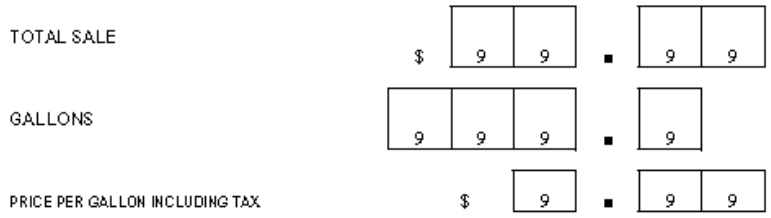
# SEPTEMBER 2007

## Total Sale Capacity for Analog Retail Motor-Fuel Dispensers

*By Juana Williams*

The increases in fuel prices have weights and measure officials questioning how to apply NIST Handbook 44 requirements to an analog retail motor-fuel dispenser that does not have sufficient capability to compute the total sales price at all possible single purchase prices and delivered quantities.

An example of the maximum indications for an analog retail motor-fuel dispenser that might be in question is shown below:




Given this example, how would Handbook 44 apply to such a dispenser being used in applications where the average unit price is above $3.00 per gallon and total quantities delivered were on the average above 35 gallons?

Let's first look at the device's design.

**Design.** The dispenser meets the design requirement in Liquid-Measuring Devices Code paragraph S.1.6.5.(a) for the sample scenario since it computes the total sales price to within the lesser of either the measurement range of the device or the range of its computing elements. Although the numerical designation has changed over the years for paragraph S.1.6.5., the language that specifies the ranges to which a device must compute the total sales value has been part of the requirement for several decades.

Paragraph S.1.6.5.(a) of the Liquid-Measuring Devices Code states the following:

**S.1.6.5. Money-Value Computations.**

*(a) A computing device shall compute the total sales price at any single-purchase unit price (i.e., excluding fleet sales, other price contract sales, and truck stop dispensers used only to refuel trucks) for which the product being measured is offered for sale at any delivery possible within either the measurement range of the device or the range of the computing elements, whichever is less.*
*[Effective and nonretroactive as of January 1, 1991]*

Paragraph S.1.6.5.(a) requires the maximum total sales price be computed and displayed to either the capacity of the quantity indication (in this case 999.9 gallons) or the capacity of the total sales indication (in this case $99.99), whichever is less. Paragraph S.1.6.5.(a) is a nonretroactive requirement enforceable for devices manufactured in a state, devices brought into a state, or noncommercial equipment placed into commercial use after January 1, 1991. In this case, the measurement range of the device is quantities from 0.1 gallon up to 999.9 gallons, and its range of computing capability is from total sales values of $0.01 up to $99.99. In this application with today's fuel prices, the lesser of those ranges is the total sale value of $99.99; therefore, the dispenser total must only be able compute the total sales price to the lesser value of $99.99.

Consider next if the dispenser is suitable for a particular application.

**Suitability.** Given the description of how the dispenser is used in this scenario, it would not meet suitability requirements outlined in General Code paragraph G-UR.1.1. as follows:

> **G-UR.1.1. Suitability of Equipment.** - 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 weighing capacity (for weighing devices), its computing capability (for computing devices), its rate of flow (for liquid-measuring devices), the character, number, size, and location of its indicating or recording elements, and the value of its smallest unit and unit prices.
> (Amended 1974)

There are several scenarios which might occur that could lead to confusion, errors, or facilitate fraud, making this device not suitable for this application. For example, if the total price per gallon were $3.00 and the total quantity purchased was 36.6 gallons (a $109.80 purchase), then the total sale indications would roll over to $00.00 after reaching $99.99 and ultimately stop at $9.80, which could be confusing to the customer or cause an inattentive or unscrupulous attendant to incorrectly charge the customer.

To further illustrate that paragraph S.1.6.5.(a), which is a design specification, is a different issue than suitability of the device for this particular application, consider the use of this same dispenser in an application where the price was set at a low unit price, for instance $1.00 per gallon, but used in an application to refuel a truck where you delivered relatively large volumes. If you pumped a large enough volume of gas through the dispenser such as 110 gallons, the total sale display would still exceed its capacity. In this example the total sales price would be $110.00, which clearly exceeds the $99.99 total sale display capacity. This does not mean that the pump isn't designed properly. The dispenser total did compute the total sales price to the lesser value of $99.99 (as specified in the specification). However, the dispenser is not suitable for the application if the typical delivery is that large.

With regard to the application of paragraph G-UR.1.1., the dispenser is not suitable in either scenario; in the first scenario it is a high unit price coupled with the limited total

sale display that is the issue; and in the second scenario (a sale of 110 gallons at $1.00 per gallon), it is the large volume of the delivery that resulted in the total sale capacity being exceeded.

A review of the history of this issue shows that the weights and measures community has made multiple attempts to address this problem.

**Related History.** The National Conference on Weights and Measures (NCWM) looked at this same issue on several occasions and in January 1987 published Interpretation and Guideline 3.3.6. Total Price Computing Capability: S.1.4.4. Money Value Computations. Although Interpretation 3.3.6. is out of print, the guidelines it provided and those covered in this discussion agree that we are dealing with a suitability issue for a device configured in this manner and used in this application.

In the mid-1970's the weights and measures community anticipated the price of gasoline climbing above $1.00 per gallon, but they did not imagine the current average U.S. price for a gallon of gasoline would reach $3.29 and that private passenger vehicle tank capacities would routinely exceed 30 gallons.

At that time the NCWM agreed there was no one solution to address the problems that would arise for all types of equipment as the marketplace changed and technology advanced. The NCWM considered solutions such as metric indications (e.g., changing the measurement unit from gallon to liter and if sales were $0.999 per liter, allowing for a computing capability roughly equivalent to $4.00 per gallon.) The NCWM also considered a later proposal for a requirement that specified the device must stop indicating once it has reached its capacity. However, there remained problems with analog devices that did not have sufficient capacity even with metric indications. The National Type Evaluation Program, in accordance with HB 44 General Code paragraphs G-S.5.1. General (Indicating and Recording Elements) and G-UR.1.1. Suitability of Equipment, requires electronic devices to have sufficient display capacity to compute and indicate total sales for any selected unit price or automatically stop the delivery before exceeding the maximum display capacity of either the quantity or total price.

**Retrofitting Existing Equipment.** NIST WMD has heard reports from a number of jurisdictions that retrofit kits have been developed for use with some analog dispensers to expand the computing capability. Several points need to be considered with the use of these kits:

(1) Was the modification to an approved device covered under the National Type Evaluation Regulation and associated policies established within a jurisdiction?

(2) Comments from industry indicate that rising costs of gasoline may necessitate further adjustments to the computing element which may affect the life of equipment due to the accelerated spin of the indicator wheels. Are there additional maintenance requirements associated with a retrofit? Will that equipment continue to function as intended under normal service conditions?

(3) Do the indicated values on the dispenser and console comply with Handbook 44 requirements for agreement between indications?

The answer to these questions may affect the suitability of the device and its continued compliance with other parts of NIST Handbook 44 such as General Code paragraph G-S.3.(b) Permanence, which states "operating parts will continue to function as intended . . .."

**Conclusion.** The issue of total sale capacity is one of many that arise regarding the appropriateness of display information on retail motor-fuel dispensers as the result of rising prices and changes in marketing practices. Currently, work is being done to modify NIST Handbook 44 to address existing and new equipment to require sufficient and accurate transaction information be available to both parties. These requirements need to be transparent to the manufacturer who designs the equipment and the official who must enforce them. The requirements must prescribe some universal means for determining what information must be displayed regardless of the price of fuel or the marketing strategy.

WMD is interested in hearing about other questions and concerns regarding how transaction information is displayed under various marketing practices and pricing structures. If you have questions about this article, please contact Juana Williams by email at juana.williams@nist.gov or by telephone at 301-975-3989.