

# 2015 NIST EPO No. 26

## Examination Procedure Outline for

### Liquefied Petroleum Gas (LPG) Liquid-Measuring Systems

It is recommended that this outline be followed as minimum criteria for examining all LPG liquid-measuring systems. Nonretroactive requirements are followed by the applicable date in parentheses.

#### SAFETY NOTES

*When excerpting this Examination Procedure Outline for duplication, the EPO Safety Annex (Safety Considerations and Glossary of Safety Key Phrases) should be duplicated and included with this outline.*

*Safety policies and regulations vary among jurisdictions. It is essential that inspectors or servicepersons be aware of all safety regulations and policies in place at the inspection site and to practice their employer's safety policies. The safety reminders included in this EPO contain general guidelines useful in alerting inspectors and servicepersons to the importance of taking adequate precautions to avoid personal injury. These guidelines can only be effective in improving safety when coupled with training in hazard recognition and control.*

Prior to beginning any inspection, the inspector should read and be familiar with the EPO Safety Annex - "Safety Considerations and Glossary of Safety Key Phrases." The terms and key phrases in each safety reminder of this outline are found in the glossary the EPO Safety Annex. The inspector is reminded of the importance of evaluating potential safety hazards prior to an inspection and taking adequate precautions to avoid personal injury or damage to the device. As a minimum, the following safety precautions should be noted and followed during the inspection.

<b>Clothing</b>	<b>Nature of Product</b>
<b>Electrical Hazards</b>	<b>Obstructions and Overhead Hazards</b>
<b>Emergency Procedures</b>	<b>Personal Protection Equipment</b>
<b>Eye Protection</b>	e.g., Safety Shoes, Safety Aprons, Respirators, Gloves, Barrier Cream, etc., if deemed necessary.
<b>Fire Extinguisher</b>	<b>Hard Hat -- for protection from overhang in rear of vehicle tank truck</b>
<b>First Aid Kit</b>	<b>Safety Cones/Warning Signs</b>
<b>Grounding</b>	<b>Safety Data Sheets (SDS)</b>
<b>Ignition Sources</b>	<b>Static Discharge</b>
<b>Lifting</b>	<b>Support -- for prover</b>
<b>Location</b>	<b>Switch Loading</b>
also: <b>Wet/Slick Conditions</b> <b>Chemicals, Petroleum Products, and</b> <b>Hazardous Materials</b>	<b>Traffic</b>
	<b>Transportation of equipment</b>

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### Inspection:

#### **SAFETY REMINDER!!!**

- Check the inspection site carefully for safety hazards and take appropriate precautions.
- Pay particular attention to the condition of the product storage tank and valves.
- Check to be certain that the ground surface of the inspection site is sufficiently strong and rigid to support the prover when it is filled with product. Don't forget to check the wheels of the prover.
- Learn the nature of hazardous products used at or near the inspection site; obtain and read copies of MSDS.
- Know emergency procedures (particularly for this location) and the location and operation of fire extinguishers and emergency shut-offs.
- Be sure that a constant supply of water is available for cooling tanks in an emergency.
- Post safety cones/warning signs and be aware of vehicular and pedestrian traffic patterns.
- Use caution moving around in wet, slippery areas and in climbing on prover, storage tanks, and vehicles.
- Use personal protection equipment and clothing appropriate for the inspection site.
- If exposed wiring or other factors cause hazardous testing conditions, it is recommended that the testing be discontinued until the unsafe conditions are corrected.
- Be sure that a first aid kit is available and that the kit is appropriate for the type of inspection activity.

**H-44 General Code and  
LPG and Anhydrous  
Ammonia LMD Code  
References - 2015**

#### 1. General considerations

Selection .....	G-S.3., G UR.1.1., G-UR.1.2., G-UR.1.3.
Use and maintenance.....	G UR.3.1., G UR.4.1., G-UR.4.2
Installation.....	G-S.2., G-UR.2.1., G-UR.2.2., UR.1.1.
Accessibility.....	G UR.2.3
Assistance.....	G-UR.4.4
Testing devices at a central location.....	G-UR.4.6.(a).

**Inspection (cont.):**

2. Indicating and recording elements.	
Design .....	S.1.1.
Travel of Indicator, wholesale devices.....	S.1.6.1.
Readability .....	G-S.5., G-S.6.(1/1/77), G-S.7.
Unit Price and Product Identity – Stationary retail devices only.....	G-UR.3.3., S.1.2., S.1.3. S.1.5.1.
Advancement and return to zero, all devices.....	S.1.1.4., UR.2.1.
Indication of delivery, retail devices. ....	S.1.4.1.
Return to zero, retail devices.....	S.1.4.2.
Recorded Representations	
General .....	G-S.5.6.
Required for vehicle-mounted systems. ....	S.1.1.1., S.1.4.2., UR.2.6.
Point-of-sale systems.....	S.1.5.3.
Provision for sealing.....	G-S.8. (1/1/90), G-UR.4.5.
3. Measuring Elements	
Vapor elimination.....	S.2.1., S.2.4.
Security seals.....	G-UR.4.5., S.2.2., Table S.2.2., A.2.6.2.
Thermometer well .....	S.2.5.
Automatic temperature compensation.....	S.2.6., S.2.6.1., UR.2.4.
4. Marking requirements.	
General.....	G-S.1.
Location, Not-Built-For Purpose, Software-Based Devices.....	G-S.1.1.(1/1/04)
Devices or Main Elements Remanufactured as of January 1, 2002 .....	G-S.1.2.
Marking, Operational Controls, Indications, and Features; Lettering .....	G-S.6.(1/1/77), G-S.7.
Visibility of required markings after installation .....	G-UR.2.1.1.
Limitation of use.....	S.4.1.
Discharge rate. ....	S.4.2.
Location of marking information, retail devices.....	S.4.3.
Temperature compensated volume. ....	S.4.4.
5. Discharge line and valves.	
Directional flow valve.....	S.2.3.,
Maintenance of liquid state. ....	S.2.4.
Diversion of measured liquid. ....	S.3.1.,
Delivery hose.....	S.3.2., UR.1.2.
Fill of discharge.....	UR.2.2.
Vapor-return line. ....	UR.2.3
6. Facilitation of fraud.....	G-S.2.

**Pretest Determinations:**

1. Determine that the test liquid is similar in character to the liquid to be measured commercially..... N.1.
2. Test Drafts. Test drafts shall be equal to at least the amount delivered by the device in 1 minute at its normal discharge rate. .... N.3.
3. Tolerances
  - Applicable requirements..... G-T., T.1.
  - Tolerance values..... T.2., Table 2
  - Repeatability..... T.3.
  - Automatic temperature-compensating systems ..... T.4.

**Test Notes:**

**SAFETY REMINDER!!!**

- **Wear appropriate personal protection equipment such as static-resistant, nonskid safety shoes (to avoid potential ignition source and to prevent possible injury from slipping on slick surfaces), protective clothing, eye protection (to prevent injury from product), and a hard hat (to prevent injury from overhangs and projections on the prover and at the test site).**
- **Use proper grounding procedures!**
- **Be sure that the prover is equipped with an explosion-proof motor.**
- **Carefully inspect the electrical supply lines for the test equipment for wear or damage; correct potentially hazardous conditions before use; protect lines from damage during use.**
- **Remove fire extinguisher(s) from storage receptacle and set out for easy access.**
- **Use proper lifting techniques to lift and move equipment!**
- **Be aware of and attempt to eliminate potential ignition sources in or near the inspection site.**
- **Be aware of vehicular and pedestrian traffic in the area.**

1. Wet the prover (fill to nominal capacity). Allow a 30 second drain period each time NIST HB 105-4 the prover is emptied.
2. Exercise care to reduce to a minimum vaporization and volume change..... N.2.
3. Read the temperature and pressure of the product in the prover immediately following each test draft and make appropriate corrections to the test results to account for changes in volume between the meter and the prover due to temperature..... N.5.

**Test Notes (cont.):**

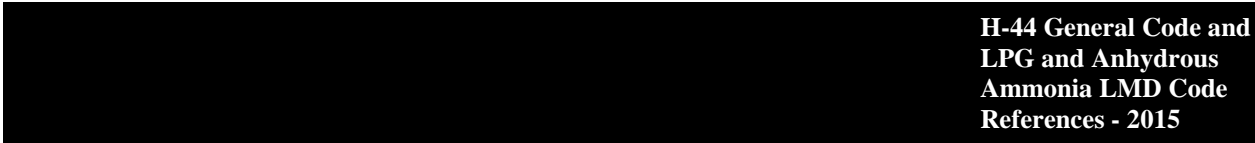
- 4. Print a ticket/receipt after each test run (if so equipped) ..... G-S.5.2.2., G-S.5.6.  
 Vehicle-mounted systems shall be equipped with a ticket printer. .... UR.2.5., UR.2.6.  
 If computing type, check price computation on indicator and on recorded S.1.1.6.,  
 representations .....  
 Check for agreement between indicators ..... G-S.5.2.2., S.1.1.5.
  
- 5. Verify that any options for obtaining a recorded representation are appropriate. The customer may be given the option of not receiving the recorded representation. If the system is equipped with the capability, the customer may also be given the option of receiving the recorded representation electronically in lieu of or in addition to a hard copy..... G-S.5.6.
  
- 6. If the device is of the computing type, check price computations.....  
 Money-value computations on stationary retail devices..... G-S.5.5., S.1.1.5.,  
 N.4.3.2.  
 S.1.5.2.
  
- 7. To determine proper operation of totalizers, observe and record the totalizer indication before and after all test drafts.

**Test:**

*If the result of any test is at or near the tolerance, repeat the test. If necessary, conduct a repeatability test as outlined in “Repeatability Test” below.*

**Nontemperature-compensated meters**

- Read the temperature of the product at the meter at one-third and two-thirds prover capacity ..... N.5.
  
- 1. Normal test - full flow, normal tolerance ..... N.2., N.4.1., N.5., T.2.
  
- 2. Repeat the normal test.
  
- 3. Special test - slow flow, special tolerance ..... N.2., N.5., T.2.  
 Motor-fuel devices ..... N.4.1.2.  
 Other retail devices..... N.4.2.2.  
 Wholesale devices ..... N.4.2.3.



**Test (cont.):**

If the result of any test is close to or outside the applicable tolerance, repeat that test.

Repeatability Test ..... N.4.1.2., T.3.

If necessary, conduct a repeatability test. A repeatability test must include at least three consecutive test drafts. Test drafts must be conducted under approximately the same conditions (e.g., flow rate and temperature) and be of approximately the same draft size.

**Temperature-compensated meters**

1. Normal test - full flow, normal tolerance. (Do not deactivate the temperature compensator.)..... N.2., N.4.1., N.4.1.1., N.5., T.2.,
2. Deactivate the temperature compensator and repeat the normal test..... N.2., N.4.1.1., N.5., T.2., T.4.
3. Special test - slow flow, special tolerance..... N.2., N.4.2.1., N.5., T.2.
  - Motor-fuel devices ..... N.4.1.2.
  - Other retail devices..... N.4.2.2.
  - Wholesale devices ..... N.4.2.3.

If the result of any test is close to or outside the applicable tolerance, repeat that test. N.4.1.2., T.3.

**All Meters**

**Repeatability Test** ..... N.2., N.4.1.2., T.3.

If necessary, conduct a repeatability test. A repeatability test must include at least three consecutive test drafts. Test drafts must be conducted under approximately the same conditions (e.g., flow rate and temperature) and be of approximately the same draft size.

Reactivate the temperature compensator.

**Post-Test Tasks:**

Security seal and audit trail. .... S.2.2., Table S.2.2., S.2.6.2.

- Apply security seals to secure the meter and temperature adjusting mechanisms.
- Also seal the register to the meter.
- Record audit trail information (if applicable) on the official report.

Note the final totalizer reading and record the number of gallons of product dispensed during the test on the official test report.