

EXAMINATION PROCEDURE OUTLINE (EPO) NO. 26

RETAIL MOTOR FUEL DISPENSERS BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and 4 CCR § 4000. 3.30. Liquid-Measuring Devices

The California Department of Food & Agriculture (CDFA) Division of Measurement Standards (DMS) recommends that this Examination Procedure Outline (EPO) be followed as the minimum criteria for examining Retail Motor Fuel Device. This EPO has been divided into six (6) categories; inspection and test items common to all categories are detailed in EPO 26-A for 'Basic Dispensers'. Additional information is included for the other categories as listed below (see Table of Contents).

This EPO does not cover Wholesale Meters, Vehicle-Mounted Meters, Mass Flow Meters, Retail Meters used for dispensing products other than Retail Motor Fuels, or Liquid-Measuring Devices for dispensing other liquids that do not remain in a liquid state at atmospheric pressures and temperatures (e.g. Liquefied Petroleum Gas).

Non-retroactive requirements are followed by the applicable date in parentheses, e.g., **REF: (NR 01/01/18)**.

NOTES:

1. Through Business and Professions Code (BPC) § 12107, the Secretary of CDFA adopts the most current edition of the National Institute of Standards and Technology Handbook 44 (HB 44) with additional language and exceptions.
2. Enforcement action notices (Notice of Violations, Administrative Actions, and Citations) must include the appropriate BPC authority section(s) and include the applicable California Code of Regulations (CCR) section(s) [note: DMS regulations are in Title 4 of the CCR]. Please see the examples below.
 - BPC § 12107; Title 4 CCR § 4000.
 - Commercial weighing and measuring devices shall, except where noted, conform to the latest requirements set forth in the National Institute of Standards and Technology Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices".
 - Example: Title 4 California Code of Regulations § 4000 [1.10.] G-UR.4.1. Maintenance of Equipment.
 - BPC § 12107; Title 4 CCR § 4002.
 - Language added to HB 44 is prefaced with CCR section (§) 4002.X.
 - Example: Title 4 California Code of Regulations § 4002.1. General Code [1.10.] Type Approval Use.

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- BPC § 12107; Title 4 CCR § 4001.
 - Exceptions to HB 44 language are prefaced with CCR section (§) 4001.X.
 - Example: Title 4 California Code of Regulations § 4001. [1.10.] G-S.1.2. Remanufactured Devices and Remanufactured Main Elements.
- 3. Be aware of Title 4 CCR § 4000 [1.10.] General Code paragraph G-N.1. Conflict of Laws and Regulations.
- 4. Petroleum Product Sampling information and Petroleum Product Signage and Labeling Requirements can be found in the DMS Petroleum Products Program Manual.
- 5. DMS issues Policy Letters and Notices to aid in clarification, provide instruction, and make recommendations to the County Sealers. Many of these notices can be found at: <https://www.cdfa.ca.gov/dms/notices/notices.html>
- 6. Safety Notes and Reminders have been included for reference. **It is essential that inspectors become familiar with their employer’s safety policies. Some facilities have specific safety requirements that must be followed.**
- 7. Periodic changes to the procedures will be made to accommodate code changes and new developments in device technology. **Before issuing a Notice of Violation (NOV), it is imperative that inspectors verify the violations, including referencing updated requirements.**

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TABLE OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Meaning</u>
A	Application requirements of a code
BPC	Division 5 of the California Business and Professions Code - Weights and Measures
CC	National Type Evaluation Certificate of Conformance
CCR, § 4000	Title 4, Division 9 of the California Code of Regulations
CTEP	California Type Evaluation Program
EPO	Examination Procedure Outline
G	General Code paragraph
G-A	General Code Application paragraph
G-N	General Code Test paragraph
G-S	General Code Specifications paragraph
G-T	General Code Tolerances paragraph
G-UR	General Code User Requirements paragraph
HB 44	NIST Handbook 44
N	Notes for official test procedure paragraphs
NR	Non-retroactive
NTEP	National Type Evaluation Program
REF	Code Reference(s) used for enforcement of BPC and CCR
RSA	Registered Service Agency
S	Specification paragraphs – design requirements
T	Tolerance paragraphs- performance requirements
UR	User requirement paragraphs applicable to the selection, use installation and maintenance requirements

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SAFETY NOTES

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 property, equipment, or the device. As a minimum, the following safety precautions should be noted and followed during the inspection. 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.

Suitable Clothing

Personal Protection Equipment

e.g. – Safety Shoes, Safety Aprons,
Gloves, Eye Protection, Hard Hat, etc.
if necessary

Transportation of Equipment

Lifting

Location

Wet/Slick Conditions, Chemicals,
Petroleum Product, Hazardous
Materials, Obstructions.

Fire Extinguisher

Emergency Procedures

First Aid Kit

Ignition Sources

Electrical Hazards

Nature of Product - Safety
Data Sheets (SDS)

Traffic

Safety Cones/Warning Signs

Grounding/ Static Discharge

Switch Loading

SAFETY REMINDER!!!

- **Become familiar with and follow safety guidelines.**
- **Check the inspection site carefully for safety hazards and take appropriate precautions.**
- **If leaks, spills, exposed wiring, etc. cause hazardous testing conditions, it is recommended that the testing be discontinued until the unsafe conditions are corrected.**
- **Learn the nature of hazardous products used at, or near, the inspection site.**
- **Obtain and read copies of Safety Data Sheets (SDS) (formerly Material Safety Data Sheets).**
- **Know the emergency procedures and location and operation of fire extinguishers and emergency shut-offs.**
- **Post safety cones/warning signs and be aware of vehicular and pedestrian traffic patterns.**
- **Use caution when moving in wet, slippery areas.**
- **Open both sides of the dispenser to allow fumes to dissipate before proceeding with the inspection.**
- **Use personal protection equipment appropriate for the inspection site.**
- **Be sure that a first aid kit is available and that the kit is appropriate for the type of inspection activity.**

EPO 26-A. BASIC DISPENSER

PRE-TEST CONSIDERATIONS

- Be aware of hazards such as traffic – use cones and other safety measures.
- Verify that the location has enough product to allow testing [this can usually be accomplished by asking for a Veeder-root (tank monitoring system) printout].
- Verify that access is available to complete full inspection of dispensers and return product to storage tanks (this may require keys, tools, or other assistance provided by responsible personnel).
- Before inspection verify that you have all tools, equipment, seals, etc. necessary to perform inspection.
- Training may be necessary to use some of the tools & equipment required to test the devices.
- Familiarity with your equipment including operation of valves on a petroleum truck, location of safety equipment, etc. is of extreme importance.

PRE-TEST INSPECTION

1. Type Approval: [CTEP](#) or [NTEP](#) Certificate of Conformance. REF: BPC § 12500.5

- For devices with an NTEP CC, see Identification Markings.
 - CTEP devices are not required to be marked with CTEP Certificate of Approval number and must be verified using the make and model (e.g. CTEP database at <https://www.cdfa.ca.gov/dms/programs/ctep/ctep.html>).
- Unapproved devices are not to be tested or sealed by weights and measures officials. Yellow “unapproved device” tags are to be affixed to devices which are not approved.

REF: BPC § 12500.10

NOTE: Follow your County protocols regarding “non-commercial” devices (e.g. High School Wrestling scales).

2. Identification Markings:

- Lettering. **REF: § 4000. [1.10.] G-S.7.**
 - All required markings and instructions shall be distinct and easily readable and shall be of such character that they will not tend to become obliterated or illegible.
- Visibility of identification. [See ‘Location of Marking Information’ below]
REF: § 4000. [1.10.] G-UR.2.1.1.
- Location of Marking Information. **REF: § 4000. [3.30.] S.4.4.2. (NR 1/1/03)**
 - (a) Within 60 cm (24 in) to 150 cm (60 in) from the base of the dispenser (for a system in a dispenser);

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- (b) Either internally and/or externally provided the information is permanent and easily read; and
- (c) On a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).

NOTE: The use of a dispenser key or tool to access internal marking information is permitted for retail liquid-measuring devices. (Retroactive)

- Name, initials, or trademark of manufacturer or distributor.
REF: § 4000. [1.10.] G-S.1.(a) Retroactive
- Model identifier. **REF: § 4000. [1.10.] G-S.1.(b) Retroactive**
- Model identifier prefix, acceptable abbreviations for “model” and “number”.
REF: § 4000. [1.10.] G-S.1.(b)(1)(NR 1/1/03)
- Nonrepetitive serial number. **REF: § 4000. [1.10.] G-S.1.(c) (NR 1/1/68)**
- Serial number prefix. **REF: § 4000. [1.10.] G-S.1.(c)(1) (NR 1/1/86)**
- Acceptable abbreviations for “Serial” and “Number”.
REF: § 4000. [1.10.] G-S.1.(c)(2) (NR 1/1/01)
- Current Software Version or Revision Identifier (for not-built-for-purpose software-based devices). **REF: § 4000. [1.10.] G-S.1.(d) (NR 1/1/04)**
 - Software version or identifier preface (for not-built-for-purpose software-based devices). **REF: § 4000. [1.10.] G-S.1.(d), G-S.1.(d)(1) i (NR 1/1/07), G-S.1.(d)(1)ii (NR 1/1/16), and G-S.1.(d)(2) (NR 1/1/16)**
- Acceptable abbreviations for version, revision, and number.
REF: § 4000. [1.10.] GS.1.d.(2) (NR 1/1/03)
- NTEP CC number (for devices that have an NTEP CC). **REF: § 4000. [1.10.] G-S.1.(e)**
 - Prefix and acceptable abbreviations.
REF: § 4000. [1.10.] G-S.1.(e)(1) (NR 1/1/03)

3. Additional Marking Requirements:

- Interchange or reversal of parts. **REF: § 4000. [1.10.] G-S.4.**
- Operational controls, indications, and features.
REF: § 4000. [1.10.] G-S.6. (NR 1/1/77)
- Limitations of Use. **REF: § 4000. [3.30] S.4.1.**
- Discharge Rate (Not required if less than 30 gpm.).
REF: § 4000. [3.30] S.4.4.1. (NR 1/1/85)
- Unattended dispensers other than for fleet or contract sales – Money operated device shall have clearly and conspicuously displayed the name, address, and phone number of local responsible party for the device. **REF: § 4000. [1.10] G-UR.3.4.**

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- Unit Price and product identity (required to be displayed on the face of dispenser).
REF: § 4000. [3.30.] S.1.6.4.1.(a), S.1.6.4.2., UR.3.2.
- Identification of Service Agency work. **REF: § 4085.(a)(4)**
 - Conspicuously located adhesive tag or label.
 - Name, registration number, business telephone, service agent license number, and date.

4. Selection:

- Suitability.
 - Commercial equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to its computing capability, its rate of flow, the character, number, size, and location of its indicating or recording elements, and the value of its smallest unit and unit prices. **REF: § 4000. [1.10.] G-UR.1.1.**
 - Permanence. **REF: § 4000. [1.10.] G-S.3.**
 - Environment. **REF: § 4000. [1.10.] G-UR.1.2.**
 - Minimum Delivery, not less than 100 divisions (digital) or 10 divisions (analog). **REF: § 4000. [1.10.] G-UR.1.3.**
- Installation.
 - Such that it does not facilitate fraud. **REF: § 4000. [1.10.] G-S.2.**
 - In accordance with manufacturer's instructions.
REF: § 4000. [1.10.] G-UR.2.1., [3.30.] UR.2.1.
 - Measuring elements.
 - Air eliminator vent, if self-contained dispenser.
 - An air eliminator vent tube must not be plugged or crimped.
REF: § 4000. [3.30.] S.2.1.
 - Security seal on adjusting mechanism.
REF: § 4000. [1.10.] G-UR.4.5.
 - Discharge hose-retail.
REF: § 4000. [3.30.] S.3.1., S.3.2., S.3.3., S.3.5., S.3.6., S.3.7.
 - Length – General. The length of discharge hose shall not exceed 18 feet unless it can be demonstrated that a longer hose is essential. **REF: § 4000. [3.30.] UR.1.1.1.**
 - Length and Protection - Marinas and Airports.
REF: § 4000. [3.30.] UR.1.1.2.
 - Diversion of measured liquid.

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- Except for truck refueling devices, measured liquid shall not be diverted from a single discharge line during delivery.
REF: § 4000. [3.30.] S.3.1.
 - For truck refueling devices, two outlets may be operated at one time to fuel a single truck provided measures are taken to prevent fraud or deception. **REF: § 4000. [3.30.] S.3.2., UR.2.4.**
 - Examples include:
 - Explanation signs;
 - Physical barriers to adjacent driveways; and
 - Visible valves or lighting systems indicating which outlets are in operation.
 - Discharge Rate.
 - Installed so that the actual maximum discharge rate will not exceed the rated maximum discharge rate. Automatic means for flow regulation shall be incorporated in the installation if necessary.
REF: § 4000. [3.30] UR.2.2.
 - Directional Flow Valves shall be automatic in operation.
REF: § 4000. [3.30] S.2.3.
- Position of Equipment.
- A device used for direct sales shall be placed so the indications and measuring operations may be seen from a reasonable “customer” and operator position. **REF: § 4000. [1.10.] G-UR.3.3.**
- Accessibility & Assistance.
- A device shall be located, or such facilities for normal access thereto shall be provided, to permit testing and sealing. **REF: § 4000. [1.10.] G-UR.2.3.**
 - If the design, construction, or location of any device is such as to require a testing procedure involving special equipment or accessories or an abnormal amount of labor, such equipment, accessories, and labor shall be supplied by the owner or operator of the device as required by the weights and measures official. **REF: § 4000. [1.10.] G-UR.4.4.**
- Use and Maintenance.
- Equipment shall be operated only in the manner that is obviously indicated by its construction or that is indicated by instructions on the equipment.
REF: § 4000. [1.10.] G-UR.3.1.
 - All equipment in service and all mechanisms and devices attached thereto or used in connection therewith shall be continuously maintained in proper operating condition throughout the period of such service.
REF: § 4000. [1.10.] G-UR.4.1.

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- Unstable indications or other abnormal equipment performance observed during operation shall be corrected and, if necessary, brought to the attention of competent service personnel. **REF: § 4000. [1.10.] G-UR.4.2.**
- Multiple unit price dispensers.
 - The selection of the unit price shall be made prior to delivery using controls on the device or other customer-activated controls. **REF: § 4000. [3.30.] S.1.6.4.1.(b)(1) (NR 1/1/91), S.1.6.4.1.(b)(2), S.1.6.5.(a) (NR 1/1/91), S.1.6.5.4. (NR 1/1/91), UR.3.3.**
 - Shall be used only for sales for which the device computes and displays the sales price for the selected transaction. See exemptions which include fleet sales, truck stops (exclusively for refueling trucks), and post-delivery discounts. **REF: § 4000. [3.30.] UR.3.3.**

5. Indicating and Recording Elements:

- Primary Indication.
 - All weighing and measuring devices shall be provided with indicating or recording elements appropriate in design and adequate in amount. Primary indications and recorded representations shall be clear, definite, accurate, and easily read under any conditions of normal operation of the device. **REF: § 4000. [1.10.] G-S.5.1., [3.30.] S.1.1.**
- Values of Intervals.
 - The values of the graduated intervals or increments shall be uniform throughout the series. **REF: § 4000. [1.10.] G-S.5.3.**
 - On devices designed to indicate or record in more than one unit of measurement, the values indicated and recorded shall be identified with an appropriate word, symbol, or abbreviation. **REF: § 4000. [1.10.] G-S.5.3.1.**
 - Graduations & Indicators **REF: § 4000. [3.30.] S.1.4., S.1.5.**
- Units.
 - Deliveries shall be indicated and recorded, if the device is equipped to record, in liters or gallons and decimal subdivisions or fractional equivalents thereof. **REF: § 4000. [3.30.] S.1.2.1.**
 - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of: 0.1 gal (if max flow rate 200 gal/min or less), 1 gal (if max flow rate more than 200 gal/min), 1 gal (if max flow rate more than 100 gal/min – used for jet fuel aviation refueling). **REF: § 4000. [3.30.] S.1.2.3.**
- Analog. **REF: § 4000. [1.10.] G-S.5.2.1.**
 - Graduations and a suitable indicator shall be provided in connection with indications designed to advance continuously.

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- Digital. **REF: § 4000. [1.10.] G-S.5.2.2.**
 - All digital values of like value agree with one another. Digital & associated analog values agree to the nearest minimum graduation. Digital values ‘round off’ to nearest minimum unit that can be indicated or recorded.
 - Zero indication includes display of zero for all places to right of decimal and at least one place to the left. **(NR 1/1/86)**
- For primary indicators separately located from their measuring elements:
 - A device shall be so installed that there is no obstruction between a primary indicating or recording element and the weighing or measuring element; otherwise there shall be convenient and permanently installed means for direct communication, oral or visual, between an individual located at a primary indicating or recording element and an individual located at the weighing or measuring element.
REF: § 4000. [1.10.] G-UR.2.2.
 - If a system is equipped with auxiliary indications, all indicated money-value divisions of the auxiliary element shall be identical with those of the primary element. **REF: § 4000. [3.30.] S.1.6.5.3. (NR 1/1/85), S.1.6.6. (Partial NR 1/1/88)**
- Zero-setback interlock. **REF: § 4000. [3.30.] S.2.5., UR.3.5.**
 - After a delivery cycle has been completed by moving the starting lever to any position that shuts off the device, an automatic interlock prevents a subsequent delivery until the indicating elements... have been returned to their zero positions.
- Advancement and return to zero. **REF: § 4000. [3.30.] S.1.6.3.**
 - Shall not be possible to advance except by the mechanical operation of the device. (Meter Creep). **REF: § 4000. [1.10.] G-UR. 4.1., G-UR.4.2., [3.30.] S.1.3.**
 - Meter shall return to zero before each delivery. (Meter Jump).
REF: § 4000. [1.10.] G-UR. 4.1., G-UR.4.2., [3.30.] S.1.3., S.1.6.1. (Partial NR 1/1/06), UR.3.1.

Note: The procedure to verify this requirement is conducted as part of the “Test” section of this EPO.

- For electronic devices manufactured prior to January 1, 2006, the first 0.03 L (or 0.009 gal) of a delivery and its associated total sales price need not be indicated. **REF: § 4000. [3.30.] S.1.6.1. (Retroactive)**
- For electronic devices manufactured on or after January 1, 2006, the measurement, indication of delivered quantity, and the indication of total sales price shall be inhibited until the fueling position reaches conditions necessary to ensure that the delivery starts at zero.
REF: § 4000. [3.30.] S.1.6.1. (NR 1/1/06)

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- Quantity and total price display – except aviation refueling.
 - When a delivery is completed, the total price and quantity for that transaction shall be displayed on the face of the dispenser for at least 5 minutes or until the next transaction is initiated.
REF: § 4000. [3.30.] S.1.6.5.5. (NR 1/1/94)
- Quantity and total price display – aviation refueling.
REF: § 4000. [3.30.] S.1.6.5.6. (NR 1/1/08)
- Totalizers. Retail dispensers shall be equipped with a non-resettable totalizer for the quantity delivered through the metering device. **REF: § 4000. [3.30] S.5. (NR 1/1/95)**

6. Indicated & Recorded Representation of Units. REF: § 4000. [1.10.] G-S.5.6.1.

- For equipment manufactured on or after January 1, 2008, the appropriate defining symbols are shown in [NIST Special Publication SP 811](https://www.nist.gov/pml/special-publication-811) “Guide for the Use of International System of Units (SI)” [<https://www.nist.gov/pml/special-publication-811>] and Handbook 44 Appendix C – General Tables of Units of Measurement.
- The appropriate defining symbols on equipment manufactured prior to January 1, 2008, with limited character sets are shown in Table 1. Representation of SI Units on Equipment Manufactured Prior to January 1, 2008, with Limited Character Sets.

7. Recorded Representations.

- Insofar as they are appropriate, the requirements for indicating and recording elements shall also apply to recorded representations. All recorded values shall be printed digitally. Customer may be given option of not receiving recorded representation or receiving required information electronically. **REF: § 4000. [1.10.] G-S.5.6. Retroactive**
- Point-of-sale systems. **REF: § 4000. [3.30.] S.1.6.7. (NR 1/1/86)**
 - Except for fleet/contract sales and post-delivery discounts, a receipt indicating: the total volume of delivery, the unit price, the computed total price, and product identity (may be abbreviation or code number), shall be available.
- Post-delivery discounts. **REF: § 4000. [3.30.] S.1.6.8., UR.3.3.**
 - Except for fleet/contract sales, a receipt indicating: the product identity (may be abbreviation or code number), total volume of delivery, unit price, total computed price, post-delivery discounts, and final total price, shall be available.

8. Provision for Sealing.

- A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.
REF: § 4000. [1.10] G-S.8. (NR 1/1/90), [3.30.] S.2.2., Table S.2.2. (NR 1/1/95)

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- A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.
REF: § 4000. [1.10.] G-S.8. Retroactive
- Sealing multiple measuring elements with a common provision for sealing.
REF: § 4000. [1.10.] G-S.8.1. (NR 1/1/10)
 - (a) A change to any metrological parameter (calibration or configuration) of any weighing or measuring element shall be individually identified.
(NR 1/1/10)
 - (b) For devices that utilize an electronic form of sealing, in addition to the requirements in G-S.8.1., any appropriate audit trail requirements in an applicable specific device code also apply. Examples of identification of a change to the metrological parameters of a weighing or measuring element include, but are not limited to:
 - a. A broken, missing, or replaced physical seal on an individual weighing, measuring, or indicating element or active junction box;
 - b. A change in a calibration factor or configuration setting for each weighing or measuring element;
 - c. A display of the date of calibration or configuration event for each weighing or measuring element; or
 - d. Counters indicating the number of calibration and/or configuration events for each weighing or measuring element.
- Sealing removable digital storage device. **REF: § 4000. [1.10.] G-S.8.2., [3.30.] S.2.2., Table S.2.2.**
 - Applies only to removable digital storage devices that remain in the device or system for it to be operational in which the configuration or calibration parameters can be changed by use of a, such as a secure digital (SD) card, USB flash drive, etc., security shall be provided for those parameters using either:
 - A category 3 method of sealing; or
 - A physical seal that must be broken in order to remove the digital storage device from the device
- A security seal shall be appropriately affixed to any adjustment mechanism designed to be sealed. **REF: § 4000. [1.10.] G-UR.4.5.**

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BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

PRE-TEST DETERMINATIONS

1. Applicability of Tolerances (Acceptance & Maintenance).

REF: § 4000. [1.10.] G-T.1., only (a) & (e), G-T.2.

2. Application. REF: § 4000. [1.10] G-T.3.

3. Tolerance Values:

– Basic values. REF: § 4000. [3.30] T.2., Table T.2.

a) Accuracy Class 0.5 (marked maximum flow rates 1 – 30 gpm)

i. Test draft up to 10 gallons:

- Maintenance tolerances on normal and special tests shall be 20 mL plus 4 mL per indicated liter or 1 in³ plus 1 in³ per indicated gallon.
- Acceptance tolerances on normal and special tests shall be one-half the maintenance tolerance values.

<u>Test Measure</u>	<u>Maintenance Tolerance</u>	<u>Acceptance Tolerance</u>
5 gallons:	± 6 cu in	± 3 cu in
19 liters:	-1.5 cu in to + 10.5 cu in	+ 1.5
19 or 20 liters: (gauge plates)	±100 mL	± 50 mL

Figure 1 - Acceptance and Maintenance Tolerances

ii. Test draft larger than 10 gal)

- Acceptance = 0.3%, Maintenance = 0.5%

b) Accuracy Class 0.3 (marked maximum flow rates greater than 30 gpm):

- Acceptance = 0.2%, Maintenance = 0.3%

Note: Special test tolerances are not applicable to retail motor-fuel dispensers.

4. Repeatability.

- When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature-compensating system. (Also see “Repeatability” in “Tests” section.)

REF: § 4000. [3.30] T.3.

5. Determine Location and Accessibility of Storage Tanks.

6. Product Storage Identification. REF: § 4000. [3.30] UR.2.5., BPC § 13480.

7. Test Liquid. REF: § 4000. [3.30] N.1.1.

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- Verify that the liquid available for testing is appropriate.

8. Test Draft Size. REF: § 4000. [3.30] N.3.4.

TEST NOTES

1. Conflict of Laws & Regulations.

- If any particular provisions of these specifications, tolerances, and other requirements are found to conflict with existing state laws, or with existing regulations or local ordinances relating to health, safety, or fire prevention, the enforcement of such provisions shall be suspended until conflicting requirements can be harmonized. Such suspension shall not affect the validity or enforcement of the remaining provisions of these specifications, tolerances, and other requirements. **REF: § 4000. [1.10.] G-N.1.**

2. Testing with Non-associated Equipment. (e.g. RFI/EMI)

- Tests to determine conditions, such as radio frequency interference (RFI) that may adversely affect the performance of a device shall be conducted with equipment and under conditions that are usual and customary with respect to the location and use of the device. **REF: § 4000. [1.10.] G-N.2.**

3. Prover/ Test Measure Considerations:

- “Wetting” the prover.
 - If the test measure or prover is dry, it must be prepared for use by first “wetting” it.
 - To wet the test measure or prover, fill it to capacity and empty it following proper drain procedures.
- Level the test measure or prover. When the test measure or prover is full of liquid, re-check its level to ensure that the weight of the product has not affected the level condition.



Figure 2 - Level Hand-Held Test Measures on the Neck.

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- Prover drain times.
 - Handheld test measures require a 30-second (± 5 s) pour followed by a 10-second drain, with the measure held at a 10 to 15 degree angle from vertical.
REF: § 4000. [3.30.] N.4.4.1.

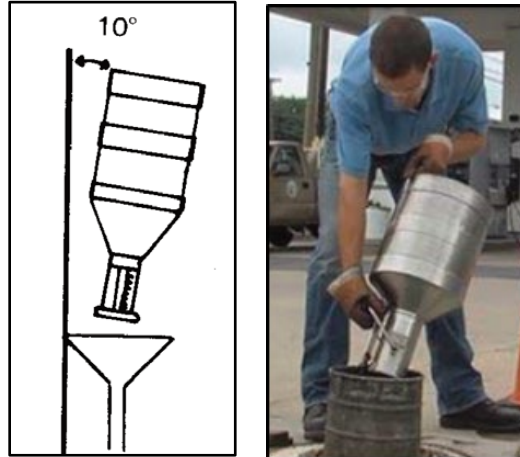


Figure 2 - Draining at a 10 Degree to 15 Degree Angle

- Bottom drain provers require a 30-second drain after the main flow ceases.
- See NIST HB 105-3, Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards, 2010, Section 7.
[\[https://www.nist.gov/system/files/documents/pml/wmd/hb-105-3-2010.pdf\]](https://www.nist.gov/system/files/documents/pml/wmd/hb-105-3-2010.pdf)

4. Product Considerations:

- Volume changes. Take care to minimize changes in volume of the test liquid due to temperature changes and evaporation losses during the test. **REF: § 4000. [3.30.] N.2.**
- Avoid switch loading!
 - Test devices dispensing low-vapor pressure products (e.g., diesel fuel and kerosene) before testing devices dispensing high-vapor pressure products (e.g., gasoline and ethanol blends up to E85) with the same test measure or prover. Additional precautions may be necessary with other high-vapor pressure products. Precautions should also be taken to prevent contamination or dilution of product.

5. Safety Considerations:

- Ground the cart or vehicle if the test measure is vehicle-mounted or left on a cart when dispensing product or returning product to the storage tank.
- Ground the nozzle spout on the rim of the test measure before dispensing product.
- Do not leave an activated dispenser unattended!
- When Returning Product:
 - Ground the neck of the test measure or prover properly.
 - Only use a metal funnel when returning product to storage.
 - **DO NOT USE PLASTIC CONE AS A FUNNEL!**

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- 6. Record Totalizer Beginning & Ending Readings** (if applicable - documentation of product used for testing).

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SAFETY REMINDER!!!

- **Wear appropriate personal protection equipment such as petroleum-resistant, nonskid safety shoes (to prevent possible injury from spills or slipping on slick surfaces), protective clothing, and eye protection to prevent injury from splashed product.**
- **Use Proper Lifting Techniques**
- **Be aware of and attempt to eliminate potential ignition sources in or near the inspection site.**
- **Be aware of vehicular and pedestrian traffic when moving between dispenser and storage tanks.**
- **Take precautions to isolate equipment when transporting it to avoid exposure to hazardous fumes.**
- **See DMS NOTICE G-91-4 & [EPO REF-E](#) regarding static Electricity**

TESTS

1. Activate the Dispenser.

- Reset device to zero (check both sides if applicable and all indicators).
- Before dispensing any product, check to see if there is any advancement of the indicating and recording elements (computer jump).
- If there is any advancement of the volume and/or money values, stop the test and take appropriate enforcement action.
REF: § 4000. [1.10.] G-UR. 4.1., G-UR.4.2., [3.30.] S.1.3., S.1.6.1. (Partial NR 1/1/06), UR.3.1.

Note: Customers using dispensers equipped with card lock, credit/debit card, or cash acceptors will be charged the cash value of the computer jump. Pre-pay customers may have difficulty proving that the meter advanced before fuel was dispensed.

- Especially when testing in response to a complaint about advancement of indication without mechanical operation; dispensers that can be used simultaneously on both sides by different users and utilizing coaxial hose systems (“balance” type vapor recovery systems and bootless nozzles), should be checked for internal leakage of valves, piping, seals between liquid, vapor spaces, or inner and outer hoses. After turning the dispenser on, observe the volume and money indications on both sides of the dispenser for advancement (even if the opposite side uses a different hose). Advancement of money indications on either side of the dispenser indicates a possible leak and diversion of measured product. Mark the device “out of order” if this condition exists.

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2. Normal Test.

- Without pulling discharge lever, clear nozzle of any liquid downstream from valve into a suitable container, not the test measure.
- Ground the nozzle spout on the rim of the test measure before dispensing product.
- Dispense product at the maximum flow until the indication meets the nominal capacity of prover/test measure.
 - At the beginning of the first delivery, the first 0.009 gallons (approximately 2 cu in) may not indicated. (i.e., on a digital display, “up to” this amount can be suppressed internally, but the dispenser will still show zeros).
REF: § 4000. [3.30.] S.1.6.1. (NR 1/1/06)
- Apply basic tolerances. [NOTE: See Appendix B for “Reading Sight Gauge”]
REF: § 4000. [3.30.] N.4.1., T.1., T.2., Table T.2.
- Dispensers should also be tested to verify that the indication does not advance without mechanical operation (meter creep). This can be achieved by observing the indication after the test draft is completed. Watch for a subtle advancement of dollar and/or volume amounts while holding the nozzle. If this condition exists, the device is “out of order.” **REF: § 4000. [1.10.] G-UR. 4.1., G-UR.4.2., [3.30.] S.1.3., S.1.6.1. (NR 1/1/06 Partial), UR.3.1.**
- For this and subsequent normal tests, verify that the maximum discharge rate of the installation does not exceed the marked maximum.
REF: § 4000. [3.30.] S.4.4.1. (NR 1/1/85), UR.2.2.
- For this and subsequent tests, verify that other conditions of use do not exceed marked or manufacturer-specified limitations. **REF: § 4000. [1.10.] G-UR.3., [3.30] S.4.1., UR.2.2.**
- For this and subsequent tests, re-check the level of the test measure or prover once it is full of liquid and before reading the indication to ensure that the weight of the product has not affected the level condition.

Note: If the result of the first test is at or near the tolerance limit, it is advisable to repeat this test. If necessary, conduct a repeatability test.

3. Indications & Recorded Representations:

- Print a ticket if the device is so equipped. **REF: § 4000. [1.10.] G-S.5.6., G-S.5.6.1., [3.30.] S.1.2.1.**
- 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. **REF: § 4000. [1.10.] G-S.5.6., S.1.6.7. (NR 1/1/86), S.1.6.8., UR.3.3.**

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4 CCR § 4000. 3.30. Liquid Measuring Devices**

- Check price computations on all indicators (including consoles) and on recorded representations. **REF: § 4000. [1.10.] G-S.5.5., [3.30.] S.1.6.5. (Partial NR 1/1/91), S.1.6.5.1., S.1.6.5.2.**
- Check for agreement between indicators. **REF: § 4000. [1.10.] G-S.5.2.2., [3.30.] S.1.6.5.3. (NR 1/1/85), S.1.6.6. (Partial NR 1/1/88)**
- Verify that required information is on the receipt and that a receipt is provided in applications where post-delivery discounts are offered. **REF: § 4000. [1.10.] G-S.5.6., Retroactive, [3.30.] S.1.6.7. (NR 1/1/86), S.1.6.8., UR.3.3.**

4. Special Tests.

When conducting surveys of marketplace conditions, special tests will be conducted, and special test compliance will be evaluated as a part of the survey.

Some local jurisdictions have adopted policies wherein special tests are not always conducted. There are however situations or “circumstances” where special tests shall be conducted.

The following are examples of “circumstances” in which special tests shall be conducted on retail fuel dispensers:

- dispensers which have been placed into or being returned to service,
- devices where compromised “seal(s)” have been detected,
- locations or devices with indications of poor maintenance, and
- locations or service agents with a history of poor maintenance or non-compliance.

The above examples are not considered all-inclusive. It is strongly recommended that jurisdictions have specific guidelines in place before individual discretion with the special test of the dispenser.

4.1. “Minimum Flow Test”, basic tolerance.

REF: § 4000. [3.30.] N.2., N.3.4., N.4.2., N.4.2.2., N.4.5, T.2., Table T.2.

- The “Minimum Flow Test” of a dispenser is a diagnostic test used to evaluate performance at different flow rates. Dispense five gallons (19 or 20 liters) into test measure at a slow rate. Five gallons per minute, minimum marked on device, lowest notch, whichever is less. For vapor recovery systems, 3 gallons per minute, lowest notch or marked minimum, whichever is less. Observe error and apply tolerances. **REF: § 4000. [3.30.] N.4.2., N.4.2.2.**
- Check indications and computations on both sides (if applicable) for agreement. Computation error shall not be greater than 1¢ for unit prices under \$1.00 or 2¢ for unit prices over \$1.00 for analog indications. Computations shall be within the nearest cent for digital indications. **REF: § 4000. [1.10.] G-S.5.5., [3.30.] S.1.6.5., S.1.6.5.1., S.1.6.5.2.**
- If the result of the first test is at or near the tolerance limit, repeat this test.

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- If necessary, conduct a Repeatability Test as outlined below.
REF: § 4000. [3.30.] N.4.6. (formerly N.4.1.2.), T.3.

Note: If the result of the first test is at or near the tolerance limit, it is advisable to repeat this test. If necessary, conduct a repeatability test.

4.2. Dispensers with “Linearization Factors”.

- At the discretion of the inspector (official), the linearization factors may be verified by either physical testing, or combination of physical testing and empirical analysis (See NTEP CC or CTEP COA).

REF: § 4000. [1.10.] G-S.8.2., G-UR.4.4., [3.30.] S.2.2., N.4.5.

4.3. Repeatability Test. REF: § 4000. [3.30.] N.4.6. (formerly N.4.1.2.), N.3.4., 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.

- For devices with no marked minimum and maximum flow rates, the minimum discharge rates shall be as specified in N.4.2.1. or N.4.2.2. and the maximum discharge rates shall be the maximum discharge rate developed under the conditions of the installation.
- For devices equipped with an automatic temperature compensator, the results shall be based on the uncompensated (gross) volume (e.g., with the temperature compensator deactivated). **REF: § 4000. [3.30.] N.4.6.**
- At the beginning of the first delivery, the first 0.009 gallons (approximately 2 cu in) may not be indicated. **REF: § 4000. [3.30.] S.1.6.1. (NR 1/1/06)**

5. Other Tests.

5.1. RFI/EMI Test (electronic equipment only). REF: § 4000. [1.10.] G-N.2., G-UR.1.2., G-UR.3.2., G-UR.4.2.

- Radio Frequency Interference (RFI)
- Electromagnetic Interference (EMI)

5.2. Anti-Drain Test - Check the effectiveness of the anti-drain means. REF: § 4000. [1.10.] G-UR.4.1., [3.30.] S.3.7.

- Turn off dispenser.
- Try to drain hose into container by opening nozzle discharge valve without raising hose above container level.
- With discharge valve open, hold nozzle over container and raise an arm’s length of hose overhead. If flow resumes, the anti-drain valve is ineffective.

NOTE: Balance system - On intended tight seal nozzles, the boot must be held back.

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5.3. Zero-Set-back Interlock - Dispensers vary in design, but this test is intended to insure that once a customer has completed dispensing fuel and the nozzle is returned to its designed slot or “hang up” position the dispenser is turned off, and the next customer cannot dispense fuel, until the display is returned to zero.

REF: § 4000. [3.30.] S.2.5.(a)

- Remove nozzle from hanging position.
- Reset computer to zero and turn on dispenser. **REF: § 4000. [1.10.] G-S.2.**
- Attempt to place nozzle in its designed hanging position without engaging interlock or turning off the dispenser. **REF: § 4000. [1.10.] G-UR.4.1.**
- After placing nozzle in its designed hanging position, carefully remove it again and attempt to dispense liquid by moving control lever toward the “on” position and opening nozzle. **REF: § 4000. [3.30.] S.2.5.(b).**

5.4. Control Valve Test. (On equipment with remote or submerged pump systems)

REF: § 4000. [1.10.] G-S.2., G-UR.4.1., [3.30.] S.2.5.(c).

- Turn on one dispenser and let pump run while testing other dispensers of the same grade.
- Complete the following steps for each dispenser connected to pump which is running.
 - Remove nozzle from hanging position. Do not turn dispenser on.
 - Try to dispense product by opening discharge valve into container.
 - If liquid flows, the control valve assembly is not functioning properly.
- Test the dispenser originally turned on by using another dispenser in the same system.

5.5. Power Loss Test.

Before conducting a power loss test, first check with your supervisor to determine your jurisdiction’s policy on the conditions under which this test is to be conducted.

REF: § 4000. [3.30] S.1.6.2.1. (NR 1/1/83), S.1.6.2.2. (NR 1/1/83)

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POST-TEST TASKS

1. Security Means.

- Check for the presence of security seals on the device. Document missing seals on the official report and apply new ones as needed. **REF: § 4000. [1.10.] G-S.8. (Portions NR 1/1/90), G-UR.4.5., [3.30.] S.2.2.**
- Record audit trail information if the device is equipped with an audit trail.
REF: § 4000. [1.10.] G-S.8. (Portions NR 1/1/90), [3.30] S.2.2. (NR 1/1/95), Table S.2.2. (NR 1/1/95)

NOTE: Do not seal a device if components which are intended to be inaccessible are accessible because of broken or missing glass, locks, etc. (maintenance of equipment)
REF: § 4000. [1.10.] G-UR.4.1., G-UR.4.3.

2. Record the Total Number of Gallons of product dispensed during testing (and returned to appropriate storage tanks if applicable) on the official report.

3. Results.

- Review results after all equipment at a location has been tested to determine compliance with specifications, tolerances, and other technical requirements.

NOTE: Predominance of error in direction favorable to device user. – Become familiar with your County Policy for interpretation and enforcement of this code section.

REF: § 4000. [1.10.] G-UR.4.1.

4. Clean Up.

- Collect your equipment and tools.
- Return all product necessary for testing if applicable.
- Return all tools, equipment, keys, etc. to responsible personnel.

5. Documentation.

- Record the results, compliance actions, and disposition of the device(s) on the report.
- Consider documenting non-compliant devices, identification markings, missing security seals, etc. with photographs.
- Record audit trail information if the device is equipped with an audit trail.
- Record Registered Service Agency (RSA) and Agent information from identification of work. **REF: § 4085(a)(4)**
- Explain and provide the results to the device owner.

EPO 26 - B. Blended Product Dispensers

General

The specifications and tolerances listed under EPO NO. 26-A for Basic Dispensers shall apply to Blended Product Dispensers. For tests applicable to these blenders, see EPO NO. 26-B. A blended-product dispenser is really two dispensing units. One unit delivers high-grade product, the other low-grade product. Either unit may be operated independently, or both may be operated simultaneously, combining high and low-grade product to produce an intermediate grade. The computing device in a blended-product dispenser, whether electronic or mechanical, is far more complex than its counterpart in a single-product dispenser. It must integrate volume totals for both dispensing units and compute a price that will vary for each different blend available. For this reason, money-value computations must be checked for all blends.

Blend Ratios

Over the years, fixed ratio blenders are being replaced with electronic blenders. The blend ratio on these blenders can be set independently at each separate dispenser or even at the remote console. It is useful to determine the actual blend ratios for each dispenser at the time of initial set-up. On most dispensers, it is possible to check the blend ratio as outlined in step 3 below. The audit trail on some dispensers may display the blend ratio settings. This will assure that the dispensers have initially been configured with the correct blend ratios.

Audit Trail Information

It is also useful, on initial installation of a dispenser, to record the audit trail event counter value for each set-up parameter for future reference. These audit trail parameters often include liter to gallon and blend ratio changes and may include totalizer readings. On succeeding annual inspections or a consumer complaint, these values can be reverified. If these values have been incremented without notification, it may be an indication that the blend ratios or other parameters, such as gallon to liter to gallon, are being changed illegally. To access audit trail information, it becomes increasingly necessary to initially determine the Manufacturer and Model Number of dispensing systems and bring the appropriate Type Approval to the location.

TESTS:

1. Lowest Octane.

- Set selector control valve for lowest octane and conduct normal and special tests.
REF: § 4000. [3.30] N.3.4., N.4.1., N.4.2.2.
- Check computed price (on both sides of dispenser, if applicable).
REF: § 4000. [1.10.] G-S.5.5., [3.30.] S.1.6.5. (portions NR 1/1/91) S.1.6.5.1., S.1.6.5.2.

2. Highest Octane.

- Set selector control valve for lowest octane and conduct normal and special tests.
REF: § 4000. [3.30] N.3.4., N.4.1., N.4.2.2.

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- Check computed price (on both sides of dispenser, if applicable).
REF: § 4000. [1.10.] G-S.5.5., [3.30.] S.1.6.5. (portions NR 1/1/91) S.1.6.5.1., S.1.6.5.2.

3. Blend.

- Set selector control at any intermediate blend and conduct minimum flow test.
REF: § 4000. [3.30] N.3.4., N.4.2.2.

NOTE: Blend ratios may be determined by recording the high and low totalizer readings prior to the start of the special test and then again at the end. Subtract the beginning reading from the ending reading. On some dispensers, it may be necessary to access the audit trail to obtain these readings.

- Check computed price (on both sides of dispenser, if applicable).
REF: § 4000. [3.30.] S.1.6.5. (portions NR 1/1/91) S.1.6.5.1., S.1.6.5.2., BPC §13489(b)
- Return the product used for testing blends to the storage tank with the lowest octane.

4. Remaining Blends.

- Set selector control on each of the remaining blends (if applicable).
- Dispense one indicated gallon to check the computed price.
REF: § 4000. [3.30.] S.1.6.5. (portions NR 1/1/91) S.1.6.5.1., S.1.6.5.2., BPC §13489(b)
- The dispenser mechanism shall not be capable of changing blends when the dispenser is in operation. **REF: § 4000. [1.10] G-S.2**
- Return the product used for testing blends to the storage tank with the lowest octane.

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EPO 26 - C. Gas/Oil Mixing Dispensers

In addition to the specifications, tolerances and tests listed under EPO NO. 26-A for Basic Dispensers, the following tests should be conducted for gas/oil mixing dispensers on blending systems with single computers and those systems with separate computers and a “Sealer’s Valve.”

1. Identification.

- Manufacturer’s or distributor’s name or trademark, model number and serial number.
REF: § 4000. [1.10] G-S.1., [3.30] S.4.4.2. (a., b., & c.) (NR 1/1/03)
- CTEP Certificate Type Approval or NTEP Certificate of Conformance.
REF: BPC § 12500.5

2. Pre-mix or Outboard Motor Fuel.

- Set selector control for lowest ratio of gasoline to oil blend and conduct normal and special tests.
- Check computer price on both sides of dispenser, if applicable.
- Check computed price for remaining blends by taking one-gallon drafts for each blend.
- Return all blended product from pre-mix tests to “premix” or “outboard motor fuel” tank.

Test - Separate Computer Blending System With “Sealer’s Valve”

1. Gasoline Only.

- Set selector control for gasoline only and conduct normal and special tests.
REF: § 4000. [3.30] N.3.4., N.4.1., N.4.2.2.
- Check gasoline computed price on both sides of dispenser if applicable.

2. Gasoline/Oil Mixture.

- With this system, separate meters and computers are used for gasoline and oil. In normal operation, blending takes place at the nozzle. For tests of oil delivery, a “sealer’s valve” is provided.
- Remove lower cap from “sealer’s valve”. Use two wrenches to assure that check valve immediately above lower cap is not loosened or removed.
- Two persons are advisable for the following tests of oil delivery. With “sealer’s valve” open, one person should observe oil delivery into a one-quart container while the other controls the delivery of gasoline into any suitable container.

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- Select available ratios of gasoline oil mixture. Examples of delivery ratios are as follows:

<u>Ratio</u>	<u>Gasoline Registered</u>	<u>Oil Registered & Delivered to Test Measure</u>
16:1	4 gallons	1 quart
20:1	5 gallons	1 quart
24:1	6 gallons	1 quart
40:1	10 gallons	1 quart
50:1	12.5 gallons	1 quart

Figure 3. Examples of Delivery Ratios

- At completion of tests, “sealer’s valve” must be returned to original operating position. Replace and seal lower cap.

EPO 26 - D. Money Acceptance in Dispenser

The specifications tolerances and tests listed under EPO NO. 26-A for Basic Dispensers shall apply to money acceptance dispensers during manual operation.

Test of Meter

1. Have operator set dispenser on manual operation.
2. Test each dispenser separately as outlined in EPO NO. 26-A for Basic Dispensers.
3. If dispensers are accurate, have the user set to money acceptance.

Test of Money Acceptance Console

Cash acceptors at both attended and unattended stations, which are used at unattended locations, must meet the marking requirements of paragraph G-UR.3.4.Responsibility, Money-Operated Devices shall have clearly and conspicuously displayed on the device or immediately adjacent to the device information detailing the return of monies paid when the product cannot be obtained

1. The following procedure is recommended in order to test the three main relay switches on the console, which are 25¢, 50¢ and \$1.00.
 - It is not necessary to measure the volume as the dispensers have been determined to be accurate.
2. Have operator put 25¢ in coin acceptor and open delivery valve. When dispenser stops automatically, close valve and check that money value equals 25¢. Do not hang up hose or reset computer.
3. Have operator insert 50¢ or two quarters, open valve and check that total price equals 75¢ when the dispenser stops automatically.
4. Have operator insert a \$1.00 bill, open valve and check that total price equals \$1.75 when the dispenser stops automatically.

EPO 26 - E. Remote Consoles - Keylock, Card Acceptor Devices & Receipt/Ticket Printers

In the following procedure, the terms readout device or readout values are used to identify the remote indicator on a remote console, keylock, or card acceptor system, including debit systems and cash value cards.

NOTE: These procedures apply only to accessories connected to the system that can affect the accuracy of the device. Systems such as credit card printers, not interfaced to a type-approved console or retail metering system do not fall under weights and measures jurisdiction.

Discussion

This Examination Procedures Outline is directed primarily at those systems/nozzles requiring an “intended tight seal” and use of the “Field Compliance Test Unit”.

PRE-TEST DETERMINATIONS

1. Identification.

- Manufacturer’s or distributor’s name or trademark, model number and serial number (on identification plate attached to an exterior surface of the console/printer).
REF: § 4000. [1.10.] G-S.1.

2. Type Approval. REF: BPC § 12500.5.

3. Indicating Elements.

- Readability (must be clear and easily read). **REF: § 4000. [1.10.] G-S.5.1.**
- Advancement only by mechanical operation. **REF: § 4000. [3.30.] S.1.3.**
- Return to zero (readily returnable to definite zero). **REF: § 4000. [3.30.] S.1.6.3.**

4. Remote Consoles (Auxiliary Element). If a system is equipped with auxiliary indications, all indicated money-value divisions of the auxiliary element shall be identical with those of the primary element.

REF: § 4000. [3.30.] S.1.6.5.3. (NR 1/1/85), S.1.6.6., S.1.6.6.(a)(2) (NR 1/1/88)

5. For Systems with Analog Dispenser Indications and Digital Indications on the Readout Device, the readout device shall track the dispenser to the nearest minimum graduation. The readout in a card acceptor system is usually the printed output of the journal or logger printer which is usually located in the operator’s office.

REF: § 4000. [1.10.] G-S.5.2.2.(b).

6. For Systems with Digital Indications on Both Dispenser and Readout Device.

REF: § 4000. [1.10.] G-S.5.2.2.(a).

- For remote displays indicating money only, the money values must agree.
- For remote displays indicating money and volume.
 - Money values must agree.

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

- Volume indication differences are acceptable depending on equipment design limitations. Some older style consoles only transmit total prices to the remote console. In order to determine the volume for the printed receipt, the console divides the total price by the unit price programmed in the console. These older consoles may present the volume in one-tenth or one-hundredths of a gallon when interfaced with a dispenser that indicates in one-thousands of a gallon.

	DISPENSER	CONSOLE
Total Price	\$11.56 (\$11.5552)	\$11.56
Gallons	10.048	10.1
Unit Price	1.15/gallon	

Figure 4 - Example of Acceptable Differences

- For remote displays indicating volume only, indications must agree or “round off” to the nearest minimum unit that can be indicated or recorded.

REF: § 4000. [1.10.] G-S.5.2.2.(c)

7. Master Key or Card Must be Available from Owner/Operator to Perform Tests.

REF: § 4000. [1.10] G-UR.4.4.

BASIC REMOTE CONSOLE TEST

1. Tests for Proper Rounding in the Conversion. REF: § 4000. [1.10] G-S.5.2.2.(b)

- 1.1. Test for proper rounding from analog to digital quantities, or for agreement on digital indications, may be accomplished without additional test drafts during the normal testing of the dispensers. If necessary, a small amount of product may be delivered on top of each test draft; (a) to advance the analog indicator to 0.3 distance between minimum graduations (see 1.1 below); and (b) to 0.7 distance between minimum graduations (see 1.2).

NOTE: Rounding on some systems may be to the nearest tenth of a gallon in lieu of to the nearest cent.

The dispenser can then be tested for anti-drain and interlock-control valve malfunction.

- 1.2. With the dispenser in operation, stop delivery at approximately 0.3 of the distance between two analog graduations of the dispenser.

1.2.1. Turn the dispenser “off” (place nozzle at its correct hanging position). The readout digital value shall round down to the lower analog value.

- 1.3. With the dispenser in operation again, stop delivery at approximately 0.7 of the distance between two analog graduations.

1.3.1. Turn the dispenser “off” (place nozzle at its correct hanging position). The readout digital value shall round up to the higher analog value.

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

1.4. During these tests, if a dispenser delivery is stopped between graduations at distances equivalent to 0.4, 0.5 or 0.6, the readout digital value may round up or down.

2. Test for Prepay Remote Consoles. REF: § 4000. [1.10.] G-S.5.2.2.

2.1. Calculate the proper price extension to include two test drafts (as 10 gallons) and have the operator preset the console for an amount from 5-7 cents higher. This allows enough room in the second test measure or prover to verify that the dispenser stops at the preset dollar amount.

2.2. Conduct basic tests as outlined in EPO NO. 26-A. At the completion of the slow test leave the dispenser “on”, apply tolerances and then open the nozzle, allowing product to flow; the dispenser should automatically shut-off when the preset dollar amount is reached (Shut-off shall occur within 3/10 of a cent of the preset amount if the dispenser is analog, and shall be the preset amount if digital.)

2.3. Have the operator switch the console to a post-pay (or manual mode), reset dispenser and run one additional 5-gallon normal test. Include any computer jump in this test. System shall deliver within maintenance tolerance. (This test determines that the next “fill-up” customer after a “prepay” customer is assured full measure.) Check console for proper rounding on analog dispensers and for agreement on digital dispensers.

At 0.3 of the distance between graduations, the console shall round down; at 0.7 the distance between graduations, the console shall round up.

3. Test for Key Lock and Card Acceptor Systems.

3.1. In most cases, only one readout will be available for routine test in these systems. This will be the one actuated by the owner/operator master key or card. Using this key or card, conduct the tests outlined in EPO No. 26-E-2. If this readout passes the test, accept the entire system. **REF: § 4000. [1.10.] G-UR.4.4.**

4. Receipt/Ticket Printer. (Computing Type Only.)

4.1. Printed receipt/ticket must have unit price, volume delivered, and total price.

4.2. Printed total price of sale must agree.

4.2.1. All digital values must be identical.

4.2.2. Analog must agree to nearest minimum money value.

REF: § 4000. [1.10.] G-S.5.5., UR.3.4.

4.3. Printed volume delivered. **REF: § 4000. [1.10.] G-S.5.2.2.**

4.3.1. Volume delivered must be printed to at least the nearest hundredth unit (example: 62.89 gallons). **REF: § 4000. [3.30.] S.1.6.5., S.1.6.5.2.**

4.4. Mathematical agreement. Printed volume delivered x unit price = total price $\pm 1/2$ cent.

The printed volume may differ from the dispenser and console displayed volumes due to equipment design and “rounding” of indications. Some older style consoles only transmit total prices to the remote console. In order to determine the volume for the printed receipt, the console divides the total price by the unit price programmed in the

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
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console. These older consoles may present the volume in one-tenth or one-hundredths of a gallon when interfaced with a dispenser that indicates in one-thousands of a gallon. **REF: § 4000. [1.10.] G-S.5.5.**

Dispenser Total Price Calculation: Total Price = Volume x Unit Price

Example: 10.048 gal x (\$2.499/gal) = \$ 25.109952 (Rounded to \$25.11)

Console Volume Calculation: Volume = Total Price/Unit Price:

Example: \$25.11/(\$2.499/gal) = 10.0480192077 gallons

(Rounded to 10.0, 10.05, or 10.048 gallons)

EPO 26 - F. Vapor Recovery Systems – Field Compliance Testing

Discussion

This Examination Procedures Outline is directed primarily at those systems/nozzles requiring an “intended tight seal” and use of the “Field Compliance Test Unit”.

Systems

Stage II vapor recovery systems are designed to control motor vehicle fuel vapors. The principle types of systems include:

1. **Balance System** - Where the fuel nozzles include a bellows and face plate designed to make an “intended tight seal” with the vehicle fill opening. Liquid entering a fuel tank displaces vapor which returns to storage.
2. **Assist System** - These systems may include more than one type of fuel delivery nozzle. One includes a bellows and face plate but does not require a “tight seal”. The other system includes a coaxial fill spout with perforations in the outer tube near its tip.

Both systems allow visual observation of vehicle fill opening while filling, if desired, and both rely on some external mechanism to create a vacuum to remove fuel vapors.

REF: CCR § 4054., A1.1., A1.2.

Assist Type

These nozzles may have a secondary shut-off or some other effective means to avoid liquid overflowing a vehicle fuel tank because of primary shut-off failure. “Other effective means” include, but are not limited to, permitting liquid to be seen either by observing the vehicle pipe opening or hearing and seeing liquid overflow spillage. **REF: CCR § 4054.1, S.1.1.(c)**

PRE-TEST INSPECTION

1. Identification.

- Manufacturer’s or distributor’s name or trademark, model number and serial number.
 - (a) Systems may have an I.D. plate.
 - (b) Certification letter by DMS. Nozzles may have this information cast in the nozzle body or on a metal I.D. tag depending on manufacturer.

REF: Health& Safety Code § 41958 [Note: informational ONLY]

2. Type Approval. REF: BPC § 12500.5

- (a) Systems.
- (b) New or Rebuilt nozzles (See following DMS Notices).

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

DMS Notice D-86-2 was issued on July 1, 1986 regarding the repair of vapor recovery systems. The notice stated that "Repairing of components in vapor recovery systems at gasoline service stations may either create or fail to correct problems in delivery or recirculation of product. Because "o-rings" or other critical parts may be omitted or damaged in assembly, it is essential that repair or replacement of parts inside the nozzle be reported to the county sealer/director. Notifications as required by the BPC§12515 included notification for repair or replacement if the following:

- Complete nozzles
- Anti-drain valves
- Automatic shutoff mechanisms
- Spouts of nozzles
- Delivery poppets
- Anti-recirculation traps of valves
- Retractor parts overhead hose systems



<p>STATE OF CALIFORNIA</p> <p>DEPARTMENT OF FOOD AND AGRICULTURE Division of Measurement Standards 8500 Fruitridge Road Sacramento, California 95826</p> <p>July 1, 1986</p>	<p style="text-align: right;">GEORGE DEUKMEJIAN, Governor</p> <p style="text-align: center;"></p> <p>DMS NOTICE D - 86 - 2</p> <p>Discard: Retain</p>
<p>TO WEIGHTS AND MEASURES OFFICIALS</p> <p>SUBJECT: Vapor Recovery System Repairs</p>	
<p>Repairing of components in vapor recovery systems at gasoline service stations may either create or fail to correct problems in delivery or recirculation of product.</p> <p>Because "o-rings" or other critical parts may be omitted or damaged in assembly, it is essential that repair or replacement of parts inside the nozzle be reported to the county sealer/director.</p> <p>Notification as required by California Business and Professions Code Section 12515 includes notification for repair or replacement of the following:</p> <ul style="list-style-type: none">• Complete nozzles• Anti-drain valves• Automatic shutoff mechanisms• Spouts of nozzles• Delivery poppets• Anti-recirculation traps or valves• Retractor parts on overhead hose systems	
<p>Sincerely,</p> <p style="text-align: center;"></p> <p>Darrell A. Guensler Assistant Director (916) 366-5119</p>	

Figure 5 - Image of DMS Notice D-86-2, Vapor Recovery System Repairs

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

DMS Notice D-94-1 was issued on January 25, 1994 on the subject of rebuilt and repaired repair of vapor recovery nozzles.

A number of questions had been asked about repairman (service agents) placing rebuilt or repaired vapor recovery nozzles into commercial use. In response to the inquiries, DMS provided the following information.

The California Air Resources Board (CARB) stated that any work on “internal parts of a nozzle” or “nozzle body” required testing and certification by CARB, DMS, and the State Fire Marshall. Any such work is defined as “rebuilding” a nozzle. “Repair” of a nozzles is limited to front end replacement of spouts, bellows, and scuff guards. Rebuilt vapor recovery nozzles placed into service by registered service agents must have been rebuilt and identified by a company holding a California type approval certificate.

When service agents install vapor recovery nozzles and place them into commercial service, they must comply with all requirements including identification, notification, and performance. It has been reported that many service agents installing vapor recovery nozzles do not possess equipment to test for proper operation of the primary and secondary shut-off mechanisms in nozzles if so equipped. A second complaint is that nozzles are being rebuilt by non-approved rebuilders and service agents.

Because a number of problems have been verified, a routine inspection of service station dispensers, equipped with vapor recovery nozzles, should include tests of three or four nozzles to screen for the probability of defective nozzles and possible violations by repair companies (service agencies). If a defective nozzle is identified during this screening process, the remaining nozzles should be examined. When failures occur, officials should gather investigative information about installations, including:

- Who is the manufacturer, rebuilder, or repairman?
- Are vapor recovery nozzles new, rebuilt, or repaired?
- If vapor recovery nozzles are new or rebuilt”, does the manufacturer or rebuilder have a certificate of approval?
- If a service agent placed vapor recovery nozzles into service, did they comply with all the requirements.

If you have any questions, please contact the Measurement Standards Specialist in your area.

EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices


STATE OF CALIFORNIA	PETE WILSON, Governor
DEPARTMENT OF FOOD AND AGRICULTURE Division of Measurement Standards 8500 Fruitridge Road Sacramento, California 95826	DMS NOTICE D - 94 - 1 (Re-Issue of D-91-3)
January 25, 1994	Discard: Retain
TO: WEIGHTS AND MEASURES OFFICIALS AND VAPOR RECOVERY NOZZLE REPAIRMEN	
SUBJECT: Rebuilt and Repaired Vapor Recovery Nozzles	
<p>A number of questions have been asked about repairmen placing "rebuilt" or "repaired" vapor recovery nozzles into commercial use. In response to the inquiries, we are providing the following information.</p> <p>The California Air Resources Board (CARB) states any work on "internal parts of a nozzle" or "nozzle body" requires testing and certification by CARB, DMS, and the State Fire Marshall. Any such work is defined as "rebuilding" a nozzle. "Repair" of a nozzle is limited to front end replacement of spouts, bellows, and scuff guards. Rebuilt vapor recovery nozzles placed into service by registered repairmen <u>must</u> have been rebuilt and identified by a company holding a California type approval certificate.</p> <p>When repairmen install vapor recovery nozzles and place them into commercial service, they must comply with all requirements including identification, notification, installation, and performance. It has been reported that many repairmen installing vapor recovery nozzles do not possess equipment to test for proper operation of primary and secondary shut-off mechanisms in nozzles so equipped. A second complaint is that nozzles are being "rebuilt" by nonapproved rebuilders or repairmen.</p> <p>Because a number of problems have been verified, a routine inspection of service station dispensers, equipped with vapor recovery nozzles, should include tests of three or four nozzles to screen for the probability of defective nozzles and possible violations by repair companies. If a defective nozzle is identified during this screening process, the remaining nozzles should be examined. When failures occur, officials should gather investigative information about installations, including:</p> <ul style="list-style-type: none">• Who is the manufacturer, rebuilder, or repairman?• Are vapor recovery nozzles new, rebuilt, or repaired?	
DMS NOTICE D - 94 - 1 Page Two	
<ul style="list-style-type: none">• If vapor recovery nozzles are new or "rebuilt", does the manufacturer or rebuilder have a certificate of approval?• If a repairman placed vapor recovery nozzles into service, did they comply with all the requirements? <p>If you have questions, please contact the Measurement Standards Specialist in your area or Dennis Johannes at the number below.</p> <p>Sincerely,</p> <p></p> <p>Darrell A. Guensler Assistant Director (916) 387-4241</p>	

Figure 6 - Image of DMS Notice D-94-1, "Rebuilt" and "Repaired Vapor Recovery Nozzle"

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

DMS NOTICE D – 19 –02 was issued on June 25, 2019 on the subject of Replacement of Hoses and/or Nozzles on Liquid-Measuring Devices

Several major motor fuel retailers have expressed concern recently to the Division of Measurement Standards (DMS) about the need to have a Registered Service Agency/Agent (RSA) replace and repair hoses and/or nozzles connected to commercial motor fuel dispensers, and the subsequent requirement to notify the county office of weights and measures.

The law has not changed since the last DMS Notice was issued on this topic (D-01-4). However, DMS took this opportunity to request a fresh review by legal counsel at the California Department of Food and Agriculture (Department). The Department’s answer remains the same, so we use this occasion to reinforce DMS Notice D-01-4.

The replacement and repairing of hoses and/or nozzles connected to motor fuel dispensers is a “repair” and is required to be performed by, or placed into service by an RSA. The RSA must then notify the county sealer of the work performed.

BPC § 12531(f) defines “repair,” *in any of its variant forms*, means to *provide maintenance*, or *install, adjust, recondition*, or *service a device*. (*Italics added for emphasis.*) Replacing a hose and/or nozzle is a repair.

BPC § 12500(b) defines “measuring equipment” as, “...any device, contrivance, apparatus, or instrument used, or designed to be used, for ascertaining measure and includes any tool, appliance, or accessory used or connected therewith.” (*Italics added for emphasis.*) A hose and/or nozzle is an accessory used or connected to a motor fuel dispenser.

BPC § 12515(a) requires persons who have made repairs or adjustments to notify the county sealer within 24 hours. BPC § 12515(b) provides one exclusion of notification, for “an adjustment to a weighing or measuring instrument only for the purpose of maintaining it in a zero or balance condition.” This further reinforces that the replacement and repairing of hoses and/or nozzles is a “repair” as defined in BPC § 12531(f).

Another concern raised by industry representatives is that county weights and measures officials are not uniformly enforcing these BPC sections. DMS wishes to emphasize that for equity to occur for the businesses we regulate, these laws, as all laws, must be applied uniformly throughout California.

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**



June 25, 2019

DMS NOTICE
D – 19 – 02
Retain Until Superseded

TO: WEIGHTS AND MEASURES OFFICIALS

SUBJECT: Replacement of Hoses and/or Nozzles on Liquid-Measuring Devices

Several major motor fuel retailers have expressed concern recently to the Division of Measurement Standards (DMS) about the need to have a Registered Service Agency/Agent (RSA) replace and repair hoses and/or nozzles connected to commercial motor fuel dispensers, and the subsequent requirement to notify the county office of weights and measures.

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CDFA Division of Measurement Standards • 6790 Florin-Perkins Road, Suite 100 • Sacramento, CA 95828 State of California
Telephone: 916.229.3000 • Fax: 916.229.3055 • www.cdfa.ca.gov/dms Gavin Newsom, Governor



Figure 7 - Image of DMS Notice D-19-02, Replacement of Hoses and/or Nozzles

DMS Notice D-19-02 Replacement of Hoses and/or Nozzles on Liquid-Measuring Devices

June 25, 2019

Page 2

If you have questions, please contact the Device Enforcement Program by email at dms@cdfa.ca.gov or by phone at (916) 229-3000.

Sincerely,

Kristin Macey
Director

cc: Hyrum Eastman, County/State Liaison, CDFA
Samuel Bayless, Regulatory Issues Specialist, California Fuels and Convenience Alliance
Registered Service Agencies – Liquid-Measuring Devices

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

DMS NOTICE D-19-07 was issued on October 2019 on the subject of Vapor Recovery Nozzle Servicing and Replacement on Liquid-Measuring Devices.

Several counties have asked for further clarification of Division of Measurement Standards' (DMS) Notice D-19-01, issued June 25, 2019.

Regardless of the cause of the service or replacement, any repair [as defined in Business and Professions Code § 12531(f)], of a vapor recovery nozzle used on a liquid-measuring device for commercial purposes must be reported to the county sealer and placed into service by a registered service agency/agent (RSA) or weights and measures official.

If you have questions, please contact the Device Enforcement Program at (916)229-3000 or dms@cdfa.ca.gov.

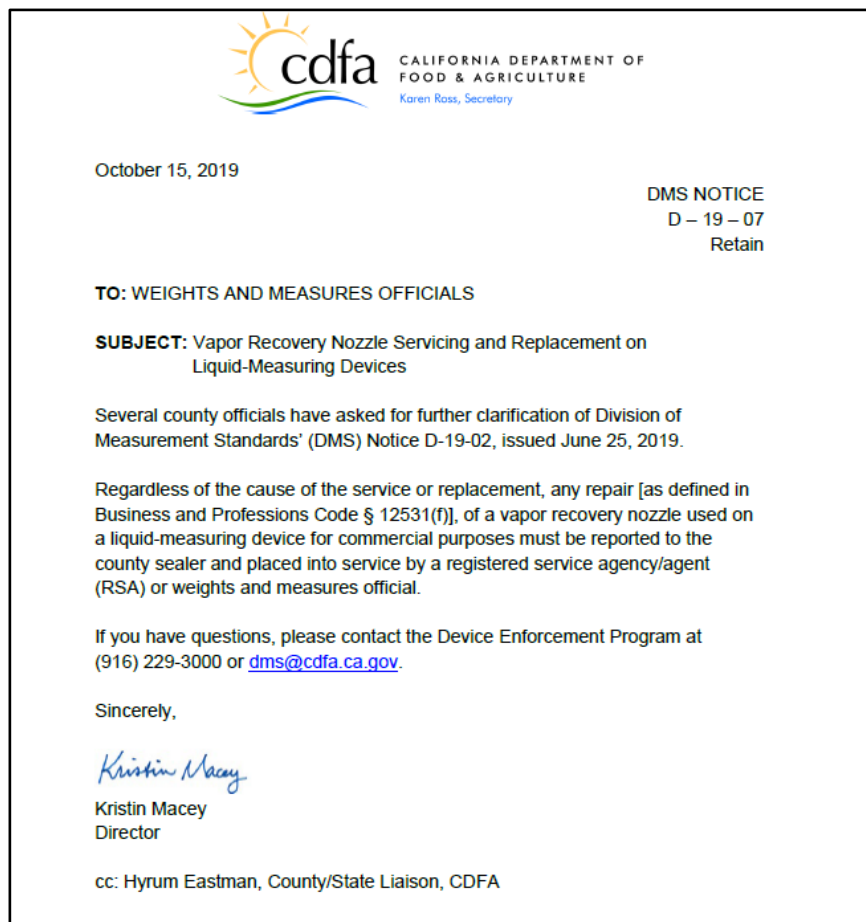


Figure 8 - Image of DMS Notice D-19-07, Vapor Recovery Nozzle Servicing and Replacement on Liquid-Measuring Device



EPO No. 26 – Retail Motor Fuel Dispensers
 BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
 4 CCR § 4000. 3.30. Liquid Measuring Devices

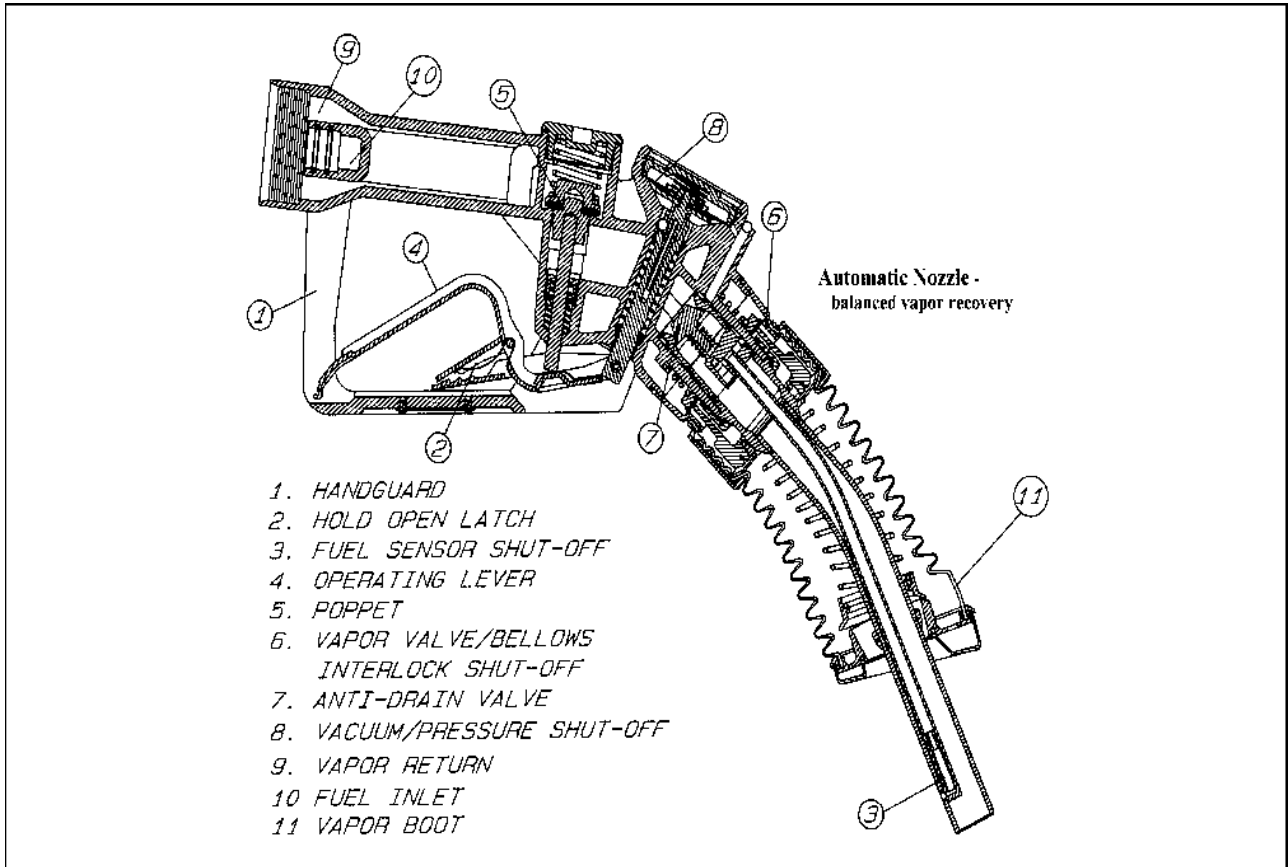


Figure 9 - Vapor Recovery Nozzle (Balance Type)

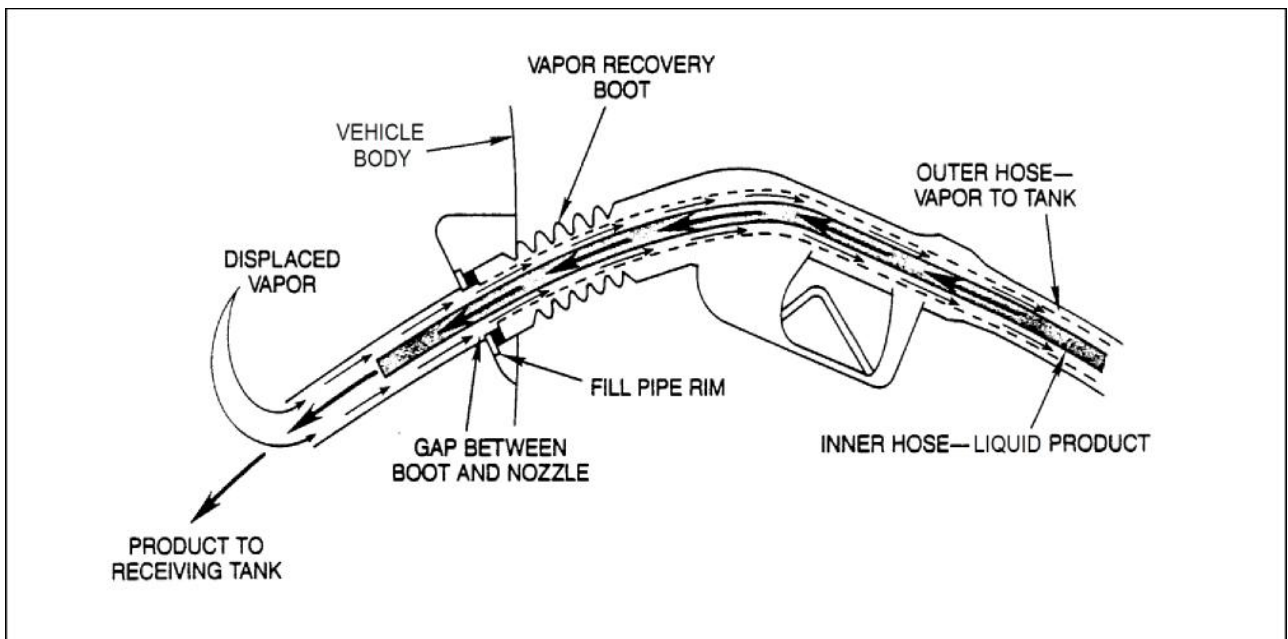


Figure 10 - Vapor Recovery Nozzle (Balance Type)

EPO No. 26 – Retail Motor Fuel Dispensers
 BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
 4 CCR § 4000. 3.30. Liquid Measuring Devices

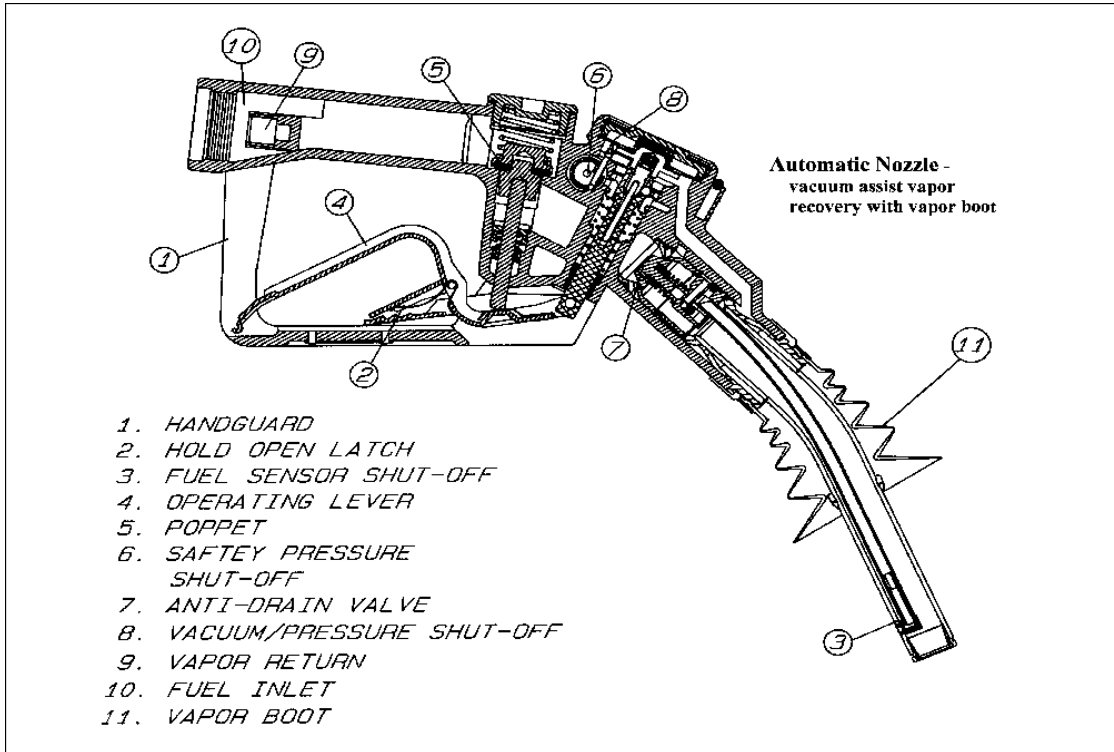


Figure 12 - Vacuum Assist Vapor Recovery Nozzle (With Boot)

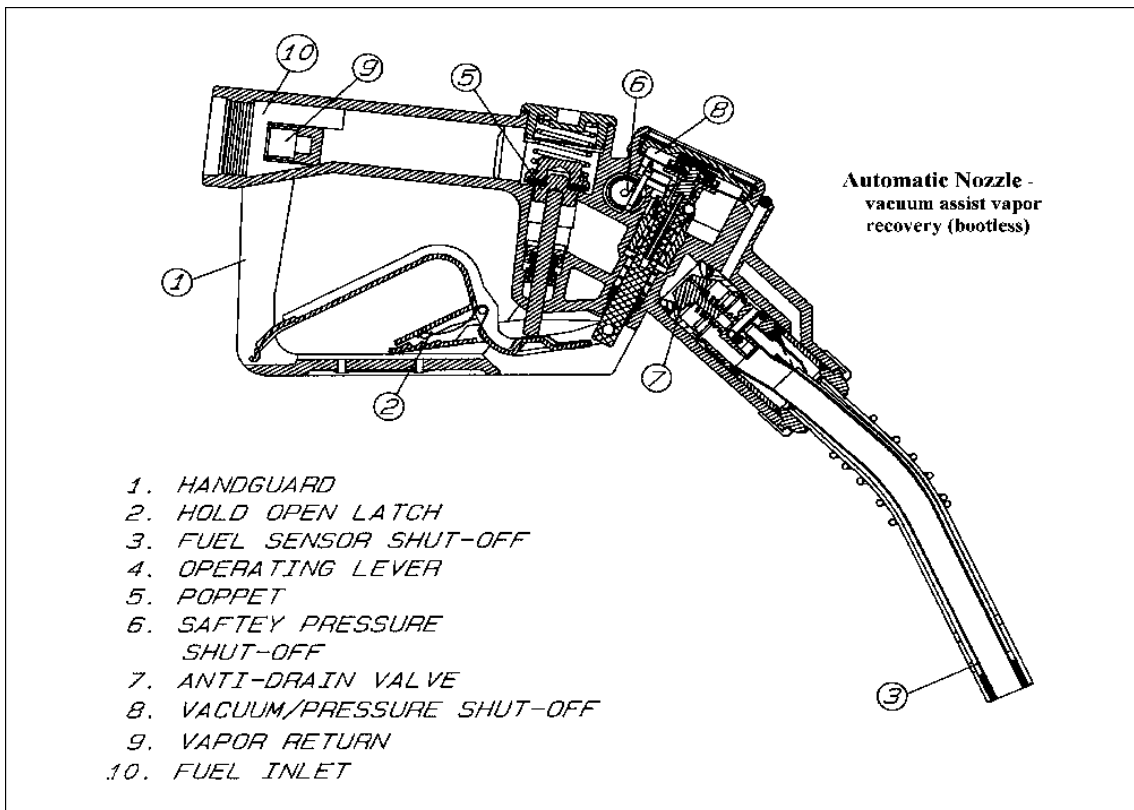


Figure 13 - Vacuum Assist Vapor Recovery Nozzle (Bootless)

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**



Figure 14 - Vapor Recovery Hose Systems (Balanced & Vacuum Assist)

**EPO No. 26 – Retail Motor Fuel Dispensers
BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
4 CCR § 4000. 3.30. Liquid Measuring Devices**

PRE-TEST DETERMINATIONS:

1. Equipment.

- Field Compliance Test Unit built as specified in the CCR.
REF: CCR § 4054.1. Specifications. S.2.

NOTE: These units should be tested using the DMS area specialist Field Compliance Units for uniformity of performance. **REF: CCR § 4054.1. Specification, CCR § 4054.2. Notes.**

2. Tolerances. REF: CCR § 4054.3 T.1. through T.3.

- Performance accuracy - primary shut-off devices.
- Primary shut-off device overrides. The required, additional attempts, in total, to override any nozzle primary shut-off device shall not increase the dispenser volume indication by more than 1/10 gallon. **REF: CCR § 4055 N. Notes N.2.2.**

TESTS:

SAFETY NOTE: Use grounding wires between Field Compliance Unit, nozzle, and dispenser prior to testing. **REF: CCR § 4055., N.2. Test Procedure – N.1. through N.3.**

1. Initial Test - Primary Shut-Off.

- Dispense fuel into the Field Compliance Test Unit in accordance with common public usage. The nozzle shall shut-off automatically when the primary shut-off sensing mechanism is covered by liquid. After the initial primary shut-off device activates, dispense enough additional fuel into the test unit to immerse the nozzle primary shut-off sensing mechanism in liquid.
- Record the dispenser indicator gallons.
- Make 6 additional, consecutive override attempts duplicating a full range of potential customer usage and record the new indicated gallons. All 6 attempts shall result in automatic nozzle shut-off before the dispenser volume indicator increases more than the 1/10 gallon limit.

NOTE: A test unit must be used for this procedure, so the primary shut-off device sensing mechanism can be immersed in liquid.

2. Secondary Shut-Off Device.

- Introduce sufficient fuel into the vapor return line (approximately 1/10 gallon) to block the return of vapors through the line.
- Hold in place a “U-shaped” configuration of the fuel discharge hose at a level lower than the nozzle to concentrate the liquid. Make one or more attempts to dispense fuel into an empty Field Compliance Test Unit (balance-type nozzles must make their intended tight seal at the fill pipe opening).
- The nozzles shall shut-off automatically before the dispenser volume indicator increases more than 3/10 gallon limit for each attempt as specified.

NOTE: This test is not usually performed except for customer complaints regarding nozzle performance.

Appendix A - Subject: Electricity - Static

Est.: 7/86

Rev.: 5/87

Static electricity or any spark, regardless of its source, can ignite gasoline vapors, propane, and other volatile liquids and gases. This potential hazard should be kept in mind when testing equipment where such products are involved.

Tank trucks and other rubber-tired vehicles (such as some test measures or provers) are great potential generators of static electricity. An accumulation of this static electricity is often demonstrated by electrical sparks when a person touches the body of the vehicle, or by a slight shock when entering or leaving the vehicle.

One of the best methods of protection for inspectors is: Connect a wire from a known ground to the prover, then connect a wire from the prover to the equipment being tested, and finally, for the ultimate precaution, a wire from this equipment back to the original known ground.

Appendix B - Subject: Reading Sight Gauge

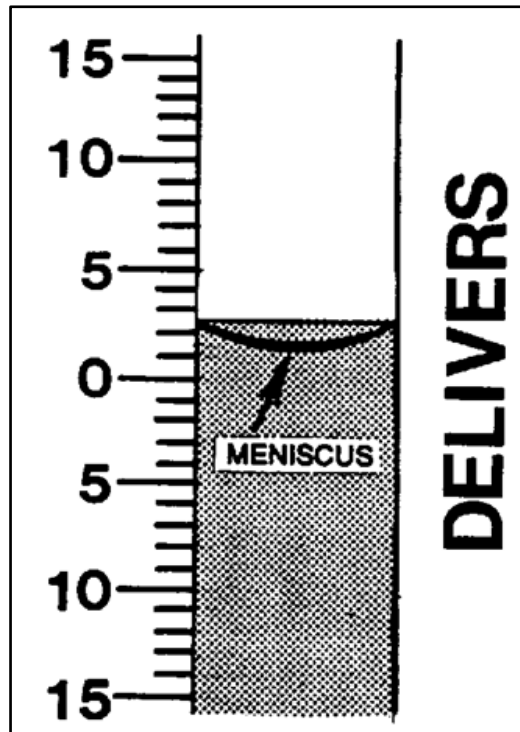


Figure 15 - Image of Liquid Level in Sight Glass. Take Reading from Bottom of Meniscus.

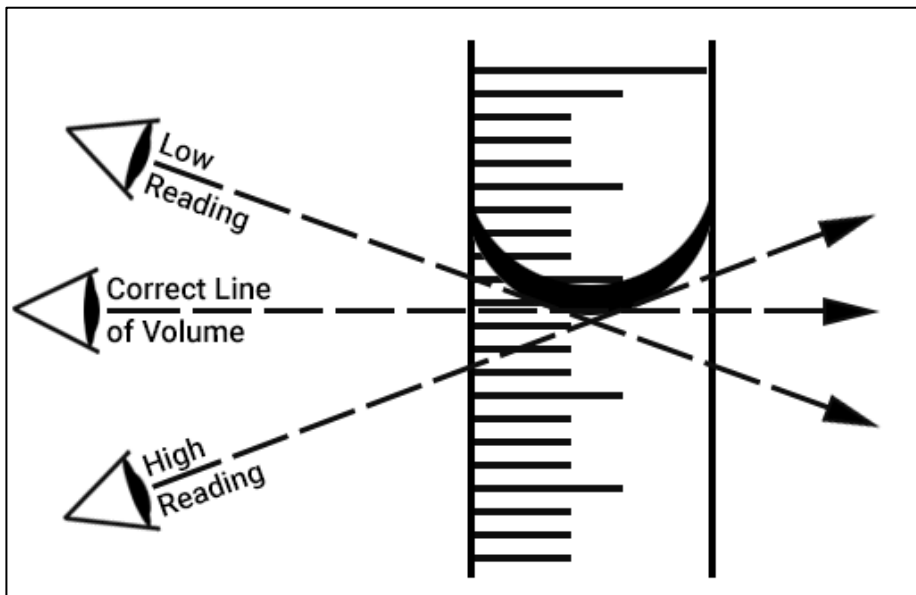


Figure 16 - Image of the effects of Parallax. Read the Meniscus at Eye Level.

Appendix C - Subject: Sealing & Digital Totalizer



Figure 17 - Example of a Lead & Wire Seal on a Calibration Wheel.

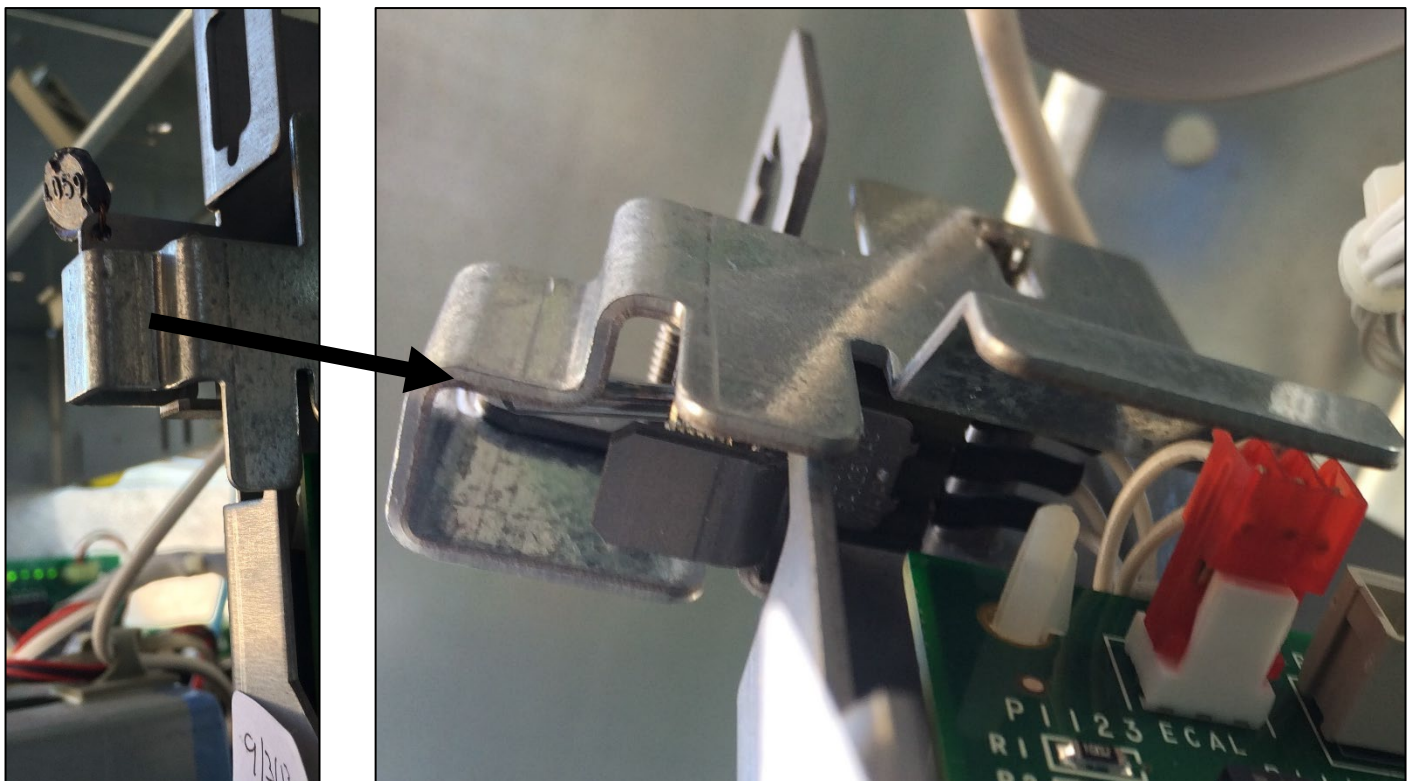


Figure 18 - Example of a Lead & Wire Seal (Left) and Calibration Switch (Right).

EPO No. 26 – Retail Motor Fuel Dispensers
 BPC Div. 5, 4 CCR § 4000. 1.10. General Code, and
 4 CCR § 4000. 3.30. Liquid Measuring Devices

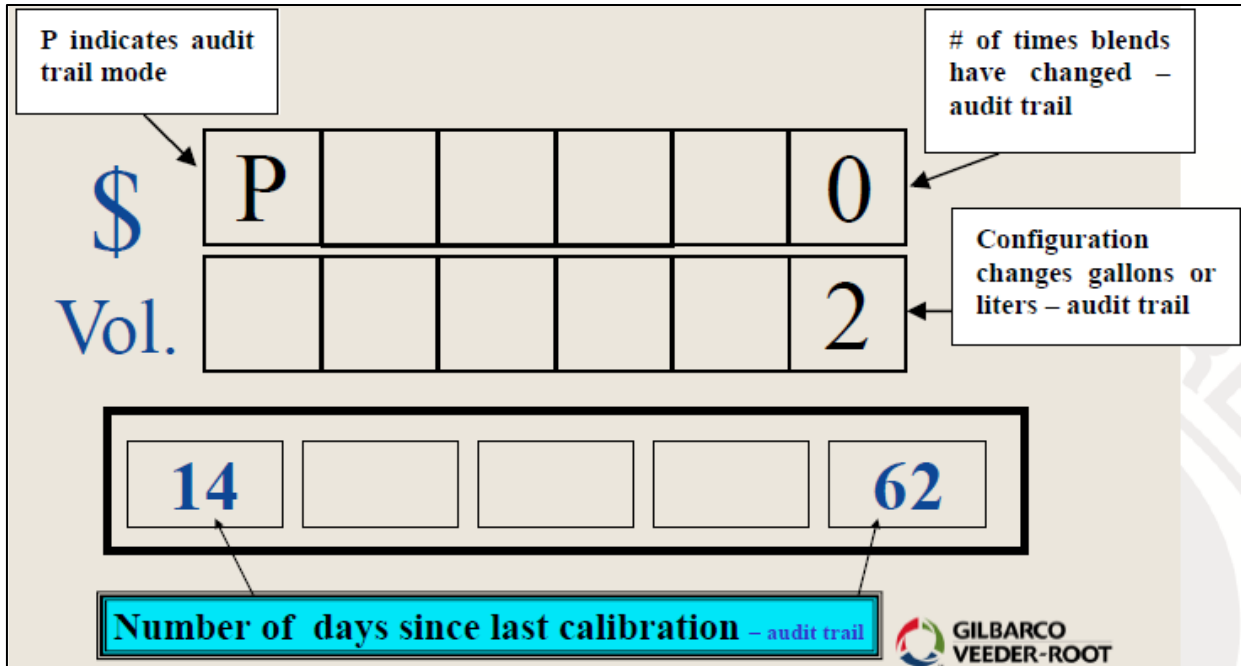


Figure 19 - Example of Audit Trail Access [Note: Check Type Approval Document for Information Specific to the Device Under Test].

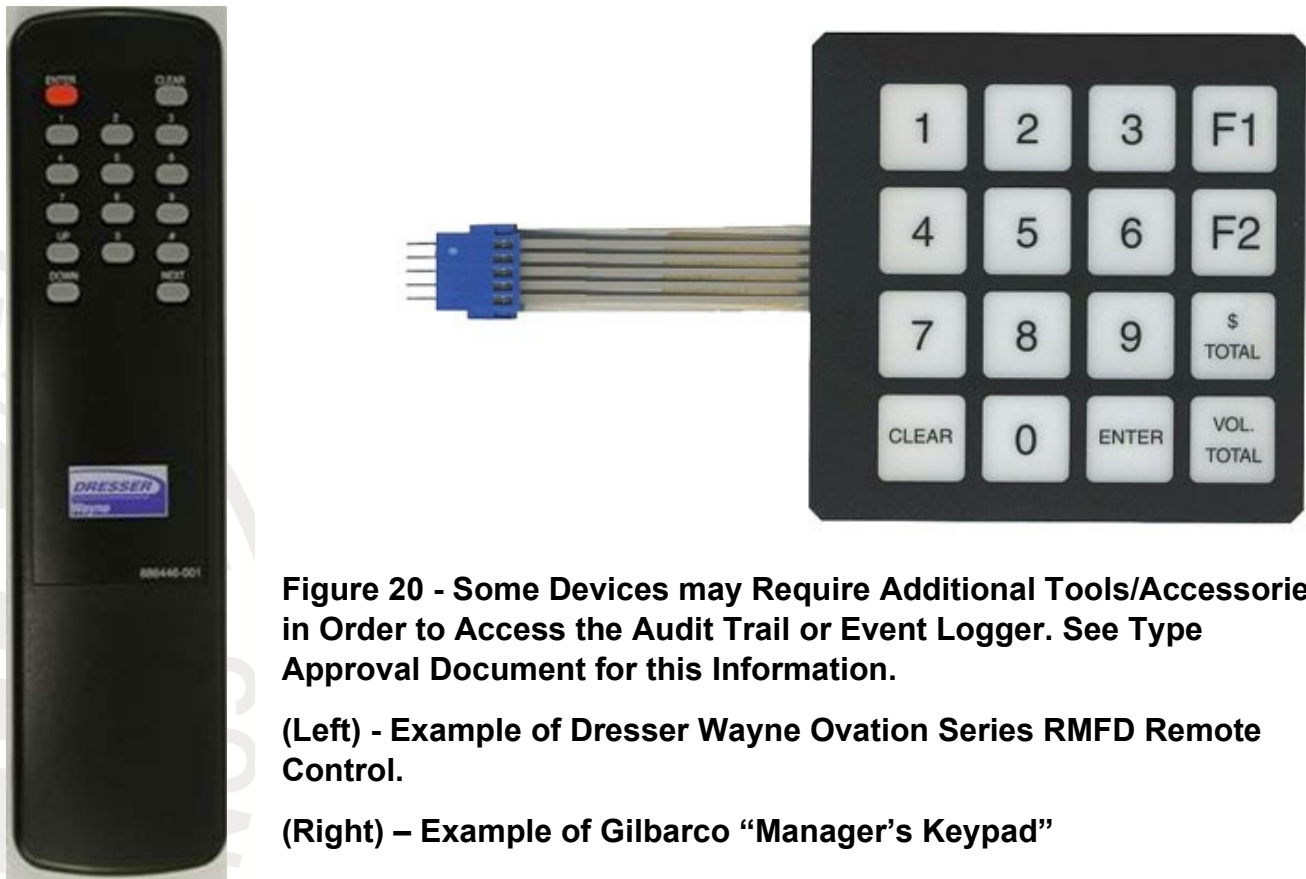


Figure 20 - Some Devices may Require Additional Tools/Accessories in Order to Access the Audit Trail or Event Logger. See Type Approval Document for this Information.

(Left) - Example of Dresser Wayne Ovation Series RMFD Remote Control.

(Right) – Example of Gilbarco “Manager’s Keypad”

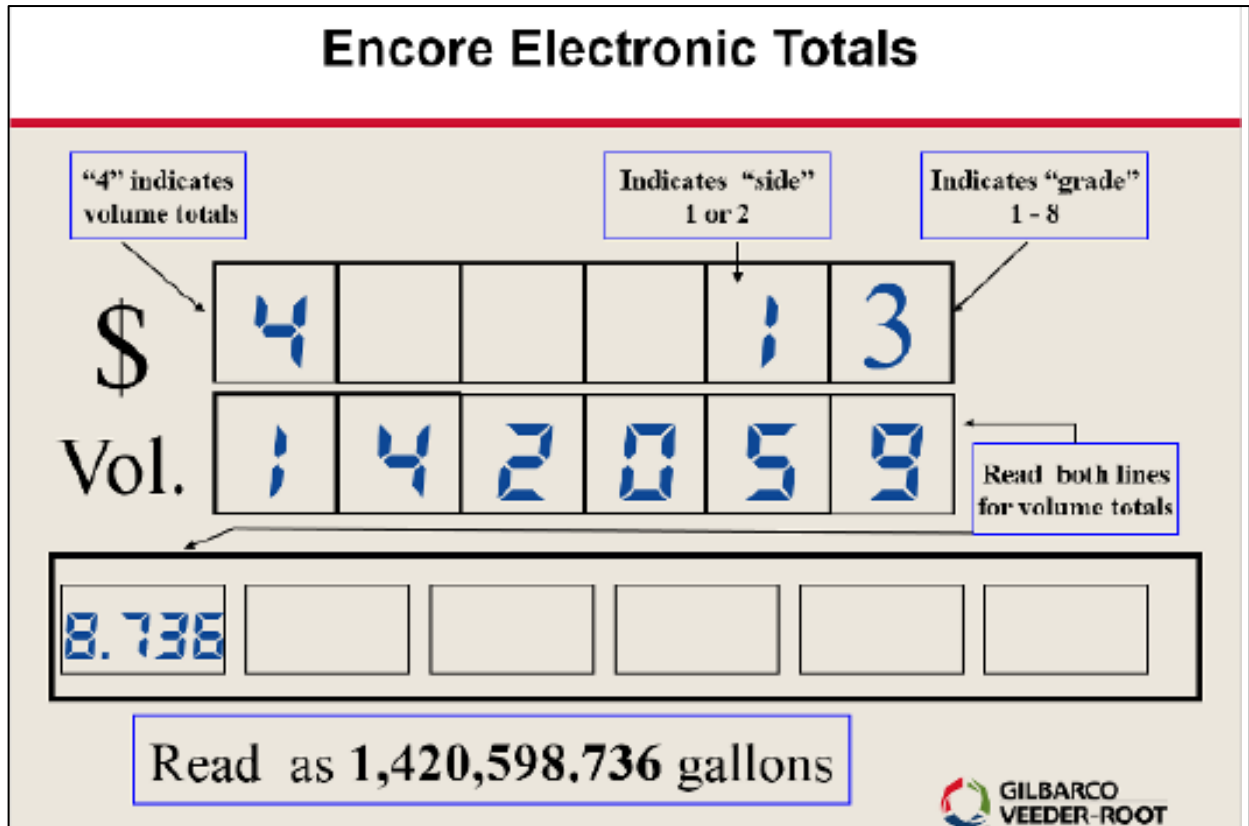


Figure 21 – Example of Electronic Totalizer [Note: See Type Approval Document]

Appendix D: Categories of Device Methods of Sealing

<i>Table S.2.2. Categories of Device and Methods of Sealing</i>	
<i>Categories of Device</i>	<i>Methods of Sealing</i>
<p>Category 1: No remote configuration capability.</p>	<p>Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.</p>
<p>Category 2: Remote configuration capability, but access is controlled by physical hardware.</p> <p>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</p>	<p>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]*</p> <p>[*Nonretroactive as of January 1, 1996]</p>
<p>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</p> <p>[Nonretroactive as of January 1, 1995]</p> <p>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</p> <p>[Nonretroactive as of January 1, 2001]</p>	<p>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</p>

[Nonretroactive as of January 1, 1995]
 (Table Added 1993) (Amended 1995, 1998, 1999, 2006, and 2015)

Figure 22 - Image of Table S.2.2. Categories of Device Methods of Sealing