Measuring Devices

Electronic Cash Registers, Consoles and Cardreaders Interfaced with Retail Motor-Fuel Dispensers

Technical Policy • Checklists • Test Procedures

N C W M

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Electronic Cash Registers Interfaced with Retail Motor Fuel Dispensers 2005

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Electronic Cash Registers, <u>Consoles, and Cardreaders</u> Interfaced with Retail Motor Fuel Dispensers

Introduction

This checklist is intended for use when conducting general evaluations of new electronic cash registers that are to interface with retail motor-fuel dispensers. It is assumed that the dispenser was previously evaluated, if not, the LMD checklist must be applied to the dispenser sale system. The ECR<u>, Console or Cardreader</u> must interface with a dispenser to perform this evaluation. ~~Specific criteria that apply to service station control consoles are in the checklist for retail motor fuel dispensers and must be applied if the cash register also serves as the service station controller.~~ As a minimum, two dispensers from different manufacturers, each of which include~~s~~ all of the features to be listed on the ECR CC, must be evaluated with the ECR in order to have the statement "equivalent and compatible equipment" appear on the CC.

This checklist is designed in a logical sequence for the user to determine and record the conformance of the device with the elements of NIST Handbook 44. The user should make copies of the checklist to serve as worksheets and preserve the original for reference. In most cases, the results of evaluation for each element can be recorded by checking the appropriate response to the following:

Yes ☐ No ☐ N/A ☐

In some cases, the user is required to record values, results, or comments. In those cases, space is provided; examples are:

1.   **Yes ☐ No ☐**

2.   ☐ EXTERNAL ☐ INTERNAL ☐ N/A

3.   Comments: _____

      _____

      _____

4.   AVOIRDUPOIS _____d

      METRIC _____d

Test procedures that can be briefly described have been incorporated in the checklist; longer test procedures are consolidated at the end of the checklist.

Checklist and Test Procedure

1.   Identification

Code Reference: G-S.1. General

Each cash register must comply with the appropriate Handbook 44 identification requirements. All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information. (prefix lettering may be initial capitals, all capitals, or all lower case)

Location of the information:

_____

1.1.	The name, initials, or trademark of the manufacturer or distributor.	**Yes** ☐ **No** ☐ **N/A** ☐
1.2.	A model designation that positively identifies the pattern or design of the device.	**Yes** ☐ **No** ☐ **N/A** ☐
1.3.	The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, at a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod.". (Effective January 1, 2003).	**Yes** ☐ **No** ☐ **N/A** ☐
1.4.	Except for equipment with no moving or electronic component parts, and not built-for-purpose, software-based devices, a nonrepetitive serial number.	**Yes** ☐ **No** ☐ **N/A** ☐
1.5.	The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.	**Yes** ☐ **No** ☐ **N/A** ☐
1.6.	The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).	**Yes** ☐ **No** ☐ **N/A** ☐
1.7.	The current software designation for not built-for-purpose, software-based devices.	**Yes** ☐ **No** ☐ **N/A** ☐
1.8.	The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.	**Yes** ☐ **No** ☐ **N/A** ☐
1.9.	The device must be marked with a unique serial number to identify the electronic element that controls the system. A remote display is not required to have a serial number because it usually does not have any electronics to analyze the signal received from the measuring element. Similarly, other elements of a system, (e.g., a printer, keyboard, cash drawer etc.) which cannot be operated as stand-alone units or are not intended to interface in a system of other models are not required to have a serial number.	**Yes** ☐ **No** ☐ **N/A** ☐

Code Reference G-S.1. (g). Effective January 1, 2003

1.10.	The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have (or will have) a CC. The number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation for the word "Number." The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.).	**Yes** ☐ **No** ☐ **N/A** ☐

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC number is not part of an identification plate, note its intended location and how it will be applied.

Location of CC Number if not located with the identification information:

_____

_____

The marking must be visible after installation.

1.11. Equipment is to be marked on a surface that is an integral part of the chassis, which is visible after installation. If the required information is located on the back of the device, the same information must also appear on the side, front, or top. It may be installed on the housing only if the housing can be fitted with a security seal. The bottom of a device is not an acceptable surface.

Yes ☐ **No** ☐ **N/A** ☐

1.12. The marking must be permanent. It may be a metal or plastic plate attached with pop rivets, adhesive, or other means. Removable bolts or screws are not permitted. A foil plate may be used provided it is destroyed in any attempt to remove it. Additionally, the printing on a foil plate must be easily read and not easily obliterated by rubbing with a relatively soft object (e.g., the wood of a pencil).

Yes ☐ **No** ☐ **N/A** ☐

Note: A location under a cover or inside a panel door is acceptable. Visibility may be achieved by placing a duplicate serial number badge on the front, side, or top of the ECR. This badge may contain only the serial number if the other information is visible elsewhere on the ECR.

Code Reference: G-S.1.1. Not Built-for-Purpose Devices, Software-Based

1.13. For not built-for-purpose, software-based devices the following shall apply:

1.13.1. the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or

Yes ☐ **No** ☐ **N/A** ☐

1.13.2. the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or

Yes ☐ **No** ☐ **N/A** ☐

1.13.3. all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) be continuously displayed. Alternatively, a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

Yes ☐ **No** ☐ **N/A** ☐

NOTE: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

2. Indications and Recorded Representations

Code Reference: G-S.5.2.2. Digital Indications and Representations; S.1.6.6. Agreement Between Indications

A nonretroactive requirement effective January 1, 1988 requires all service station consoles installed after January 1, 1988 (not just new models) to satisfy the mathematical agreement of money values requirement (S.1.6.6.). The money value indication for dispensers and consoles must agree for all installations, both old and new.

For those systems consisting of a console and dispensers and equipped with pre-set volume, the dispenser must deliver at least the pre-set volume; it cannot deliver less. For example, if the console sends only the money equivalent of the pre-set volume to the dispenser, the dispenser shall deliver at least the pre-set volume. It may not stop at the first quantity amount that results in mathematical agreement with the money value equivalent of the pre-set volume if the quantity indication is less than the pre-set volume. Similarly, if a money value is pre-set, the dispenser is not properly designed if it always stops at the lowest quantity value that provides mathematical agreement with the pre-set money value.

Tests for agreement of digital values shall be performed in the postpay, prepay money, and pre-set volume models. Agreement should be checked at several unit prices including the maximum unit price and with the dispenser operating at its maximum flow rate.

7.3. 2.1.	All total sale money value indications in a computing system are primary indications and must agree.	Yes ☐ No ☐ N/A ☐
7.4. 2.2.	Digital volume indications in a non-computing system must agree or "round off" to the nearest minimum unit that can be indicated or recorded.	Yes ☐ No ☐ N/A ☐
7.5 2.3.	Manual quantity entries in invoice billing systems must be identified as such.	Yes ☐ No ☐ N/A ☐
7.6. 2.4.	When delivery from a computing device is based upon a pre-set volume, the quantity indicated on the dispenser and any auxiliary device must be equal to or greater than the pre-set volume and the dispenser and remote console must comply with G-S.5.5. Money Values, Mathematical Agreement.	Yes ☐ No ☐ N/A ☐
7.7. 2.5.	The quantity, unit price, and total price indications on the console shall be in mathematical agreement.	Yes ☐ No ☐ N/A ☐
7.8. 2.6.	The following applies when a quantity value indicated or recorded by an auxiliary element such as a console, ticket printer, or remote customer display, is a derived or computed value based on data received from a retail motor-fuel dispenser.	
7.8.1. 2.6.1	The quantity values indicated or recorded on a console, electronic cash register, or other auxiliary indicating or recording element may differ, however:	Yes ☐ No ☐ N/A ☐
7.8.2. 2.6.2.	all indicated or recorded total money values for an individual sale shall agree; and	Yes ☐ No ☐ N/A ☐
7.8.3. 2.6.3.	the indicated or recorded quantity, unit price, and total sales price values shall be in mathematical agreement to the closest cent (i.e., within each element, the values indicated or recorded must meet the formula [quantity x unit price = total sales price] to the closest cent).	Yes ☐ No ☐ N/A ☐
	Examples: $1.5549 rounds to $1.55 $1.5551 rounds to $1.56 $1.5550 rounds to either $1.55 or $1.56	
7.9. 2.7.	The printed ticket and dispenser must comply with G.S.5.5. Money Values, Mathematical Agreement to the nearest cent (unit price x volume = total sale ± 0.5 cent).	Yes ☐ No ☐ N/A ☐
7.10. 2.8.	Digital values agree with their associated analog value to the nearest minimum graduation.	Yes ☐ No ☐ N/A ☐

Code Reference: G-S.5.5. Digital Money Values, Mathematical Agreement

Any recorded money value and any digital money value indication on a primary indicator must agree mathematically with its associated quantity (volume) representation or indication to the nearest one cent.

Formula: Unit Price x Indicated Volume = Total Sale ± 0.5 cent

7.11. 2.9.	Check mathematical agreement of all primary indications (e.g., dispenser, console, printer) under the following conditions:	

~~7.11.1.~~ 2.9.1.	At various flow rates, including maximum and minimum.	**Yes** ☐ **No** ☐ **N/A** ☐
~~7.11.2~~ 2.9.2.	Snapping nozzle on and off several times during delivery. Check mathematical agreement each time flow is halted.	**Yes** ☐ **No** ☐ **N/A** ☐
~~7.11.3.~~ 2.9.3.	At several unit prices including the low prices and the maximum pricing capability of the computer and when operating at the maximum flow rate.	**Yes** ☐ **No** ☐ **N/A** ☐
~~7.11.4.~~ 2.9.4.	Turn the dispenser off during delivery with nozzle open.	**Yes** ☐ **No** ☐ **N/A** ☐

Code Reference: G-S.5.1. Indicating and Recording Elements/General

Discount Pricing. - Handbook 44 requires that, except for dispensers used for fleet sales, other price contract sales, truck refueling (e.g., truck stop dispensers used only to refuel trucks), when a product or grade is offered for sale at more than one unit price through a computing device, the selection of the unit price shall be made prior to delivery using controls on the device or other customer-activated controls.

Should the customer elect to use another method of payment following completion of delivery, the console may be used to recalculate the total price -- provided the dispenser complies with all applicable Handbook 44 requirements. For example, the customer selects the credit card unit price on the dispenser and dispenses product at that unit price. However, the customer discovers that he forgot his credit card and decides to pay cash. In this case, the console might be used to calculate the total price at the cash unit price. In keeping with the intent of NCWM action in 1989 to require dispensers to calculate at all unit prices for which a product is offered for sale, it is anticipated that the console would be required to recalculate the new total price using the formula (quantity x unit price = total price). Except for fleet sales and other contract sales, a receipt providing the total volume unit price, total computed price and product identity shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash. (Code Reference S.1.6.7) as the transaction was completed. The recorded and displayed total volume on the receipt and dispenser, respectively, shall agree.

Selectable Unit Price Capability. - Selectable unit price capability is a design feature that permits the customer to select the unit price for a particular transaction at the time of sale. A dispenser may then allow the unit price for a delivery to be selected from two or more unit prices.

If the customer selects the unit price at the dispenser (e.g., cash or credit price), the selection may be made at any time prior to the start of product flow. The dispenser operating handle may be on when the selection is made. A system shall not permit a change to the unit price during delivery of product.

After a transaction is completed, the unit price displayed at the dispenser may be changed to a base unit price. However, the quantity and total price must be displayed on the face of the dispenser for at least 5 minutes or until the next transaction is initiated. Any display of quantity, unit price, and total price that does not mathematically agree occurs between transactions. This is permitted (in response to demands of device users) because the displayed values between "transactions" are not "significant" relative to the actual delivery process (transaction).

The displayed unit price may revert to the base unit price immediately after the completion of a transaction, defined as the time the delivery has been terminated and payment has been settled. The payment may be automatic if the delivery is to a pre-paid amount. If the sale is prepaid, the delivery is considered terminated after the "handle" is in the off position or after the nozzle has been returned to the designed hanging position. This will allow the customer adequate time to observe that the prepaid amount has been reached. If the delivery stops short or overruns a prepaid amount, settling the payment means that money is either refunded or collected from the customer and the transaction is "cashed out" by the console operator.

In the case of invoice billing systems, such as card-lock or key-lock systems which compute the total sale price, it is considered not appropriate for the displayed unit price to revert to the base unit price immediately following a transaction. Because a receipt for the transaction may not be available, the customer must be allowed an adequate period of time following the delivery to record the transaction information. The transaction unit price must be displayed for at least 30 seconds, and the total price and the quantity must be displayed for at least 5 minutes following the completion of the delivery or the start of the next transaction. The delivery is considered complete after the "handle" is off or the nozzle has been returned to its designed hanging position.

7.12. 2.10.	A dispenser may be equipped with means for selecting more than one unit price, provided that the selected unit price cannot be changed after the initial flow begins.	Yes ☐ No ☐ N/A ☐
7.13. 2.11.	The selected unit price must be made clearly evident on the dispenser.	Yes ☐ No ☐ N/A ☐
7.14. 2.12.	The unit price cannot be changed by the operator at the console prior to or during the delivery.	Yes ☐ No ☐ N/A ☐
7.15. 2.13.	The selected unit price (once selected by the customer [dispenser activated]) displayed at the dispenser prior to the delivery of product must be continuously displayed at the conclusion of the delivery by moving the operating mechanism to the "off" position, until the start of the next transaction by:	
7.15.1. 2.13.1.	Movement of the operating mechanism to the "on" position, or	Yes ☐ No ☐ N/A ☐
7.15.2. 2.13.2.	"Authorization/Approval" by the console operator, whichever occurs first.	Yes ☐ No ☐ N/A ☐

23. Indicating and Recording Elements

Code Reference: G-S.5.1. Price Look-up Codes (PLUs)

23.1.	PLUs must operate only with appropriate information, (e.g., if a PLU activates a dispenser transaction, a volume input is required before a price is computed and recorded).	Yes ☐ No ☐ N/A ☐
23.2.	Other PLUs must not interact with dispenser information.	Yes ☐ No ☐ N/A ☐
23.3.	Manual volume entries are permitted. They must be clearly identified on the receipt as a manual entry by the terms "Manual Fuel Sale."	Yes ☐ No ☐ N/A ☐

Note: All uppercase or a combination of upper and lower case letters are permitted, provided the evaluating laboratory finds the resulting text to be clear and legible.

23.4.	Incorrect entries shall be signaled by an audio and/or visual signal.	Yes ☐ No ☐ N/A ☐
23.5.	A dispenser verification display, (e.g., segment test) shall not be recorded by the ECR.	Yes ☐ No ☐ N/A ☐

Code Reference: S.1.6.2. - Provision for Power Loss

23.6.	Power Interruptions. First test with a power failure to the ECR alone. Then a power failure to the dispenser alone. Finally, a power failure to both components simultaneously. When power interruption occurs, the register must do one of the following:	
23.6.1.	Continue to function and perform correctly either automatically or manually.	Yes ☐ No ☐ N/A ☐

2̶3.6.2.   The transaction is halted and can be continued when power returns.   **Yes ☐ No ☐ N/A ☐**

Note: The ECR may continue to function while power is interrupted, (e.g., the ECR is equipped with an uninterruptible power supply). Alternatively, the ECR may cease operation when power is interrupted and may resume the transaction in process at the time of the power failure when power is returned. Either alternative is acceptable provided that the ECR continues to function and perform correctly. There are no requirements to indicate when a power failure or interruption has occurred.

2̶3.7.   Provisions for Power Loss.

Note: For remote controllers,(e.g., cash register, console, etc.) which have the capability to retain information pertaining to a transaction,(e.g., stacked completed sales, if the information cannot be recalled at the dispenser following a power outage, (e.g., uninterruptible power supply or other means) then provisions must be made for the transaction information to be recalled and verified for at least 15 minutes following a power outage.

2̶3.7.1.   Remote controllers which stack completed sales must have a means to enable the transaction information to be recalled and verified for at least 15 minutes.   **Yes ☐ No ☐ N/A ☐**

Listing of Stacked Sales for Electronic Cash Registers Interfaced with Retail Motor Fuel Dispensers

If an electronic cash register interfaced with retail motor-fuel dispensers can be programmed to accept stacked, completed sales, then the Certificate of Conformance must indicate that this option is permitted only when the electronic cash register is provided with an uninterruptible power supply or other means of recalling stacked sales information in the event of a power failure. If the cash register is equipped with the stacked sales option, but the option is not programmable, then the Certificate must limit the use of the electronic cash register to applications in which an uninterruptible power supply or other means of recalling stacked sales information in the event of a power failure is provided.

Authorization of Stacked Sales

Service station consoles, which are capable of stacking prepaid sales, shall not be capable of automatically authorizing a stacked sale immediately upon completing the previous transaction. The console operator cannot maintain adequate control over a console with automatic authorization capability. To avoid facilitation of fraud, the console operator must maintain control over the transaction process until the customer who has paid for a prepaid, stacked sale is ready to begin dispensing the product.

1̶.6̶.
3.7.2.   A service station console shall not be capable of automatically authorizing a sale immediately upon the completion of the previous transaction for that dispenser.   **Yes ☐ No ☐ N/A ☐**

Note: The criteria for power loss to a fuel dispenser are given in the retail motor fuel dispenser checklist.

2̶3.8.   An ECR shall be able to record all quantities, unit prices, and total prices up to the capacity of the dispenser. When the capacity of the quantity or total price is exceeded and the display "rolls over," the ECR shall not record the "rolled over" value but shall either record the correct total volume and total price or give an error indication.   **Yes ☐ No ☐ N/A ☐**

2̶3.9.   A cash register shall not print the values from a dispenser until the delivery has been completed and dispenser turned off.   **Yes ☐ No ☐ N/A ☐**

Items not measured or weighed may be split-priced according to general marketing practices. Acceptable price extensions will depend on individual State policies. Normally, the single item price will be the multiple item price divided by the number of items and rounded up to the next high cent. If the single item price is different from the price that would be computed as described, the price per item must be posted at the display. (See FPLA value comparison considerations and the Model Unit Pricing Regulation.) Suggested multiple item prices for test procedures are 3/$1.00 and 7/$1.00. The single item prices may be recorded as $.34, $.34, $.32 or .$.34, $.33, $.33 and $.15, $.15, $.15, $.15., $.15, $.15, $.10 or $.15, $.14, $.14, $.15, $.14, $.14, $.14, respectively.

2<u>3</u>.10.	Price calculations for multiple-item-priced commodities shall be correctly computed as described above for:	
	2<u>3</u>.10.1. Prices entered via PLUs.	**Yes** ☐ **No** ☐ **N/A** ☐
	2<u>3</u>.10.2. Prices entered through the keyboard	**Yes** ☐ **No** ☐ **N/A** ☐

3<u>4</u>.   Recorded Representations

Code Reference: G-S.5.1., S.1.6.7

A sales receipt showing the quantity, unit price, total price, and product identity for each fuel delivery in a transaction is required for point-of-sale systems. A printed receipt must always be available to the customer upon request.

Various forms (or representations) of sales receipt formats are acceptable provided they are clear and understandable. Guidelines are provided to assist manufacturers and weights and measures officials in determining the acceptability of formats. Symbols other than those given below may be acceptable, but they will be reviewed on a case-by-case basis. More descriptive symbols and terms are acceptable.

3<u>4</u>.1.	The unit of measure shall be clearly defined. Acceptable symbols for units are: Gallon Gal, of G for gallons and Liter, l or L for liters. Upper or lower case is optional except that a lower case "l" must not resemble a "1" (numeral one), (e.g. a script "l" is an acceptable symbol for liters).	**Yes** ☐ **No** ☐ **N/A** ☐

The unit of measure may be defined with either the quantity value, (e.g., 10 000 GAL) or with the unit price, (e.g., $1.119/Gal), not necessarily both.

3<u>4</u>.2.	Acceptable designations of the unit price are: "@" as a prefix to the unit price value, an upper or lower case "X" or slash between the quantity and unit price, $/G, PPG (price per gallon), PPL (price per liter), UP (unit price), P/G, price/Vol, PPU (price per unit), DOL/GAL	**Yes** ☐ **No** ☐ **N/A** ☐
3<u>4</u>.3.	The total fuel price must be clearly distinguished from other information in the fuel transaction. To identify the total fuel sale price, use one of the following methods:	
	3<u>4</u>.3.1. Decimal point in the proper dollar position, (e.g., XX.XX). If a dollar sign is not used, there must be at least one offset column of the least significant digit in recorded information, other than the sale price.	**Yes** ☐ **No** ☐ **N/A** ☐
	3<u>4</u>.3.2. The words gas, diesel, or other product designation may be used with the word "SALE", (e.g., "FUEL SALE" or GAS SALE"), or the product identification followed by the sale price, (e.g., GAS 20.00).	**Yes** ☐ **No** ☐ **N/A** ☐

3~~4~~.4.	Each fuel delivery in a transaction for a single customer must be recorded separately.	**Yes** ☐ **No** ☐ **N/A** ☐
3~~4~~.5.	When a service station cash register/console is capable of recording sales transactions of other products, the fuel transaction must be clearly distinguished from the other transactions. A "product class" must be associated with the fuel transaction as well as the other transactions. In terms of format, the fuel transactions may be separated (blocked-off) from other transactions by blank lines or by at least one offset column between the sales price and the other recorded information.	**Yes** ☐ **No** ☐ **N/A** ☐
3~~4~~.6.	The product identity for fuel need only distinguish it from other items. The product name, code number (similar to a price look-up code), or hose or pump number are acceptable designations of product identify.	**Yes** ☐ **No** ☐ **N/A** ☐

See LMD Code S.1.6.4.

Example 1		**Example 2**	
Meat	3.89	Meat	3.89
Soda	2.99	Soda	2.99
Gas 5.080 G @ 1.000	5.08	Gas 4.080 G @ 1.000	4.08
Cig	1.00		

Note: Handbook 44 does not require that product identification, date, and change due be printed on a ticket or a cash register receipt. These requirements apply to recorded representations resulting from a final sale, not to deposit slips for prepay transactions, etc.

| 3~~4~~.7. | The quantity representation of an item sold by count must be expressed in whole units. An expression of count with a decimal point and trailing zeroes, (e.g., 2.00 items) is acceptable provided that fractions of a whole unit cannot be expressed. | **Yes** ☐ **No** ☐ **N/A** ☐ |

4~~5~~. Provisions for Sealing

Code Reference: G-S.8. Provision for Sealing Electronic Adjustable Components

Remote controllers, which have the capabilities to electronically adjust components that affect the performance of a device, shall have provisions for approved means of security. (See LMD - Appendix A - Philosophy for Sealing, Typical Features to be Sealed.)