

## EPO No. 22

### Examination Procedure Outline for Retail Motor-Fuel Dispensers Blended Product

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It is recommended that this outline be followed for blending-type, power-operated retail dispensers--"gasoline pumps," analog or digital, and consoles. Nonretroactive requirements are followed by the applicable date in parentheses.

#### SAFETY NOTES

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

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. The inspector should read and be familiar with the introductory section on safety found at the beginning of this publication. As a minimum, the following safety precautions should be noted and followed during the inspection. Definitions of each reminder are found in the "Glossary of Safety Key Phrases" at the back of this publication.

*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.*

<b>Clothing</b>	<b>Material Safety Data Sheets (MSDS)</b>
<b>Electrical Hazards</b>	<b>Nature of Product</b>
<b>Emergency Procedures</b>	<b>Personal Protection Equipment</b> e.g., Safety Shoes, Safety Aprons, Gloves, Barrier Cream, etc. if deemed necessary
<b>Eye Protection</b>	<b>Safety Cones/Warning Signs</b>
<b>Fire Extinguisher</b>	<b>Static Discharge</b>
<b>First Aid Kit</b>	<b>Switch Loading</b>
<b>Grounding</b>	<b>Traffic</b>
<b>Ignition Sources</b>	<b>Transportation of Equipment</b>
<b>Lifting</b>	
<b>Location</b> also: <b>Wet/Slick Conditions, Chemicals, Hazardous Materials, Petroleum Products, Obstructions</b>	



**Inspection:**

**Safety First !!!**

**Check the inspection site carefully for safety hazards and take appropriate precautions.**

**Learn the nature of hazardous products used at or near the inspection site – obtain and read copies of MSDS’s.**

**Know emergency procedures and location and operation of fire extinguisher and emergency shut-offs.**

**Post safety cones/warning signs and be aware of vehicular and pedestrian traffic patterns.**

**Use caution in moving in wet, slippery areas.**

**Use personal protection equipment and clothing appropriate for the inspection site.**

**Open both sides of dispenser to allow fumes to dissipate before proceeding with the inspection of the dispenser.**

**If leaks, spills, or exposed wiring 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 it is appropriate for the type of inspection activity.**

**H-44 General Code and  
Liquid-Measuring Devices  
Code References**

1. General considerations.
  - Selection.....G-S.3., G-UR.1.1., G-UR.1.2.,  
G-UR.1.3.
  - Installation.....G.S.2, G-UR.2.1., G-UR.2.2.,  
UR.2.1., UR.2.4.
  - Position of equipment .....G-UR.3.3.
  - Accessibility.....G-UR.2.3.
  - Assistance.....G-UR.4.4.
  - Use and maintenance .....G-UR.3.1., G-UR.4.1.,  
G-UR.4.2., UR.3.5.
  
2. Indicating and recording elements.
  - Design.....S.1.1.
  - Units.....S.1.2.1., S.1.2.3.(a), S.1.2.3.(c)
  - Readability.....G-S.5., G-S.6. (1/1/77),  
G-S.7., S.1.4., S.1.5.
  - Values of intervals.....G-S.5.3., G-S.5.3.1.
  - Indication of delivery .....S.1.6.1. (portions NR 1/1/06)
  - Money-value divisions
    - Analog.....S.1.6.5.1.
    - Digital .....S.1.6.5.2.
    - Auxiliary indications .....S.1.6.5.3. (1/1/85)
  - Unit Price and product identity .....S.1.6.4.1.(a), S.1.6.4.2.,  
U.R.3.2.

**Inspection (cont.):**

Multiple unit price dispensers .....S.1.6.4.1.(b) (1/1/91),  
S.1.6.5.(a) (1/1/91), S.1.6.5.4.  
(1/1/91), UR.3.3.

Quantity and total price display – except aviation refueling .....S.1.6.5.5. (1/1/94)

Quantity and total price display – aviation refueling.....S.1.6.5.6. (1/1/08)

Advancement and return to zero .....S.1.3., S.1.6.3., UR.3.1.

Recorded representations, point of sale systems .....S.1.6.7. (1/1/86)

Provision for sealing.....G-S.8.(1/1/90), G-UR.4.5.,  
S.2.2., Table S.2.2. (1/1/95)

Sealing multiple measuring elements with a common provision for sealing.....G-S.8.1. (1/1/10)

3. Marking .....G-S.1., G-S.1.1.(1/1/04),  
G-S.1.2. (1/1/02) G-UR.2.1.1.,  
G-UR.3.4., S.4.1., S.4.4.1.  
(1/1/85), S.4.4.2. (1/1/03)

4. Measuring elements.

    Air eliminator vent, if self-contained dispenser.....S.2.1.

    Security seal on adjusting mechanism.....G-UR.4.5.

5. Discharge hose-retail .....S.3.1., S.3.2., S.3.3., S.3.5.,  
S.3.6., UR.1.1.

    Marinas and airports.....UR.1.1.2.

6. Totalizers.....S.5. (1/1/95)

**Pretest Determinations:**

1. Tolerances.

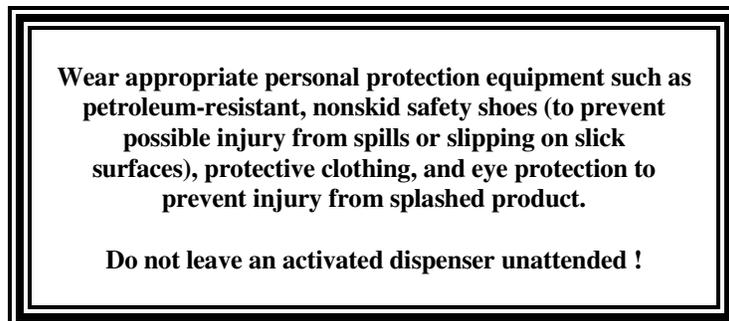
    Applicable requirements .....G-T., T.1.

    Basic tolerance values .....T.2., Table T.2.

    Repeatability.....T.3.

2. Product storage identification .....UR.2.5.

**Test Notes:**



1. If test measure is dry, add 16.4 milliliters (one cubic inch) to gauge reading to allow for amount of liquid required to "wet" measure.

**Test Notes (cont.):**

- 2. Hand held test measures require a 30-second ( $\pm 5$  s) pour followed by a 10-second drain, with the measure held at a (10 to 15) degree angle from vertical. ....N.4.4.1.

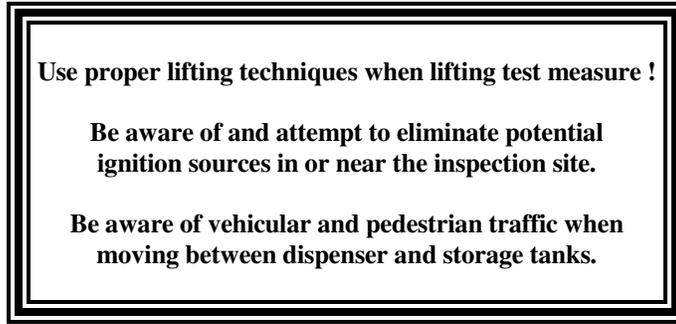
Bottom drain provers require a 30-second drain after the main flow ceases. ....N.4.4.2.

See NIST HB 105-3, Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards, 2010, section 7.

**Ground test measure properly and only use a metal funnel when returning product to storage.**

- 3. To determine proper operation of totalizers, read and record the totalizer indications before and after all test drafts. ....S.5. (1/1/95)
- 4. After each test draft:
  - a. Print ticket if device is so equipped .....G-S.5.6., G-S.5.6.1., S.1.6.7. (1/1/86), UR.3.4.
  - b. Check price computations on all indicators .....S.1.6.5.(a) (1/1/91) (including consoles) and on recorded representations.
    - Digital equipment .....G-S.5.5.
    - Analog equipment .....S.1.6.5.(b), N.4.3.2.
  - c. Check for agreement between indications .....G-S.5.2.2., S.1.6.6.(a), S.1.6.6.(b) (1/1/88)
- 5. Verify, after a delivery is completed, that the quantity and total price are displayed for at least 5 minutes or until the next transaction .....S.1.6.5.5. (1/1/94) S.1.6.5.6. (1/1/08) (aviation)

**Test:**



1. Test at lowest grade. Set selector control so that lowest grade product is dispensed.  
Normal test—full flow, basic tolerance .....N.1.1., N.2., N.3.4., N.4.1.,  
T.2., Table T.2.,  
Verify maximum discharge rate of installation does not exceed marked maximum. ....UR.2.2.  
At the beginning of the first delivery, check for suppressed values. ....S.1.6.1.  
  
If the test result is at or near the tolerance limit, repeat this test. If necessary, conduct a  
repeatability test as outlined in Step 5 below.  
  
Special test - slow flow, basic tolerance .....N.4.2., N.4.2.2., T.2.,  
Table T.2.  
  
If the test result is at or near the tolerance limit, repeat this test. If necessary, conduct a  
repeatability test as outlined in Step 5 below.  
  
*Petroleum Product Sampling<sup>1</sup> Lowest Octane.*
2. Test at highest grade. Set selector control so that highest grade product is dispensed.  
Normal test - full flow, basic tolerance .....N.1.1., N.2., N.3.4., N.4.1.,  
T.2., Table T.2.  
Verify maximum discharge rate of installation does not exceed marked maximum. ....UR.2.2.  
  
If the test result is at or near the tolerance limit, repeat this test. If necessary, conduct a  
repeatability test as outlined in Step 5 below.  
  
Special test - slow flow, basic tolerance .....N.4.2., N.4.2.2., T.2.,  
Table T.2.  
  
If the test result is at or near the tolerance limit, repeat this test.  
  
*Petroleum Product Sampling<sup>1</sup> Highest Octane*
3. Test at blend. Set selector control at intermediate blend.  
  
Special test - slow flow, basic tolerance .....N.4.2., N.4.2.2., T.2.,  
Table T.2.  
  
If the test result is at or near the tolerance limit and the error is the same as or greater  
than the average error of the previous slow flow tests, repeat this test. If necessary,  
conduct a repeatability test as outlined in Step 5 below.

<sup>1</sup> When taking gasoline samples from blended product dispensers, the samples should be collected after an observed sale of the particular grade or product to be tested, or sufficient product should be purged from the hose to ensure the sample is representative of the grade or product being sampled. The National Conference on Weights and Measures policy on procedures for taking samples for octane verification is as follows: **“A minimum of a liter (0.3 gallon) of engine fuel shall be flushed from the dispensers before taking a sample for octane verification. This flush shall be returned to the storage tank containing the lowest octane.”** (see NCWM Publication 21, Petroleum Products Sampling Procedures and Safety Manual, August 1997).

4. Conduct a slow flow test at first blend above lowest grade and first blend beneath highest grade.

*Petroleum Product Sampling<sup>1</sup> Blended Product*

**Return blended product to the storage tank containing the lowest octane**

**Test (cont.):**

5. 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.
6. Check money-value computations on other blends. Set selector control at each of the remaining blends and dispense 1 indicated liter/gallon to check computed price.
  - a. Print ticket if device is so equipped .....G-S.5.6., G-S.5.6.1., S.1.6.7. (1/1/86), UR.3.4.
  - b. Check price computations on all indicators (including consoles) and on recorded representations ..... S.1.6.5.(a) (1/1/91)
    - Digital equipment .....G-S.5.5.
    - Analog equipment .....S.1.6.5.(b), N.4.3.2.
  - c. Check for agreement between indicators .....G-S.5.2.2., S.1.6.6.(a), S.1.6.6.(b) (1/1/88)
7. RFI/EMI test (electronic equipment only) .....G-N.2., G-UR.1.2., G-UR.3.2., G-UR.4.2.  
Radio Frequency Interference (RFI)  
Electromagnetic Interference (EMI)
8. Check effectiveness of anti-drain means.....S.3.7.
9. Check effectiveness of zero-setback interlock.....S.2.5.  
On equipment with remote pumping systems, activate one dispenser and check all others operated by the same pump to make certain they will not operate without activating the individual starting levers.
10. Power loss test.....S.1.6.2.1.(1/1/83), S.1.6.2.2. (1/1/83)  
  
Check with your supervisor before requiring shutdown of power to equipment under test.
11. Security means
  - a. Check/apply security seal.....G-UR.4.5
  - b. Record audit trail information.....S.2.2. (1/1/95), Table S.2.2 (1/1/95)

Record on the official report the number of gallons of product dispensed during test.

**Avoid switch loading!**  
**Test devices dispensing low-vapor pressure products (e.g., diesel fuel, kerosene)**  
**before testing devices dispensing high-vapor pressure products (e.g., gasoline).**

After all equipment at a location has been tested, review results to determine compliance with equipment maintenance and use of adjustments.....G-UR.4.1., G-UR.4.3.

**Take precautions to isolate equipment when**  
**transporting it to avoid exposure to hazardous fumes.**