recorded to the actual delivered volume.**
- 3.3. Conduct prover wet down. Start dispenser pump. Open prover inlet valve, and then open prover vapor valve. A wet down is not required for each retail meter as long as they are tested consecutively and not more than 1/2 hour has elapsed between retail meter testing.
- 3.4. While filling prover determine and record meter flow rate on meter worksheet. Observe and record thermometer temperatures at 8 gallons and again at 16 gallons in the appropriate boxes on the meter worksheet. Move thermometer from meter to prover after recording the 16 gallon amount. Using the prover inlet valve, stop flow at 25 gallons on meter or near 25 gallons on prover. Stop flow at a whole gallon or whole tenth of gallon on meter while nearing the 25 gallon mark on prover. Pay close attention to prover product level and meter amount while filling to prevent overfill or under fill condition. Close the prover vapor valve. Turn off dispenser pump.
- 3.5. On the meter worksheet, record the amount on the meter register/display. Immediately record the prover temperature, prover pressure, and the amount in the upper prover sight glass on the worksheet. Calculate the amount of error by using the instructions on the worksheet and the appropriate prover temperature and pressure correction factors.
- NOTE: results for wet down are not recorded on inspection report except for gallons used.**
- 3.6. Open prover pump valves and prover vapor valve. Start prover pump and pump back product to tank. Try and stop flow at “zero” in bottom of prover sight glass. Stop pump and shut prover valves after pump back. Return thermometer back to meter thermo well. After 30 second drain time ensure prover is at “zero” start prior to next test run.
- 3.7. Conduct meter test at the normal/maximum obtainable flow rate using steps 3.2. - 3.6. If any results of the test are out of tolerance, then repeat normal test. If results are within tolerance, then conduct a special test (slow flow).
- 3.8. Conduct slow flow test by closing down on prover inlet valve to obtain a flow near or the same amount as the rated minimum flow rate on the meter ID plate. If results of the test are out of tolerance, then repeat the special test. Check printed tickets, if required. Record any abnormalities on meter worksheet. Notate the end totalizer reading on the worksheet at the end of meter testing.
- 3.9. Upon completion of meter testing then re-stow all hoses and electrical cords. Remove thermometer from thermo well. Raise trailer jacks and secure trailer for travel. Seal meter with state seals. Affix a new inspection sticker to meter body or cabinet. If device is in need to be tagged “out of service”, then attach “out of service” tag to meter cabinet or to

hose end valve to prevent the use of the device. Record register end totalizer reading on worksheet.

4.0. Wholesale/Bulk LP Gas Meter Testing,

- 4.1. After setting up prover as in section 2 turn on and insert long thermometer in to thermo well on 100 gallon prover. Keep thermometer in prover thermo well during duration of test.
- 4.2. Have driver operate truck, pump and meter while testing meter. This is due to the many different operating characteristics of each unit. Direct the driver when to start and stop the pump/meter during test. Set prover liquid level in bottom sight glass to “zero”. This may be done by filling or pumping down prover as needed.

NOTE: Test temperature compensated meters in an “as found” condition, do not deactivate temperature compensators until repeating the test. Compare the uncompensated volume indicated/recorded to the actual delivered volume.

- 4.3. Conduct prover wet down. Have driver reset meter to “zero” for delivery, with ticket in printer, and then start truck pump. Inspector opens prover inlet valve and then open prover vapor valve. Determine and record meter flow rate onto meter worksheet. Using the prover inlet valve, fill the prover to/near 100 gallons on prover upper sight glass. Stop flow at a whole gallon or whole tenth of gallon on meter while nearing the 100 gallon mark on prover. *(Due to temperature compensation, stopping the meter at 100 gallons is not practical, except near or at 60° F.)* Shut prover vapor valve. Have driver stop pumping operation on truck and retrieve printed delivery ticket for review.
- 4.4. Record meter amount onto worksheet. Record prover temperature, prover pressure and the amount in upper prover sight glass onto the worksheet. Calculate the amount of error by using the instructions on the worksheet and the appropriate prover temperature and pressure correction factors.
NOTE: results for wet down are not recorded on the inspection report except for gallons used. A wet down is not required for each truck as long as they are tested consecutively and not more than 1/2 hour has elapsed between truck meter testing.
- 4.5. Open prover pump inlet valve and prover vapor valve. Start prover pump and pump back product to tank. Try and stop flow at “zero” in bottom of prover sight glass. Stop pump and shut prover valves after pump back. After a 30 second drain time ensure prover is at “zero” start prior to next test run.
- 4.6. Conduct meter test at the normal/maximum obtainable flow rate using steps 4.2. - 4.5. If results of the test are out of tolerance, then repeat normal test. If results are within tolerance, then conduct a special test (slow flow). Conduct special (slow flow) test by closing down on prover inlet valve to obtain a flow near or the same amount as the rated minimum flow rate on the meter ID plate. If results for the special (slow flow) test are out of tolerance, then repeat special (slow flow) test. Check printed tickets for accuracy and compliance. Record any abnormalities on meter worksheet. Seal meters with state seals,

affix inspection sticker to meter body. Notate the end totalizer reading on the worksheet at the end of each meter testing. If a device is required to be tagged “out of service”, then attach “out of service” tag to meter cabinet or to hose end valve to prevent the use of the device.

- 4.7. Upon completion of all meter testing then re-stow all hoses and electrical cords. Remove thermometer from thermo well. Raise trailer jacks and secure trailer for travel.

5.0. Documentation.

- 5.1. Upon completion of meter testing enter findings in the facilities data base under the inspection summary screen. Present and discuss inspection results and forms to the facility owner/manager or representative. Scan and upload worksheet(s) and any facility representative signed documents into the facilities data base.

Version	Rev. Date	Change Control Comments	Approver