

# National Type Evaluation Program (NTEP) Measuring Sector

**Annual Meeting**  
**September 25-26, 2018 Baltimore, MD**

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<b>Glossary of Acronyms</b>			
CC	Certificate of Conformance	OIML	International Organization of Legal Metrology
DMS	Division of Measurement Standards	OWM	Office of Weights and Measures (NIST)
ECR	Electronic Cash Register	PD	Positive Displacement
EVFS	Electric Vehicle Fueling Systems	Pub 14	NCWM Publication 14
HB 44	NIST Handbook 44 “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices”	RMFD	Retail Motor-Fuel Dispenser
LMD	Liquid Measuring Devices	SI	International System of Units
mA	milliamp	S&T	Specifications and Tolerances
NCWM	National Conference on Weights and Measures	TG	Task Group
NIST	National Institute of Standards and Technology	VTM	Vehicle Tank Meter
NTEP	National Type Evaluation Program	W&M	Weights and Measures
NTETC	National Type Evaluation Technical Committee		
This glossary is meant to assist the reader in the identification of acronyms used in this agenda and does not imply that these terms are used solely to identify these organizations or technical topics.			

## **Carry-over Items:**

### **1. Laboratory and Field Evaluation – Clarification of Language**

**Source:** NTEP Laboratories

**Background Information:** The NTEP evaluators have experienced confusion when interpreting the “Laboratory or Field Evaluation” section of the LMD checklist (see Page LMD-111). At its 2018 meeting, the Sector reviewed proposed changes from the NTEP laboratories to clarify the information in this section. The Sector agreed there are multiple points in this section that are confusing. Sector Technical Advisor, Tina Butcher noted that the original section was intended to cover multiple applications. Over time, permanence test criteria were changed or deleted for certain device types and there appears to be residual language that needs to be moved or deleted. NTEP Director, Jim Truex noted that there have been arguments from manufacturers over the requirements for permanence testing and modifying the language as proposed is intended to help eliminate these instances.

After discussing the proposed changes at length, the Sector agreed that the proposed changes from the laboratories will help with some of the confusion, but more work is needed. The Sector agreed that additional clarifications to the first part of this section would be helpful; this will be a carryover item for next year. Tina Butcher agreed to rework the section based on the Sector’s discussions and past decisions and circulate those proposed revisions to the labs, Rich Miller, and Dmitri Karimov and bring it back next year for the Sector to review.

**Recommendation:** The Sector will be asked to review proposed changes to the “Laboratory or Field Evaluation” section of the LMD checklist to be distributed prior to the Sector Meeting.

### **2. Diesel Exhaust Fluid (DEF) - Testing Criteria to Include DEF on an NTEP CC**

**Source:** NTEP Laboratories

**Background Information:** NTEP evaluators are routinely asked what testing is necessary to cover DEF on NTEP certificates. Another common question is what testing is necessary to get a family of meters certified for DEF and what other products will be included.

The current policy has been questioned at times by applicants. For example, a client stated that DEF is 67% water and 32% Urea. Mag Flow conductance for Urea is 5000 micro siemens/centimeter and that for water is 725 (see page LMD-7 in Pub 14 for both products). Plus, they are in different families.

NTEP tested the product with DEF. NTEP concluded that each family (water and fertilizer) should be tested to establish conductivity. Our thoughts were that we would simply give the product DEF (the product actually tested) on the CC since we are not really establishing conductivity for the family table for either water or fertilizer. In this case, after discussion, NTEP let the client know that they had a couple of choices.

1. Test only DEF and only get DEF with no conductance range
2. Test water and Urea which would establish conductivity for both water and fertilizer families.

Prior to the 2017 Sector Meeting, DEF was and had been considered fertilizer due to the Urea content. DEF is prevalent enough now to justify its own category listing. The Sector considered a recommendation to establish a separate product category for diesel exhaust fluid (DEF).

NTEP Director, Jim Truex introduced the item on behalf of the NTEP Laboratories, noting the proposal arose from discussions among the laboratories who need more specific criteria to address DEF. He clarified that the criteria are intended to apply to all meter types. Some Sector members asked if the proposed change, if adopted, would affect the status of current NTEP Certificates of Conformance (CCs) and Mr. Truex noted that NTEP would not require

companies to resubmit CCs for evaluation. Some questioned whether not having the reference on a current CC might not create a disadvantage compared with companies getting new CCs with the listing on the CC.

Mr. Truex noted that DEF is becoming prevalent enough that people want this to be specifically listed on their CCs and giving DEF its own category might help answer some of the questions and clear up some current confusion. The Sector acknowledged that the Family of Products Table does not provide an exhaustive listing of specific products; these are just examples of products and their characteristics that might be measured with a given meter type and a classification of how they would be treated regarding NTEP testing.

There was some additional discussion about the nature of DEF and some commented on the fact that there can be different percentages of water used in the mixture. The Sector spent some time discussing possible ranges to list in the table. The Sector finally agreed that more research is needed and concluded that this task would be better completed outside of the meeting.

The group discussed this item at length, including proposed parameters for DEF and Urea. The proposed changes are more complex than can be resolved at the meeting and the Sector wants to see a final, marked-up draft of the changes to the Product Family Table before making a decision.

Michael Keilty agreed to lead a small group of volunteers consisting of the following to work on this item:

Michael Keilty (Endress + Hauser)  
Rich Miller (FMC)  
Craig Cavanaugh (Tuthill Transfer System)  
Robin Parsons (Parafour Innovations)

The group was to develop and circulate a proposal to the remainder of the Sector in a ballot to add DEF as a separate line item for each meter type in the Product Family Table. In addition, the group was to further review the listings for Urea to ensure the references are accurate.

**Recommendation:** No action is asked of the Sector on this item. This item is included on the Sector's agenda to report on the actions taken following the last Sector meeting.

The group assigned to this task completed its work. Sector Chairman, Michael Keilty, balloted the Sector initially in ballot 17-01 and in a subsequent ballot 17-02. Sector reached a consensus on the changes proposed and Mr. Keilty summarized the results of the ballot in an email to the Sector dated 11/21/17. The results are repeated below for reference. The changes adopted are shown in Appendix A to this Agenda.

<b>Summary of Ballot Results</b>			
<b>Ballot 17-01</b>		<b>Ballot 17-02</b>	
(Prior to change recommended by D. Karimov)			
3 yes		9 yes	
2 no		0 no	
1 abstain		0 abstain	
(After recommended change by D. Karimov)			
4 yes – with the changes and no others			
<b>Summary Totals:</b>	<b>7 yes; 2 no; 1 abstain</b>	<b>Summary Totals:</b>	<b>9 yes; 0 no; 0 abstain</b>
<b>Public Members:</b>	<b>2 yes; 1 no</b>	<b>Public Members:</b>	<b>3 yes; 0 no</b>
<b>Private Members:</b>	<b>5 yes; 1 no; 1 abstain</b>	<b>Private Members:</b>	<b>6 yes; 0 no</b>

## **New Items:**

### **3. Recommendations to Update NCWM Pub 14 to Reflect Changes to NIST HB 44 and Other Proposed Changes.**

**Source:** NCWM S&T Committee

#### **Background:**

At its 103rd Annual Meeting, the National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2019 Edition of NIST Handbook 44. These items were included on the Sector's agenda to inform the Measuring Sector of the NCWM actions and to recommend corresponding changes to NCWM Publication 14. For additional details on these items, refer to the NCWM S&T Committee's 2018 Interim Report and its accompanying appendix along with the addendum sheets issued by the S&T Committee during the 2018 NCWM Annual Meeting, all of which can be found on the NCWM's web site at:

<http://www.ncwm.net/meetings/annual/publication-16>

#### **A. Vehicle-Tank Meters Code - Manifold Flush Systems - Paragraph S.3.1. Diversion of Measured Liquid**

**Background:** At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the Vehicle-Tanks Meters Code to specify requirements for "manifold flush systems" used to flush product on metering systems with multiple compartments delivering multiple products through a single discharge hose. For reference, see Block 1 on the 2018 S&T Committee's Agenda, which includes GEN-1 and VTM-1.

Modify paragraph S.3.1. as follows:

**S.3.1. Diversion of Measured Liquid. – ~~Except on equipment used exclusively for fueling aircraft, a~~ No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the meter or the discharge line thereof. However, two or more delivery outlets may be installed if means are provided to ~~insure~~ ensure that:**

- (a) liquid can flow from only one such outlet at one time; and
- (b) the direction of flow for which the mechanism may be set at any time is definitely and conspicuously indicated.

**This paragraph does not apply to the following:**

- 1) Equipment used exclusively for fueling aircraft.
- 2) Multiple-product, single discharge hose metering systems that are equipped with systems designed to flush the discharge hose, provided the flushing system complies with the provisions of paragraph S.3.1.1.

Add a new paragraph S.3.1.1. as follows:

**S.3.1.1. Means for Clearing the Discharge Hose. Metering systems may be equipped with systems specifically designed to facilitate clearing of the discharge hose prior to delivery to avoid product contamination. In such systems, a valve to temporarily divert product from the measuring chamber of the meter to a storage tank, shall be installed only if:**

- (a) The discharge hose remains of the wet hose type; and

- (b) the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use; and
- (c) the valve is permanently marked with its purpose (e.g., flush valve); and
- (d) the valve is installed in a conspicuous manner and as far from the hose reel as practical; and
- (e) the system clearly and automatically indicates the direction of product flow during operation of the flush system; and
- (f) clear means, such as an indicator light or audible alarm, is used to identify when the valve is in use; and
- (g) no hoses or piping are connected to the inlet when it is not in use.  
(Added 20XX)

Add a new paragraph heading UR.2.6. and new paragraph UR.2.6.1. as follows:

**UR.2.6. Clearing the Discharge Hose**

**UR.2.6.1. Records. Whenever, prior to delivery, a different product is pumped through the discharge hose to avoid contamination, a record including the date, time, original product, new product and gallons pumped shall be maintained. These records shall be kept and available for inspection by weights and measures for a period of 12 months**  
(Added 20XX)

**Recommendation:** The Sector is asked to consider recommending modifications to NCWM Publication 14 to correspond with the changes to Handbook 44 relative to “manifold flush systems” that were adopted by the NCWM in July 2018. Proposed changes are outlined in Appendix B to this Agenda.

**B. Vapor Elimination – Multiple Measuring Codes**

**Background:** At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the LPG & Anhydrous Ammonia Liquid-Measuring Devices Code; Cryogenic Liquid-Measuring Devices Code; and Carbon Dioxide Liquid-Measuring Devices Code to align requirements for air/vapor elimination. For reference, see the block of items under S&T Block 6, including LPG-1, CLM-3, and CDL-3.

**LPG & Anhydrous Ammonia LMD Code:**

**S.2.1. Air/Vapor Elimination.** - A ~~device~~ measuring system shall be equipped with an effective air/vapor eliminator or other automatic means to prevent the passage of air/vapor through the meter. Vent lines from the air/vapor eliminator shall be made of appropriate non-collapsible material.  
(Amended 2016 and 2018)

**Cryogenic Liquid-Measuring Devices Code:**

**S.2.1. Vapor Elimination.** – A measuring system shall be equipped with an effective air/vapor eliminator or other ~~effective automatic~~ means to prevent the ~~measurement of vapor that will cause errors in excess of the applicable tolerances~~ passage of air/vapor through the meter.

**Vent lines from the air/vapor eliminator shall be made of appropriate non-collapsible material.**

(Also see Section T. Tolerances.)

**(Amended 2018)**

**Carbon Dioxide Liquid-Measuring Devices Code:**

**S.2.1. Air/Vapor Elimination.**

~~(a)~~ A **device measuring system** shall be equipped with an effective **air/vapor eliminator or other** automatic means to prevent the passage of **air**/vapor through the meter.

~~(b)~~ Vent lines from the **air**/vapor eliminator shall be made of appropriate non-collapsible material.

(Amended 2016 **and 2018**)

**Recommendation:** The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the three HB44 codes described in the “Background” section above. Proposed changes are outlined in Appendix C to this Agenda.

**C. Recorded Representations – 2018 S&T Item LMD-2: S.1.6.7. Recorded Representations; S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided; and UR.3.4. Printed Ticket.**

**Background:** At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the Liquid-Measuring Devices Code to specify requirements for including information to identify the dispenser used in a transaction on recorded representations issued by retail motor-fuel dispensing systems. For reference, see Item LMD-2 on the S&T Committee’s Agenda.

***S.1.6.7. Recorded Representations. – Except for fleet sales and other price contract sales and for transactions where a post-delivery discount is provided, a printed receipt providing the following information 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:***

- (a) the total volume of the delivery;\**
- (b) the unit price;\**
- (c) the total computed price; ~~\*and~~*
- (d) the product identity by name, symbol, abbreviation, or code number. \* and*
- (e) the dispenser designation by either an alpha or numerical description. \*\**

*\*[Nonretroactive as of January 1, 1986] ~~\*\*[Nonretroactive as of January 1, 2021]~~*

(Added 1985) (Amended 1997, 2012, ~~and 2014~~ **and 2018**)

**S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided.** – Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available through a built-in or separate recording element that is part of the system for transactions involving a post-delivery discount:

- (a) the product identity by name, symbol, abbreviation, or code number;
- (b) transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount(s), including the:
  - (1) total volume of the delivery;
  - (2) unit price; and
  - (3) total computed price of the fuel sale.
- (c) an itemization of the post-delivery discounts to the unit price; ~~and~~
- (d) the final total price of the fuel sale after all post-delivery discounts are applied, ~~and~~ **and**

**(e) The dispenser designation by either an alpha or numeric description.**  
(Added 2012) (Amended 2014 **and 2018**) [**Nonretroactive as of January 1, 2021**]

**UR.3.4. Printed Ticket.** - The total price, the total volume of the delivery, ~~and~~ the price per liter or gallon, **and a corresponding alpha or numeric dispenser designation\*** shall be shown, either printed by the device or in clear hand script, on any printed ticket issued by a device and containing any one of these values.

(Amended 2001 **and 2019**) \* [**Nonretroactive as of January 1, 2021**]

**Recommendation:** The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the Liquid-Measuring Devices Code in NIST Handbook 44 relative to including information to identify the dispenser used in a transaction on recorded representations issued by retail motor-fuel dispensers. Proposed changes are outlined in Appendix D to this Agenda.

#### **D. WTR- Water Meters – Paragraph S.2.1. Provision for Sealing**

**Background:** At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the Water Meters Code to add specific criteria for sealing water meters and to align the sealing requirements with that of other measuring device codes in HB44. For reference, see S&T Item WTR-2.



<u><b>Table S.2.1.</b></u> <u><b>Categories of Device and Methods of Sealing</b></u>	
<u><b>Categories of Device</b></u>	<u><b>Methods of Sealing</b></u>
<u><b>Category 1: No remote configuration capability.</b></u>	<u><b>Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.</b></u>
<u><b>Category 2: Remote configuration capability, but access is controlled by physical hardware.</b></u>  <u><b>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.</b></u>	<u><b>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.</b></u>
<u><b>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</b></u>  <u><b>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.</b></u>	<u><b>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.)</b></u>

**[Nonretroactive as of January 1, 2019]**  
**(Added 2018)**

**Recommendation:** The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the Water Meters Code described in the “Background” section above. Proposed changes are outlined in Appendix E to this Agenda.

## **E. Power Loss on Retail Motor-Fuel Dispensing Systems – Alignment of Pub 14 with HB 44**

**Background:** In the process of researching a technical question, the Technical Advisor, Tina Butcher, noted a discrepancy between language in NCWM Publication 14 and that of NIST Handbook 44 with regard to power loss requirements for retail motor-fuel dispensers.

NIST Handbook 44 paragraph S.1.6.2. Provisions for Power Loss requires that transaction information needed to complete a transaction in progress at the time of a power loss be retained in the system for at least 15 minutes as follows:

**S.1.6.2. Provisions for Power Loss.**

**S.1.6.2.1. Transaction Information.** – *In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable for at least 15 minutes at the dispenser or at the console if the console is accessible to the customer.*  
[Nonretroactive as of January 1, 1983]

**S.1.6.2.2. User Information.** – *The device memory shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.*  
[Nonretroactive as of January 1, 1983]

Paragraph S.1.6.2.1. Transaction Information gives examples of “quantity and unit price” or “quantity and sales price” as examples of the required information; however, the multiple corresponding code references to these paragraphs in Pub 14 specifies “quantity” and “total sale” values must be recallable.

**Recommendation:** The Sector is asked to consider recommending modifications to the power loss requirements in Pub 14 to align with HB44 (or suggest a change to HB44 to align with Pub 14). Proposed changes are outlined in Appendix F to this Agenda, which includes excerpts from the following portions of the LMD Checklist:

- **Retail Motor-Fuel Dispensers (RMFDs)** – Code References S.1.6.2.1. and S.1.6.2.2. Provisions for Power Loss – Page LMD-37
- **Cash-Activated RMFDs** - S.1.6.2. Provisions for Power Loss – Page LMD-47
- **Liquefied Petroleum Gas (LPG) Liquid Measuring Devices** – Code Reference S.1.5.6. - Page LMD-68
- **Mass Flow Meters** - Code References S.2.4.1. and S.2.4.2. on Page LMD-76
- **Hydrogen Gas Measuring Devices** - Code Reference S.2.3. on Page LMD-100 and LMD-106
- **Field Evaluation & Permanence Tests - CNG Devices** - Code References S.2.4.1. and S.2.4.2. on Page LMD-123

**Additional Items as Time Allows:**

If time permits, the NCWM S&T Committee and/or other groups and individuals would appreciate input from the Measuring Sector on the measuring-related issues that are outlined in the remaining agenda items below. A copy of any regional association modifications or positions will be provided to the Sector when these are made available by the regions. For each item in this section, the Sector is asked to review the item and consider providing input that might assist the S&T Committee and other groups and individuals in their deliberations. For items included on the S&T Agenda, the content in this agenda is limited to a brief synopsis along with the current proposal. Full background information on these items can be found in the NCWM S&T Committee’s Interim Report and Carryover Agenda. The Interim Report is available at the following web address; the carryover agenda will be posted after September 1 when it is distributed to the Regional Weights and Measures Associations.

**4. Limiting Flow Rate During Field Testing of LPG Retail Motor-Fuel Systems**

**Source:** Robin Parsons, Parafour

**Recommendation/Item Under Consideration:** The Sector is asked to review and discuss the following proposal to modify NIST Handbook 44 LPG and Anhydrous Ammonia Liquid-Measuring Devices Code Paragraph N.4.1. Normal Tests and provide input to assist the submitter and the S&T Committee in considering this proposal.

Modify N.4.1. as follows to clarify the need to test the unit at the maximum discharge flow rate that the system is capable of in the application for which it was designed:

**N.4.1. Normal Tests.** – The “normal” test of a device shall be made at the maximum discharge flow rate developed under the conditions of the installation. Any additional tests conducted at flow rates down to and including one-half the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests. **Adjustments of the inlet valve of the proving device to limit the maximum flow of the device, as designed for and capable of in normal use (and as marked on the data plate as indicated on the device COC), shall be permitted.**

(Amended 1998 **and 20XX**)

An alternative to changing the wording, and possibly warranted even IF changing the wording, would be to send a clarification statement to all state metrology enforcement divisions, explaining that the control of flow when testing a lower flow device with a high flow prover which could exceed the metrological rating of the device being tested, is both permitted and required.

Optionally, wording could be added to require the use of a proving device with a flow path diameter no greater than that of the device being tested, e.g., 3/4” metering device – uses 3/4” prover or 18 gpm max flow rate metering device uses an 18 gpm max flow rate prover.

**Background:** The current market for LPG powered vehicles uses a liquid injection system, which causes an elevated temperature in the vehicle storage tank. In order to fill these vehicles, the LPG station must use a “High Differential Pressure” pump. These pumps typically have flow rates in the range of 20 to 30 GPM. Most LPG Autogas vehicle fueling dispensers, have meters with a maximum flow rate of 12 to 18 gpm. In normal operation, there is NO commercial/retail dispensing application where the receiving tank will take flow greater than 15 gpm, due to the design of the tank fill valve circuit, which has a maximum nominal flow path equal to +/1 1/2”. However, most calibration inspectors use a 100-gallon volumetric prover, which has a 1-1/2” inlet valve. Thus, when performing a calibration verification draft, it is possible to exceed the maximum NTEP rated flow rate of the meter/dispenser due to the high capacity of the prover fill circuit (which is designed to be used for calibration of 3/4” to 2” size meters) which could never be seen in the actual applications for which the dispenser is designed. Many prover operators/inspectors interpret HB44 section N4 Testing Procedures, N4.1 Normal tests, to mean that they are forbidden to adjust or “throttle” the volumetric prover inlet valve to be within the range of the NTEP documented min/max flow rate, which is greater than the possible in-use for application flow rate. Therefore, when they run the draft at the maximum flow the dispensing system is capable of when attached to a high flow prover, they are substantially exceeding the maximum design flow rate of the dispenser, and the actual maximum flow rate it can ever achieve in any typical metering activity. Sometimes they red-tag the unit and tell the customer they need a higher capacity meter, and sometimes they adjust the calibration to be within tolerance with the meter over-speeding, which of course results in the meter being out of tolerance when used in normal operations for which it is designed.

## **5. Development of Infrastructure to Validate the Use of “Master Meters”**

**Source:** NIST OWM

**Background Information:** Over the past few years, weights and measures jurisdictions and industry have expressed an interest in using “master meters” to conduct testing of compressed natural gas metering systems and other types of measuring systems. OWM concurs that the use of master meters has merit and may offer a safer, more cost effective, and time efficient method of testing for some types of measuring systems than other test methods. The Measuring Sector has also worked to identify criteria to allow the use of “master meters” in type evaluation testing using criteria provided by NIST regarding “essential elements of traceability.”

As mentioned in its comments on this general subject on related issues before the NCWM S&T Committee over the past few years, OWM has pointed out that ensuring traceability of measurements and compliance with the Fundamental Considerations of NIST Handbook 44 is critical to ensuring credibility and support of any test method for use in official testing. OWM has been repeatedly asked by regulatory officials and industry for assistance and guidance in putting this infrastructure in place. In order to assist regulators and industry in this endeavor, OWM is devoting resources to working with industry and officials to assist in the development of a framework that will facilitate the validation of this test method.

OWM is in the process of purchasing six Coriolis meters for the purpose of collecting and analyzing data obtained from field testing using this method. NIST OWM will purchase the following Coriolis meters:

- Two ½ inch
- One 1-inch
- Two 1 ½ inch and
- One 3-inch, and
- ½ inch meter, specific for testing CNG.

**Recommendation:** This item is included on the Sector's agenda to allow OWM to provide an update on this project if time allows. No action is asked of the Sector; however, input is welcome.

## **6. S&T 2018 Carryover Item VTM-1B – S.3.1.1. Diversion of Measured Liquid and UR.2.6. Clearing the Discharge Hose**

**Source:** New York and NIST OWM (2018)

**Purpose:** Provide specifications and user requirements for manifold flush systems to help ensure their design and use does not facilitate fraud. Recognize that there is a balance between a mechanism that provides an important safety benefit but also, if used incorrectly, facilitates fraud. Ensure that VTM owners understand their responsibilities when installing such a system and ensure uniformity in enforcement throughout the country.

**Items Under Consideration:** See Appendix F to this Agenda.

**Background:** At its 2018 Annual Meeting, the NCWM adopted modifications to Paragraph S.3.1. Diversion of Measured Liquid and added new Paragraphs S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge Hose. Additional changes to these paragraphs were considered at that meeting, but they could not be acted upon without delaying the original proposal. The S&T Committee agreed to carryover a portion of that item as outlined in the "Items Under Consideration" above to allow the submitter and OWM to propose additional changes to help ensure these flush systems are designed and used in such a way so as to minimize the facilitation of fraud.

For full details on this issue, including the submitter's justification and recommendations and other background information, please see Appendix A, Page S&T – A5 in the S&T Committee's 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

## **7. S&T 2018 Carryover Items in Block 4 – Terminology for Testing Standards**

**Source:** NIST OWM (2018)

**Purpose:** To remove the current limited definition and use of the term "Transfer Standard" and eliminate terms "Testing Standards", "Verification (Testing) Standards", and instead use the term Field Standard, consistent with its reference in Handbook 44, Appendix A, Fundamental Considerations and its use in several sections of Handbook 44. To correct the broad use of the term Transfer Standard and instead replace its use with the term Field Standard. To update all use of the term "standard" to use the term "Field Standard." To remove the current limited definition of Transfer Standard and instead use the term Field Standard.

**Item Under Consideration:** See Appendix F to this Agenda.

**Background:** A review of terminology used to describe standards used in field testing indicate a number of inconsistencies in both NIST Handbook 44 as well as in common usage. For example, the term "transfer standard" is used in the Cryogenic Liquid-Measuring Devices Code and defined in Appendix D of Handbook 44; however, the

definition is limiting in scope and may be better termed simply a “field standard.” All instruments/devices used as a Field Standard in the testing of Weighing and Measuring Devices, regardless of nomenclature, must comply with the requirements of HB 44, Appendix A, Fundamental Considerations Associated with the Enforcement of Handbook 44 Codes, paragraph 3.2 Testing Apparatus, Adequacy. Using the term transfer standard as it is recently being applied in no way negates this requirement of adequacy and confuses the user as to the nature of the field standard being used. Likewise, the term “standard” to describe a field standard can also cause confusion since there are multiple meanings associated with the word “standard.”

There are also multiple definitions pertaining to various types of “standards” in NIST Handbook 130 that may be confusing relative to the terminology used in Handbook 44. OWM identified proposed changes in multiple areas of Handbook 44 (as shown in the Item Under Consideration in Appendix F to this Agenda) in an attempt to improve the consistency among the various references in Handbook 44. Although OWM heard support for the proposed changes to the Metering Codes from MMA, others recommended “Developing” status. Some of the comments received included whether or not current standards referred to as “transfer standards” should be considered “field standards” and if these standards were intended or can meet the fundamental considerations that state “when the standard is used without correction its combined error and uncertainty must be less than one-third of the applicable tolerance.” Based on comments received and those made at the 2018 Interim and Annual Meetings, it is clear this issue is more complex than originally envisioned and OWM concurs that additional development is needed.

During the S&T Committee’s work session at the 2018 NCWM Annual Meeting, the Committee agreed to recommend that the entire block of items move forward as “Developing.” The Committee also concluded that all of the block 5 items, as well as LPG-4, and MFM-2 are related to the Block 4 items due to terminology, and that the submitter of the Block 4 items (OWM) provide detail of their developing language to the submitter of the related items (Endress & Hauser Flowtec AG USA) to prevent conflicting terms as they are considered during future meetings.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A17 in the S&T Committee’s 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

**Recommendation:** This item is still under development. OWM has received a number of comments on this proposal and is continuing to work on revisions to the proposal in response to those comments. This item is included to keep the Sector apprised of the work and OWM continues to welcome comments to assist in further developing changes to various HB44 codes and sections that will improve understanding and consistency relative to references to test standards.

## 8. S&T 2018 Carryover Items in Block 5 – Define Field Reference Standard

**Source:** Endress+Hauser Flowtec AG (2018)

**Purpose:** Add definition for field reference standard meter to HB44. Delete transfer standard definition. Change terms in sections 3.34, 3.38, and 3.39.

**Item under Consideration:** Amend paragraphs in multiple codes as follows. See Appendix F to this agenda for the specific proposed changes.

B5: CLM-2	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: CDL-2	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: HGM-2	D	N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method
B5: OTH-4	D	Appendix D – Definitions: field reference standard meter and transfer standard

**Background:** During S&T open hearings discussion in July 2017 it was pointed out that the term transfer standard which is used in the proposal to amend HB44 3.37 N.3 and 3.32 N.3 Test Drafts is incorrect. The statement made also suggested that the use of transfer standard is incorrectly used in HB44 code sections 3.34, 3.38 and 3.39. It was

suggested that a more appropriate term to use is field reference standard or field reference standard meter. There is no definition in OIML G18 which supports the use of the term transfer standard. There is suggestive basis to support reference standard as it is used textually in OIML G18.

NIST has no procedural documents in place to justify the revision with a definition. The definition of transfer standard is used in code sections 3.34, 3.38 and 3.39 and that those sections do not need to change.

During the 2018 NCWM Interim Meeting, open hearings, the Committee heard comments from Mr. Michael Keilty (Endress & Hauser Flowtec AG USA), submitter of this block of items. Mr. Keilty reported he had developed this proposal with help from Mr. Henry Oppermann (Weights and Measures Consulting, LLC). In written comments to the Committee by Mr. Oppermann, on another item. Mr. Oppermann opposed the term "Transfer Standard" in that it is a temporary measurement reference. Mr. Keilty stated that he agrees with this interpretation and states that what he is proposing is for a "field reference standard meter" term and recommends that the items move forward (he did not specify to what status).

Mr. Henry Oppermann (Weights and Measures Consulting, LLC) provided comments for Stand Alone Items LPG-4 and MFM-2. Mr. Oppermann agrees with Mr. Keilty that these are field standards, however, the terminology "field reference standard meter" should just be "field standard". Anything that meets the 1/3 requirement should be accepted, but currently, there is no data to prove that these can meet the 1/3 requirement. He stated that this proposal specifies that the size of the test draft be in two minutes but has no explanation for the size, and it conflicts with the previous proposal that said that larger test drafts were needed. He also stated that the definition for "field reference standard meter" is vague and insufficient, the requirements for accuracy and repeatability are not defined. He commented that a NIST 105 series handbook is not yet established for these and that there are currently no test procedures or parameters for performance requirements to demonstrate these systems can meet the requirements. The definition would apply to all codes and more study and assessment is needed. He commented that more data is needed before this is moved forward, and that the items should be given a "Developing" status.

Mr. Constantine Cotsoradis (Flint Hills Resources) provided comments, at this time, intending to address item MFM-2 (see Item MFM-2 for comments).

Mr. Michael Keilty (Endress & Hauser Flowtec AG USA), asked the Committee that it be noted that the 2 previous commenters, Mr. Oppermann and Mr. Cotsoradis, were speaking to Stand Alone Items LPG-4 and MFM-2 and not only Block-5.

Mr. Dmitri Karimov (Liquid Controls), speaking on behalf of the MMA, reported that while the MMA supports Block 4, the terminology in Block 5 conflicts with those in Block 4 and therefore recommends that the items be "Developing."

Mr. Ross Andersen (NY- retired) commented that all standards are a transfer standard, transferred from one measurement to another. He stated that what is needed is to make sure that the standard we use is accurate to 1/3 of the applied tolerance. In regard to the data that has been discussed, he asks where is the data for what we use now? There is none. It was just selected. He stated that what we need is one test method as the "referee standard" and that whatever test method is used, that it can agree with the reference.

During the Committee's work session, the members considered the comments heard on this block of items. The Committee agreed to recommend that this block of items move forward as "Developing." The Committee also agreed that all the Block 5 items, as well as LPG-4, and MFM-2 items are related to the Block 4 items due to terminology and that the submitter of Block 4 (OWM) provide detail of their developing language to the submitter of the related items (Endress & Hauser Flowtec AG USA) to prevent conflicting terms as they are considered during future meetings.

The Committee did not take comments during open hearings on Developing items at the 2018 NCWM Annual Meeting except to grant the submitter of a Developing item (or block of Developing items) an opportunity to provide an update on the progress made to further develop the item(s) since the 2018 NCWM Interim Meeting.

Mike Keilty (Endress+Hauser Flowtec AG), the developer of this item provided comments during the NCWM annual meeting open hearings. He mentioned that this item has been before the conference since 2015. He agreed that the

definitions are confusing and agrees with the work that NIST is doing to clarify the terminology. Mr. Keilty recommended that any new information be presented at the January meeting and recommends that Block 5 items move forward as Voting items at the 2019 NCWM Annual Meeting.

The Committee received written comments from Seraphin Test Measure Company on all items in Block 4 regarding transfer standards raising several concerns and recommending the items remain developmental until such time those concerns have been resolved.

OWM provided the following written recommendations and comments to this block of items as feedback to the submitter and as part of its analysis of the S&T Committee's 2018 agenda items

The Committee agreed to carryover this block of items on its 2019 agenda to allow for further discussion and development of these proposals.

For full details on this issue, including the submitter's justification and recommendations and other background information, please see Appendix A, Page S&T – A20 in the S&T Committee's 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

## 9. S&T 2018 Carryover Items in Block 7 – Address Devices and Systems Adjusted Using a Removable Digital Storage Device

**Source:** NIST OWM (2013)

**Purpose:** Expand the scope of definition to cover instances where the “other device,” as noted in the current definition, may be necessary to the operation of the weighing or measuring device or which may be considered a permanent part of that device.

**Item under Consideration:** The Sector is asked to review and provide input on the following items under this block. See Appendix F to this Agenda for proposed language under consideration for these items.

B7: GEN-2	D	G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage
B7: LMD-1	D	S.2.2. Provision for Sealing.
B7: VTM-2	D	S.2.2. Provision for Sealing.
B7: LPG-2	D	S.2.2. Provision for Sealing.
B7: HGV-1	D	S.2.2. Provision for Sealing.
B7: CLM-4	D	S.2.5. Provision for Sealing.
B7: MLK-1	D	S.2.3. Provision for Sealing.
B7: WTR-1	D	S.2.1. Provision for Sealing.
B7: MFM-1	D	S.3.5. Provision for Sealing.
B7: CDL-4	D	S.2.5. Provision for Sealing.
B7: HGM-3	D	S.3.3. Provision for Sealing.

**Background:** The proposal was originally intended to address the use of removable digital storage devices, such as USB flash drive, memory cards, etc. in grain moisture meters (GGMs). This proposal was later expanded to address all device types when it was recognized that other weighing and measuring systems may make use of the same type of media to make metrologically significant changes. The scenario originally identified in this item recognized that there are systems in which removable digital storage devices can be used as either data transfer devices that are not necessary to the operation of the device or as data storage devices which are necessary to the operation of the device. If removable data storage devices are necessary to the operation of the device, they are not covered by the current definition of remote configuration capability in HB 44.

Rather than propose requirements which could potentially impact weighing and measuring systems using other methods of making metrologically significant changes, OWM is proposing the addition of:

- (1) A General Code paragraph (G-S.8.2.) which specifies the method of sealing for those devices which can be adjusted using digital storage media; and
- (2) Changes to each specific HB44 code to reference this new General Code paragraph as the required method of sealing for those devices which can be adjusted using digital storage media.

The intent of proposed new paragraph G-S.8.2. is to address the sealing of devices and systems adjusted using a removable digital storage device that must remain in the device in order for the device to be operational. The intent of all the other items in this block is to provide an exemption to the existing sealing requirements in each of the device codes being applied when the calibration or configuration parameters are changed using a removable digital device and direct those performing the inspection to paragraph G-S.8.2.

OWM has developed multiple iterations of these proposed changes based on comments from the weights and measures community, including from the NTEP Measuring Sector. The most recent proposal (with changes to the General Code paragraph to address comments made at the 2018 Interim Meeting) are shown in the Item Under Consideration in Appendix F to the Sector's Agenda. With these changes, OWM believes these items are fully developed and ready for vote.

During its work session at the July 2018 NCWM Annual Meeting, members of the S&T Committee agreed that the amended version of paragraph G-S.8.2. offered by OWM to address the concern raised by a meter manufacturer improved clarification. Consequently, the Committee agreed to OWM's request to replace the existing proposed paragraph G-S.8.2. with the amended version made available by OWM and as shown in Item under Consideration for this item. No other changes were made to any other item in this block and members of the Committee agreed they believe the items in this block are fully developed and should be presented for vote in the 2019 NCWM Conference cycle. Refer to the Committee's 2018 Interim Report to view the version of paragraph G-S.8.2. that was replaced by the Committee at the 2018 NCWM Annual Meeting.

For full details on this issue, including the submitter's justification and recommendations and other background information, please see Appendix A, Page S&T – A23 in the S&T Committee's 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

## **10. S&T 2018 Carryover Item GEN-3 – G-S.2. Facilitation of Fraud – “Skimmers”**

**Source:** Arizona, Florida, Maine, Michigan, and Cambridge, MA (2018) and NCWM S&T Task Group on Skimmers

**Purpose:** To prevent access and tampering by unauthorized persons to any area of the device where electronic financial transactions occur, credit card information is obtained, and/or personal information is stored or transmitted.

**Item under Consideration:** See Appendix F to this Agenda.

**Background:** The following background information appeared with this item when it was originally presented to the S&T Committee:

Given the potential financial impact to consumers and credit issuing companies, Weights & Measures recognizes the need to offer more protection to both buyer and seller in these transactions. The current design of these devices offers little to no barrier to fraud through theft of credit information, as such it is our belief that the current design, in most cases, already violates G.S.2. by facilitating easy access to allow installation of these fraudulent card reading devices. Therefore, in our opinion, stronger means must be implemented to decrease the potential for fraudulent activity with these devices.

The Florida Department of Agriculture and Consumer Services estimates that on average, each skimmer results in 100 counterfeit cards, each of which are used to make \$1,000 in fraudulent purchases. In other words, a single skimmer typically leads to \$100,000 in theft. This is a nationwide problem that causes millions of dollars in fraudulent charges to consumers, device owners, and banking institutions each year. A solution can be achieved through upgraded security measures on the weighing and measuring devices that fall within the guidelines of this handbook.



One possible argument is that these preventative measures should be in User Requirements instead of in Specifications, but this is intended to be a long-term solution. The State of Florida has enacted legislation to require device users to add security measures. They have found that most owner/operators have chosen to use security seals or non-standard locks on the dispensers and that 85% of the skimming equipment being found is in devices with user applied security measures. User applied security measures are not as effective as electronic security and/or unique, tamper proof locks. The current design of these devices offers little to no barrier to fraud through theft of credit information, as such it is our belief that the current design, in most cases, already violates G.S.2. by facilitating easy access to allow installation of these fraudulent card reading devices.

Manufacturers of these devices may argue that the cost to make the necessary upgrades will be prohibitive. This item is not intended to be retroactive and the cost of the additional security measures will be universal and not place any manufacturer at a competitive disadvantage. Several manufacturers of electronic security systems designed for retail motor fuel dispensers have products available and at least three new manufacturers of low cost systems have recently come into the marketplace (at least one of them is working with OEM manufacturers and the security systems are being integrated into newly manufactured dispensers).

At the 2018 NCWM Interim Meeting, the S&T Committee heard comments both in favor or and in opposition to the proposal. The Committee agreed to recommend giving this item an “Assigned” status and requested the formation of a Task Group (TG). At the 2018 NCWM Annual Meeting, Mr. Hal Prince (FL), Chairman of the TG reported the following to the Committee, noting work is ongoing and the TG has been meeting bi-weekly since May 2018:

1. Is this a weights and measures issue that NCWM should take on?
2. If so, does weights and measures have the authority to require manufacturers and users of commercial weighing and measuring equipment to take whatever steps needed to ensure such equipment prevents unauthorized access to nonmetrological changes to the equipment?

Mr. Prince further reported members of the TG were recently surveyed and asked these questions, but results are not yet available. It is hoped more information will be available to report at the next (2019) NCWM Interim Meeting.

Mr. Prince also stated that more members and stakeholders are needed for the TG. Members of the TG believe that Weights and Measures needs an educational component, e.g., an outreach program set up for law enforcement and consumers and perhaps a “best practice guide” developed.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A27 in the S&T Committee’s 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

## **11. S&T 2018 Carryover Item LPG-3: S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle-Mounted Meters, Electronic**

**Source:** Maryland (2018)

**Purpose:** To align the LPG code with the VTM code for electronic registers/indicators used in stationary and mobile applications.

**Item under Consideration:** See Appendix F to this Agenda.

**Background:** This specification has been in place for VTMs for many years. Its purpose is to prevent a second party from being charged for product delivered to the first party. However, there is no requirement for interlocks in the LPG Code, other than the requirement added in 2016 for stationary retail motor fuel devices. Currently, the only

protection is provided by two User Requirements paragraphs, UR.2.5. Ticket in Printing Device, which prohibits the “riding of tickets” (having a ticket in the printer while the vehicle is moving from one location to another) and UR.2.1. Return of Indication and Recording Element to Zero, which requires the indications to be set to zero before a delivery. Both requirements are extremely difficult, if not impossible to enforce where printers are frequently mounted in the cab of the vehicle and are not visible to an observer outside the vehicle. In addition, electronic registers used in stationary applications shall not be exempt from this requirement due to the possibility of a second party being charged for product delivered to the first party in this scenario as well.

This requirement for electronic indicators already exists in the VTM Code and being as the majority of electronic registers are used in both applications, I cannot see any objections as to why this requirement should be added to the LPG and Anhydrous Ammonia Liquid-Measuring Device Code.

During the 2018 NCWM Interim Meeting, the Committee received multiple comments in support of this item, including comments from NIST OWM suggesting some modifications adjustments to the proposed language. Based on comments received, the Committee felt nonretroactive date is needed before advancing the item to a “Voting” status and changed the status to “Developing” pending agreement on an effective date. The Committee did not invite comments from other than the submitter at the 2018 Annual Meeting. No updates were provided.

During the Committee’s work session, members of the Committee felt that the nonretroactive date needed to be included before the item could be advanced to a “Voting” status. The Committee elected to maintain the item on its agenda as “Developing” pending agreement of an effective date.

The Committee did not take comments during open hearings on Developing items at the 2018 NCWM Annual Meeting except to grant the submitter of a Developing item (or block of Developing items) an opportunity to provide an update on the progress made to further develop the item(s) since the 2018 NCWM Interim Meeting. There were no comments or updates provided on this item by the submitter at the Annual meeting.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A51 in the S&T Committee’s 2018 Interim Report found at: [http://www.ncwm.net/\\_resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf](http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf)

## **12. S&T 2018 Carryover Item LPG-5: N.4.1.2. Repeatability Tests and N.4.2.4. Repeatability Tests for Type Evaluation**

**Source:** Ross Andersen, Retired (2017)

**Purpose:** To address differences between Handbook44 and Publication 14 practices for repeatability testing.

**Item under Consideration:** See Appendix F to this Agenda. This version of the Item Under Consideration reflects changes proposed by the submitter following the July 2018 NCWM Annual Meeting.

**Background:** The proposal is aimed to correct a number of areas of confusion. First, the inclusion of repeatability in the N.4.1. series indicates that repeatability is to be run at normal flow rates. There was some confusion if this was the actual intent when these sections were added to HB44 in multiple codes. Running the tests only at Normal flow rates is consistently how the test was typically performed in the field. The amendment to N.4.1.2. was to clarify this explicitly for field tests and type evaluation tests.

A new paragraph was proposed because NTEP has required repeatability on tests over the entire range of flow rates conducted under controlled conditions during type evaluation testing. This means anywhere between rated maximum and minimum flow rates. The proposed code addition would have formalized and legitimized what has been done for a long time.

Another question arose whether gross or net results could be used in repeatability tests? Obviously, you can’t compare net to gross but you can compare three consecutive gross or three consecutive net results. The tolerance paragraph in

the LPG Code specifies the tolerance does not apply to the test of the compensator. Also, the practice in HB44 is to test one variable at a time to the extent possible, the revision clarifies that repeatability is addressed to gross meter performance only. This can be through deactivating the ATC or just using gross values where both gross and net are available from the same test.

The submitter provided proposed changes with the goal of clarifying and maintaining the status quo as the code is presently written. Following the July 2018 Annual Meeting, the submitter submitted a revised version of the Item Under Consideration in response to comments received on the item. The proposal outlined in the Item Under Consideration reflects the updated version provided by the submitter. The submitter provided additional analysis and rationale for the updates made to the original proposal as outlined below.

In the original proposal (carried as developing item LPG-5 in 2018 L&R Report), the intent was to address only the LPG code and preserve the status quo based on what presently appears in the Handbook. It was understood that the decisions on this item would set precedents affecting all LMD codes that contained a repeatability test. After discussion at the 2018 Interim and Annual Meetings, with various Meter Manufacturers, with OWM, and with other interested parties, the original proposal is being amended. The questions being posed have been broadened to include all LMD codes. The issues in this revision can now be expressed through the following questions:

1. Should the repeatability test be conducted net (compensated) or gross (uncompensated)? Or possibly, are both allowed provided all test results are from the same mode of operation?

Response to Issue 1.

In developing this item, I heard comments agreeing with the original proposal to use only gross results and comments differing in that either gross or net should be accepted provided all results are from the same mode. The tolerance paragraph in the LPG/NH4 code indicates the test does not apply to the test of the ATC system. It can be argued that the ATC system already has a performance requirement in T.4., requiring agreement between net and gross, i.e. compensated and uncompensated results. This tolerance reads much like the T.3. paragraph. Also, Handbook 44 precedent tends to support performing the tests in gross mode only. That precedent implies that in testing one component or variable, you attempt to hold all other components or variables constant. The revised proposal retains the limitation of performing the test using gross results (uncompensated).

In those codes where different device applications are sometimes gross and sometimes net, it will be necessary to specify using gross results, if the device has ATC capability. It is proposed to add the following text in the note paragraph specifying the repeatability test. "For devices equipped with an automatic temperature compensator, the test results shall be based on uncompensated (gross) volume, i.e. with the temperature compensator deactivated." (or equivalent wording) In the LPG/NH4 code this change renders the extra wording in T.3. unnecessary, i.e. that the tolerance does not apply to ATC.

2. Should the repeatability test be a normal test as presently presented in the Code? That is, is the test limited to flow rates within the range of normal tests? Note that the repeatability test now appears in the Normal Test section in every affected HB44 LMD Code, Sections 3.30, through 3.39. The table below shows the history of the related sections.

Code	Note Paragraph	Tolerance Paragraph
3.30. LMD	N.4.1.2. (Added 2001)	T.3. (Added 1992) (Amended 2001 and 2002)
3.31. VTM	N.4.1.2. (Added 2001)	T.3. (Added 1992) (Amended 2001 and 2002)
3.32. LPG/NH4	N.4.1.2. (Added 2001)	T.3. (Added 1992) (Amended 1997 and 2001)
3.33. Vapor	N.4.1.2. (Added 2002)	T.3. (Added 2002)

3.34. Cryogenic	N.5.1. (Added 2001)	T.4. (Added 2001)
3.35. Milk	N.4.1.1. (Added 2002)	T.3. (Added 2002)
3.36. Water	N.4.1.1. (Added 2002)	T.1.1. (Added 2002) (Amended 2010)
3.37. Mass Flow	N.6.1.1. (Added 2001)	T.3. (Amended 1992, 1994, and 2001)
3.38. CO <sub>2</sub>	N.4.1.1. (Added 2002)	T.2.1. (Added 2002)
3.39. Hydrogen	N.6.1.1. (Tentative Code 2010)	T.3. (Tentative Code 2010)

#### Response to Issue 2.

Overwhelming support has emerged for the proposition that repeatability tests may be performed at any flow rate within the legitimate operating range of the device. To accomplish this, the Note paragraph on repeatability tests must be removed from the Normal Test section of each Code and placed in its own section. In the proposed wording below, the repeatability Note was simply moved to the next available number under Testing Procedures in each Code. For example, in 3.30. LMD Code, note N.4.1.2. is proposed to be renumbered N.4.6. This results in the sequence N.4.1. Normal tests, N.4.2. Special Tests, N.4.3. Money-Value Computation Tests, N.4.4. Pour and Drain Times, N.4.5. Temperature Correction on Wholesale Meters, and N.4.6. Repeatability Tests. NIST OWM has suggested inserting it after Special Tests and renumbering N.4.3. to N.4.5. Either way accomplishes the same end. Adding at the end of the list may cause less disruption.

However, removing repeatability from the special tests now leaves the issue of flow rates for conducting the test unstated. I suggest we need to add a statement to each Note as follows: “When conducting the tests, the flow rates shall be within the minimum and maximum discharge rates as marked by the manufacturer.” However, some codes use different terminology and in some cases minimum and maximum discharge rates are not marked like RMFD’s. For these cases I propose to add an additional statement regarding minimum discharge rates and maximum discharge rates as appropriate to that code.

3. If the test may only be performed as a normal test in Issue 2, how do we legitimize the NTEP policy of applying the tolerance to repeatability tests at special test flow rates? Based on the response to Issue 2, this will be a moot issue and can be dropped moving forward.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A59 in the S&T Committee’s 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

### 13. S&T 2019 - New Proposal – Section 3.30 LMD Code - Airport Refueling Systems

**Source:** G. Diane Lee and Tina Butcher (NIST OWM)

**Purpose:** Modify the Liquid Measuring Devices Code to address self-service airport fueling dispensing systems equipped with a primary analog indicator and a separate card activated console with a printer that are used to fuel multiple tanks on aircrafts.

**Item Under Consideration/Background:** See corresponding NCWM Form 15 in Appendix H to this Agenda.

**14. S&T 2019 – New Proposal – Section 3.30 LMD Code - Recognition of Diesel Exhaust Fluid and Other Products**

**Source:** G. Diane Lee and Tina Butcher (NIST OWM)

**Purpose:** Modify the Liquid Measuring Devices Code to adequately address requirements for retail liquid measuring devices that measure DEF and other products.

**Item Under Consideration/Background:** See corresponding NCWM Form 15 in Appendix H to this Agenda.

**15. S&T 2019 – New Proposal – Section 3.37. Mass Flow Meters Code – Location of Marking Information, RMFDs**

**Source:** Juana Williams (NIST OWM)

**Purpose:** Extend the NIST Handbook 44 Mass Flow Meters Code provision allowing the use of a key or tool for accessing internal required markings for liquid retail motor-fuel dispensers to include retail motor-fuel dispensers delivering compressed gases.

**Item Under Consideration/Background:** See corresponding NCWM Form 15 in Appendix H to this Agenda.

**16. S&T 2019 – New Proposal – Block – Mass Flow Meters Code; Hydrogen Gas Measuring Devices Code; and Electric Vehicle Refueling Code – Addition of Timeout Requirements**

**Source:** Juana Williams (NIST OWM)

**Purpose:** To prevent the facilitation of fraud on a vehicle fueling system equipped with the capability for authorization of a transaction by a credit card, debit card, or cash.

**Item Under Consideration/Background:** See corresponding NCWM Form 15 in Appendix H to this Agenda.

**17. S&T 2019 – New Proposal – Section 3.37. Mass Flow Meters Code – Deletion of “GLE” and Addition of DGE Maximum Quantity Division**

**Source:** Juana Williams (NIST OWM)

**Purpose:** Delete the reference to “gasoline liter equivalent (GLE)” since that term that was removed from all Mass Flow Meters Code requirements in 2016. Clarify and limit the maximum value of the quantity division for indicated and recorded deliveries in the diesel gallon equivalent (DGE) to an increment of 0.001.

**Item Under Consideration/Background:** See corresponding NCWM Form 15 in Appendix H to this Agenda.

## **18. S&T 2019 – New Proposal – Section 3.40 Electric Vehicle Fueling Systems Code - Definition - Power Factor**

**Source:** Tina Butcher (NIST OWM)

**Purpose:** To simplify the definition for “Power Factor” currently included in NIST Handbook 44 (HB44) Section 3.40. Electric Vehicle Fueling Systems – Tentative Code. To align the current HB 44 definition with a definition included in a proposal to adopt a “Method of Sale” requirement for electric watt hour meters that is currently under consideration by the NCWM Laws & Regulations Committee.

**Item Under Consideration/Background:** See corresponding NCWM Form 15 in Appendix H to this Agenda.

## **19. Meeting Location and Date of 2019 Measuring Sector Meeting**

**Background:** This Item is included on the Sector’s agenda to apprise Sector members of arrangements for the 2019 Sector meeting.

At its 2017 meeting, the Sector concluded most Sector members prefer not to hold the meeting in conjunction with a regional association meeting and, in particular, want to avoid holding it over a weekend. The Sector identified the following possible destinations for future meetings to recommend to the NCWM BOD:

- Atlanta, GA
- Baltimore/Annapolis, MD
- Columbus, OH
- Denver, CO (different hotel than before)
- Fort Wayne, IN
- Indianapolis, IN
- Jacksonville, FL
- Orlando, FL

In June 2018, NTEP Director, Jim Truex polled the Sector on potential locations and dates for the 2019 Sector Meeting. Based upon the results of that poll, the meeting will be held September 24 – 26, 2019 in Denver, CO as follows:

### **Meeting Location:**

Holiday Inn & Suites  
6900 Tower Road  
Denver, CO 80249  
(303) 574-1300

### **Dates:**

Tuesday, 9/24/19: 8 am – 5 pm  
Wednesday, 9/25/19: 8 am – 5 pm  
Thursday, 9/26/19: 8 am – 5 pm

Final meeting and lodging details will be provided closer to the 2019 meeting.

**Appendix A**  
**September 2018 NTEP Measuring Sector Meeting**

**DEF - Changes Adopted to the Family of Products Table in NCWM  
Publication 14 Via Email Ballot to the Sector  
to Recognize Diesel Exhaust Fluid (DEF)  
(11/11/17 Email from Sector Chairman, Michael Keilty)**

At its October 2017 Meeting, the NTEP Measuring Sector agreed to consider proposed additions to the Family of Products Table in NCWM Publication 14 to recognize Diesel Exhaust Fluid (DEF). The Sector agreed a small group would develop proposed changes and circulate the proposal to the Sector for review and balloting. Changes were proposed for each meter technology in the table, including:

- Mass Meter
- Magnetic Flow Meter
- Positive Displacement Flow Meter
- Turbine Flow Meter

Additionally, an addition was proposed to the “Product Table Category Table Category Abbreviations” to recognize “DEF.”

In a series of two letter ballots, concluding in November 2017, the Sector adopted the proposed changes shown in bold, underlined text highlighted in yellow in the tables below. For ease of reference, changes are shown for each technology in a separate table. In the interest of brevity, only a couple of line items of the existing table that appear immediately before and after the proposed additions are shown.

<b>Mass Meter Product Category and Test Requirements</b>		
<b><u>Test B</u></b> To cover a range of the following products, test with one product having a low specific gravity and test with a second product having a high specific gravity. The Certificate of Conformance will cover all products in all product categories listed in the table under Test B within the specific gravity range tested. <ul style="list-style-type: none"><li>• Test B does not apply to product categories of liquefied gases, compressed liquids, cryogenic liquids or heated products.</li></ul>		
<i><b>Note: Product categories under Test B were formerly referred to collectively as "Normal Liquids."</b></i>		
<b>Typical Products</b>	<b>Specific Gravity<sup>2</sup> (60 °F)</b>	<b>Product Category</b>
...	...	...
N-P-K Solutions	1.2 – 1.4	Fert
Urea	<b>1.3</b>	Fert
<b><u>Diesel exhaust fluid</u></b>	<b>1.08 -1.18</b>	<b>DEF</b>
6 Oil (#5, #6)	0.9	FL&O
Asphalt		FL&O
...	...	...

Magnetic Flow Meter Product Category and Test Requirements		
<b>Test D</b> To obtain coverage for a product category, test with one product in the product category. The Certificate of Conformance will cover all products in the category. <ul style="list-style-type: none"> <li>• Test D does not apply to product categories of pure alcohols, pure glycol, pure water, solvents chlorinated, solvents general, fuels, lubricants, industrial and food grade liquid oils.</li> <li>• Test D does not apply to product categories of liquefied gases, compressed liquids or heated products.</li> </ul>		
Typical Products	Conductivity micro Siemens/centimeter	Product Category
...	...	...
N-P-K Solutions		Fert
Urea	5000	Fert
<b>Diesel exhaust fluid</b>	<b>2000 - 5000</b>	<b>DEF</b>
Liquid Molasses	300	Liq Feed
Molasses Plus Phos Acid and/or Urea (TreaChle)		Liq Feed
...	...	...

Positive Displacement Meter Product Category and Test Requirements	
<b>Test C</b> To cover a range of products within each product category, test with one product having a low viscosity and test with a second product having a high viscosity within each category. The Certificate of Conformance will cover all products in the product category within the viscosity range tested.	
<b>Test C</b> Product Category: Clear Liquid Fertilizers (Fert) <b>and DEF</b>	
Typical Products	Reference Viscosity <sup>1</sup> (60 °F) centipoise (cP)
...	...
Clear Liquid Fertilizer	31 – 110
N-P-K Solution	
Urea	<b>1.7 – 1.9</b>
<b>Diesel exhaust fluid</b>	<b>1.2 – 1.7</b>
...	...

Turbine Flow Meter Product Category and Test Requirements	
<b>Test A</b> The following products must be individually tested and noted on the Certificate of Conformance.	
Typical Products	Product Category
...	...
Nitrogen Solution	Fert
N-P-K Solutions	Fert
Urea	Fert
<b>Diesel exhaust fluid</b>	<b>DEF</b>
Bicep	Flow
Broadstrike	Flow
...	...



**Product Category Table – Category Abbreviations**

<b>Abbreviation</b>	<b>Product Category</b>	<b>Abbreviation</b>	<b>Product Category</b>
<b>Alc Gly</b>	<b>Alcohols, Glycols and Water Mixes Thereof</b>	<b>Fert</b>	<b>Fertilizers</b>
<b>CC-A</b>	<b>Crop Chemicals (Type A)</b>	<b>FL&amp;O</b>	<b>Fuels, Lubricants, Industrial and Food Grade Liquid Oils</b>
<b>CC-B</b>	<b>Crop Chemicals (Type B)</b>	<b>Flow</b>	<b>Flowables</b>
<b>CC-C</b>	<b>Crop Chemicals (Type C)</b>	<b>Heated</b>	<b>Heated Products (Above 50 °C)</b>
<b>CC-D</b>	<b>Crop Chemicals (Type D)</b>	<b>Liq Feed</b>	<b>Liquid Feeds</b>
<b>Chem</b>	<b>Chemicals</b>	<b>Liq CO2</b>	<b>Liquid Carbon Dioxide</b>
<b>Comp gas</b>	<b>Compressed Gases</b>	<b>Solv Chl</b>	<b>Solvents Chlorinated</b>
<b>Comp H2</b>	<b>Compressed Hydrogen Gas</b>	<b>Solv Gen</b>	<b>Solvents General</b>
<b>Comp liq</b>	<b>Compressed Liquids (Fuels and Refrigerants, NH<sub>3</sub>)</b>	<b>Sus Fert</b>	<b>Suspension Fertilizers</b>
<b>Cryo LNG</b>	<b>Cryogenic Liquids and Liquefied Natural Gas</b>	<b>Water</b>	<b>Water</b>
<b>DEF</b>	<b>Diesel Exhaust Fluid</b>		

*Note: The Typical Products listed in this table are not limiting or all-inclusive; there may be other products and product trade names, which fall into a product family. Water and a product such as stoddard solvent or mineral spirits may be used as test products in the fuels, lubricants, industrial, and food- grade liquid oils product family.*

**Appendix B**  
**September 2018 NTEP Measuring Sector Meeting**

**Proposed Changes to NCWM Publication 14  
to Reflect Changes Adopted by the NCWM in July 2018  
Manifold Flush Systems**

The Sector is asked to consider recommending modifications to NCWM Publication 14 to correspond with the changes to in July 2018 to the Vehicle-Tank Meters Code in NIST Handbook 44 relative to “manifold flush systems.” For reference, see the block of items under NCWM Committee S&T Agenda Item Block 1, including Items GEN-1 (which was withdrawn from the S&T Agenda) and VTM-1.

Changes are proposed (as shown further below in highlighted, marked text) in the following sections of the Liquid-Measuring Devices Checklist and Test Procedures:

- **Vehicle-Tank Meters** – Code References: Paragraphs S.3.1. Diversion of Measured Liquid & S.3.1.1. Clearing the Discharge Hose, Page LMD-61

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**25. Discharge Lines and Discharge Valves**

**Code Reference: S.3.1. Diversion of Measured Liquid**

~~Except on equipment used only for fueling aircraft, a~~ No means shall be provided ~~to allow~~ **by which** any measured liquid ~~to~~ **can** be diverted from the measuring chamber or from the discharge line. However, two or more delivery outlets may be installed if means are provided to ensure that liquid can flow from only one outlet at a time and the setting for the direction of flow is conspicuously and definitely indicated. **This paragraph does not apply to the following:**

- 1) Equipment used exclusively for fueling aircraft.**
- 2) Multiple-product, single-discharge hose metering systems that are equipped with systems designed to flush the discharge hose, provided the flushing system complies with the provisions of paragraph S.3.1.1. Means for Clearing the Discharge Hose.**

25.1. Is the equipment used only to fuel aircraft? ☐ Yes ☐ No ☐ N/A  
**If “yes” skip to next Code Reference.**

**25.2. Is the application for the metering system intended to be for multiple-product, single-discharge hose metering systems that will include systems designed to flush the discharge hose?** ☐ Yes ☐ No ☐ N/A  
**If “yes” skip to next Code Reference.**

25.3. It shall not be possible to divert measured liquid from the measuring chamber or the discharge line. ☐ Yes ☐ No ☐ N/A

25.4. If two or more delivery outlets are installed, then liquid shall flow from only one outlet at a time and the direction of flow shall be conspicuously indicated. ☐ Yes ☐ No ☐ N/A

**Code Reference S.3.1.1. Means for Clearing the Discharge Hose.**

**Metering systems may be equipped with a system specifically designed to facilitate clearing of the discharge hose prior to delivery to avoid product contamination. In such systems, a valve to temporarily divert product from the measuring chamber of the meter to a storage tank shall be installed only under specific conditions. For**

Appendix B – Manifold Flush Systems - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4A

metering systems which are interfaced with such flushing systems, the provisions paragraph S.3.1.1. Means for Clearing the Discharge Hose must be satisfied. This must be specified on the CC when this option is listed.

If the system under evaluation is equipped with such a flush system, verify that the interface with the metering system operates properly; does not affect the operation of the metering system; and does not facilitate fraud.

Verify the metering system and flush system meets the following conditions:

(a) the discharge hose remains of the wet hose type;

☐ Yes ☐ No ☐ N/A

(b) the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use;

☐ Yes ☐ No ☐ N/A

(c) the valve is permanently marked with its purpose (e.g., flush valve);

☐ Yes ☐ No ☐ N/A

(d) the valve is installed in a conspicuous manner and as far from the hose reel as practical;

☐ Yes ☐ No ☐ N/A

(e) the system clearly and automatically indicates the direction of product flow during operation of the flush system;

☐ Yes ☐ No ☐ N/A

(f) clear means, such as an indicator light or audible alarm, is used to identify when the valve is in use; and

☐ Yes ☐ No ☐ N/A

(g) no hoses or piping are connected to the inlet when it is not in use.

☐ Yes ☐ No ☐ N/A

**Appendix C**  
**September 2018 NTEP Measuring Sector Meeting**

**Proposed Changes to NCWM Publication 14  
to Reflect Changes Adopted by the NCWM in July 2018  
Vapor Elimination**

The Sector is asked to consider recommending modifications to NCWM Publication 14 to correspond with the changes made in July 2018 to the LPG & Anhydrous Ammonia Liquid-Measuring Devices Code; Cryogenic Liquid-Measuring Devices Code; and Carbon Dioxide Liquid-Measuring Devices Code in NIST Handbook 44 relative to air/vapor elimination. For reference, see the block of items under NCWM Committee S&T Agenda Item Block 6, including Items LPG-1, CLM-3, and CDL-3.

Changes are proposed to Pub 14 (as shown further below in highlighted, marked text) in the following sections of the Liquid-Measuring Devices Checklist and Test Procedures:

- **Common Specific Code Requirements** – Code Reference: S.2.1. Air/Vapor Elimination (LPG S.2.1.), Page LMD-32
- **Wholesale and Loading Rack Meters** – Code Reference S.2.1.1. Air/Vapor Elimination, Page LMD-54
- **Mass Flow Meters** - Code Reference: S.3.3. Air/Vapor Elimination, Page LMD-78

Changes are proposed (as shown further below in highlighted, marked text) in the following sections of the Cryogenic Liquid-Measuring Devices Checklist:

- **Common Specific Code Requirements** – Code Reference S.2.1. Air/Vapor Elimination, Page CLMD-12
- **Common Specific Code Requirements** - Code Reference: S.2.1. Air/Vapor Elimination on Wholesale and Loading Rack Metering Systems, Page CLMD-14

<b>Liquid-Measuring Devices Checklist</b>	
<b>Checklist &amp; Test Procedures for Common Specific Code Requirements - Page LMD-32</b>	
<b>Code Reference: S.2.1. Air/Vapor Elimination (LPG S.2.1.)</b> If air/vapor enters a measuring system or the product changes into the vapor state as it passes through the system, then the system must be equipped with an effective air/vapor eliminator or other automatic means to prevent the air/vapor from passing through the meter. To prevent the vapor eliminator vent lines from being pinched closed and re-opened without being detected, the vent lines shall be made of appropriate non-collapsible material. If the system is designed such that air/vapor will not enter the system, then an air/vapor eliminator is not required. One example is when a product is being pumped from the bottom of a tank and a low-level detector in the tank shuts off the pump before the liquid level gets to the point where air could enter the system.	
59.1. The metering system is equipped with an effective air/vapor eliminator.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
59.2. Other effective, automatic means are provided to prevent air/vapor from passing through the system. Describe the means provided and list this information on the Certificate of Conformance.  _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
59.3. The vent lines are made of appropriate non-collapsible material to prevent the lines from being pinched closed and re-opened without being detected.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

### Checklist & Test Procedures for Wholesale and Loading-Rack Meters - Page LMD-54

**Code Reference: S.2.1.1. Air/Vapor Elimination on Loading Rack Metering Systems**  
(Remaining language for this section is the same as in the code reference S.2.1. above.)

### Checklist & Test Procedures for Mass Flow Meters - Page LMD-78

**Code Reference: S.3.3. Air/Vapor Elimination**

If air/vapor enters a measuring system or the product changes into the vapor state as it passes through the system, then the system must be equipped with an effective air/vapor eliminator or other automatic means to prevent the air/vapor from being measured by the meter. To prevent air/vapor eliminator vent lines from being pinched close and re-opened without being detected, the vent lines shall be made of appropriate non-collapsible material. If the system is designed such that air/vapor will not enter the system, then an air/vapor eliminator is not required. One example is when a product is being pumped from the bottom of a tank and a low-level detector in the tank shuts off the pump before the liquid level gets to the point where air could enter the system.

(Remaining language for this section is the same as in the code reference S.2.1. above with the exception of the reference to preventing air/vapor from being “measured” by the meter rather than “passing through the meter.”)

## Cryogenic Liquid-Measuring Devices Checklist

### Checklist & Test Procedures for Common Specific Code Requirements - Page CLMD-12

**Code Reference: S.2.1. Air/Vapor Elimination (LPG Code Reference S.2.1.)**

*Note: Only applies to product metered in liquid state.*

If air/vapor enters through a metering system or the product changes into the vapor state as it passes through the system, then the system must be equipped with an effective air/vapor eliminator or other automatic means to remove the air or vapor before it passes prevent the passage of air/vapor through the meter. To prevent the air/vapor return eliminator vent lines from being pinched closed and reopened without being detected, the vent lines shall be made of metal tubing or other rigid material appropriate non-collapsible material. If the system is designed such that air or vapor air/vapor will not enter the system, then an air/vapor eliminator is not required. One example is when a product is being pumped from the bottom of a tank and a low-level detector in the tank shuts off the pump before the liquid level gets to the point where air could enter the system.

1.1. The metering system is equipped with an effective air/vapor eliminator.

☐ Yes ☐ No ☐ N/A

1.2 Other effective, automatic means are provided to prevent air/vapor from passing through the system. Describe the means provided and list this information on the Certificate of Conformance.

☐ Yes ☐ No ☐ N/A

59.4. The vent lines are made of appropriate non-collapsible material to prevent the lines from being pinched closed and re-opened without being detected.

☐ Yes ☐ No ☐ N/A

Checklist & Test Procedures for Common Specific Code Requirements - Page CLMD-14	
Code Reference: S.2.1. <b>Air/Vapor Elimination on Wholesale and Loading Rack Metering Systems</b>	
<b>8.1.</b> —A measuring system shall be equipped with an effective <b>air</b> /vapor eliminator or other effective means to prevent the measurement of vapor that will cause errors in excess of the applicable tolerances. <i>See NIST Handbook 44, Cryogenic Liquid-Measuring Devices, Section T.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<b>8.1. The metering system is equipped with an effective air/vapor eliminator.</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<b>8.2. Other effective, automatic means are provided to prevent air/vapor from passing through the system. Describe the means provided and list this information on the Certificate of Conformance.</b>  	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<b>8.3. The vent lines are made of appropriate non-collapsible material to prevent the lines from being pinched closed and re-opened without being detected.</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

**Appendix D**  
**September 2018 NTEP Measuring Sector Meeting**

**Proposed Changes to NCWM Publication 14**  
**to Reflect Changes Adopted by the NCWM in July 2018**  
**Recorded Representations – Retail Motor-Fuel Dispensers (RMFDs)**

The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the Liquid-Measuring Devices Code in NIST Handbook 44 relative to including information to identify the dispenser used in a transaction on recorded representations issued by retail motor-fuel dispensers. For reference, see the Item LMD-2 on the NCWM S&T Committees 2018 Agenda.

Changes are proposed to Pub 14 (as shown further below in highlighted, marked text) in the following sections of the Liquid-Measuring Devices Checklist and Test Procedures:

- **Retail Motor-Fuel Dispensers** – Code Reference: S.1.6.7. Recorded Representations and S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided, Page LMD-39
- **Cash-Activated Retail Motor-Fuel Dispensers** – Code Reference: S.1.6.7. Recorded Representations and S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided, Page LMD-50
- **Card-Activated Retail Motor-Fuel Dispensers** - Code Reference: S.1.6.7. Recorded Representations and S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided, Page LMD-84

Changes are proposed to Pub 14 (as shown further below in highlighted, marked text) in the following sections of the Electronic Cash Registers Interfaced with Retail Motor-Fuel Dispenser, Console Controller, Point-of-Sale System Software Checklists and Test Procedures:

- Code Reference: S.1.6.7. Recorded Representations and S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided, Page ECRD-6

***NOTE: Individual checklist numbering may not match Publication 14 numbering due to automatic numbering features of MS Word. Page Numbers and beginning checklist item numbers are included in each section for reference.***

**Checklist and Test Procedures for Retail Motor-Fuel Dispensers**  
**Page LMD-39, Beginning with Checklist Item Numbered 7.41.**

**Code References: S.1.6.7. Recorded Representations; and S.1.6.8. Recorded Representations for Transaction Where a Post-Delivery Discount(s) is Provided.**

Except for fleet sales and other price contract sales, for transactions conducted with point-of-sale systems or devices activated by credit cards, debit cards, or cash, a printed receipt containing information about the transaction shall be available to the customer as outlined in the following items. A printed receipt must always be available to the customer upon request and printing of the receipt may be initiated at the option of the customer. In addition, some systems may be equipped with the capability to issue an electronic receipt; for those systems, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.). See also NCWM Publication 14, Code Reference: G-S.5.6. Recorded Representations.

**Appendix D – Recorded Representations, RMFDs - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4C**

Device capabilities: ☐ Printed Receipt ☐ Electronic Receipt

7.41. The system must provide a receipt to be made available to the customer at the completion of the transaction through either:

7.44.1. a built-in recording element OR ☐ Yes ☐ No ☐ N/A

7.44.2. a separate recording element that is part of the system ☐ Yes ☐ No ☐ N/A

7.42. Except for transactions where a post-delivery discount is provided, the customer receipt must contain the following information: ☒ Yes ☐ No ☐ N/A

7.42.1. ~~T~~he total volume of the delivery; ☐ Yes ☐ No ☐ N/A

7.42.2. ~~T~~he unit price; ☐ Yes ☐ No ☐ N/A

7.42.3. ~~T~~he total computed price; **and** ☐ Yes ☐ No ☐ N/A

7.42.4. ~~T~~he product identity by name, symbol, abbreviation, or code number; **and** ☐ Yes ☐ No ☐ N/A

**7.42.5. the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021).** ☐ Yes ☐ No ☐ N/A

7.43. Where a post-delivery discount(s) is applied, the sales receipt must provide: ☒ Yes ☐ No ☐ N/A

7.43.1. the product identity by name, symbol, abbreviation, or code number; ☐ Yes ☐ No ☐ N/A

7.43.2. the total quantity, unit price, and total computed price that were displayed on the dispenser at the end of the delivery prior to any post-delivery discount(s); ☐ Yes ☐ No ☐ N/A

7.43.3. an itemization of the post-delivery discounts to the unit price; **and** ☐ Yes ☐ No ☐ N/A

7.43.4. the final total price of each fuel sale after all post-delivery discounts are applied; **and** ☐ Yes ☐ No ☐ N/A

**7.43.5. the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021).** ☐ Yes ☐ No ☐ N/A

## Checklist and Test Procedures for Cash-Activated Retail Motor-Fuel Dispensers Page LMD-50, Beginning with Checklist Item Numbered 15.10.

**Code References: S.1.6.7. Recorded Representations; and S.1.6.8. Recorded Representations for Transaction Where a Post-Delivery Discount(s) is Provided.**

Except for fleet sales and other price contract sales, for transactions conducted with point-of-sale systems or devices activated by credit cards, debit cards, or cash, a printed receipt containing information about the transaction shall be available to the customer as outlined in the following items. A printed receipt must always be available to the customer upon request and printing of the receipt may be initiated at the option of the customer. In addition, some systems may be equipped with the capability to issue an electronic receipt; for those systems, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.). See also NCWM Publication 14, Code Reference: G-S.5.6. Recorded Representations.

Device capabilities: ☐ Printed Receipt ☐ Electronic Receipt

59.1. The system must provide a receipt to be made available to the customer at the completion of the transaction through either:

15.10.1. a built-in recording element OR ☐ Yes ☐ No ☐ N/A

15.10.2. a separate recording element that is part of the system ☐ Yes ☐ No ☐ N/A



**Appendix D – Recorded Representations, RMFDs - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4C**

- 59.2. Except for transactions where a post-delivery discount is provided, the customer receipt must contain the following information: ☐ ~~Yes~~ ☐ ~~No~~ ☐ ~~N/A~~
- total volume of the delivery; ☐ Yes ☐ No ☐ N/A
- unit price; ☐ Yes ☐ No ☐ N/A
- total computed price; **and** ☐ Yes ☐ No ☐ N/A
- product identity by name, symbol, abbreviation, or code number; **and** ☐ Yes ☐ No ☐ N/A
- dispenser designation by either and alpha or numerical description (effective as of January 1, 2021).** ☐ ~~Yes~~ ☐ ~~No~~ ☐ ~~N/A~~
- 59.3. Where a post-delivery discount(s) is applied, the sales receipt must provide: ☐ ~~Yes~~ ☐ ~~No~~ ☐ ~~N/A~~
- ~~The~~ the product identity by name, symbol, abbreviation, or code number; ☐ Yes ☐ No ☐ N/A
- the total quantity, unit price, and total computed price that were displayed on the dispenser at the end of the delivery prior to any post-delivery discount(s); ☐ Yes ☐ No ☐ N/A
- ization of the post-delivery discounts to the unit price; **and** ☐ Yes ☐ No ☐ N/A
- the final total price of each fuel sale after all post-delivery discounts are applied; ☐ Yes ☐ No ☐ N/A
- and**
- the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021).** ☐ ~~Yes~~ ☐ ~~No~~ ☐ ~~N/A~~
- 59.4. 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.
- 59.5. 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.
- 59.6. 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:
- 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.
- ds 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.)

## Checklist and Test Procedures for Card-Activated Retail Motor-Fuel Dispensers Page LMD-84, Beginning with Checklist Item Numbered 38.8.

### Code References: S.1.6.7. Recorded Representations; and S.1.6.8. Recorded Representations for Transaction Where a Post-Delivery Discount(s) is Provided.

Except for fleet sales and other price contract sales, for transactions conducted with point-of-sale systems or devices activated by credit cards, debit cards, or cash, a printed receipt containing information about the transaction shall be available to the customer as outlined in the following items. A printed receipt must always be available to the customer upon request and printing of the receipt may be initiated at the option of the customer. In addition, some systems may be equipped with the capability to issue an electronic receipt; for those systems, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.). See also NCWM Publication 14, Code Reference: G-S.5.6. Recorded Representations.

Device capabilities: ☐ Printed Receipt ☐ Electronic Receipt

33.1. The system must provide a receipt to be made available to the customer at the completion of the transaction through either:

- 33.1.1. a built-in recording element OR ☐ Yes ☐ No ☐ N/A  
33.1.2. a separate recording element that is part of the system ☐ Yes ☐ No ☐ N/A

33.2. Except for transactions where a post-delivery discount is provided, the customer receipt must contain the following information:

- 33.2.1. ~~T~~the total volume of the delivery; ☐ Yes ☐ No ☐ N/A  
33.2.2. ~~T~~the unit price; ☐ Yes ☐ No ☐ N/A  
33.2.3. ~~T~~the total computed price; ~~and~~ ☐ Yes ☐ No ☐ N/A  
33.2.4. ~~T~~the product identity by name, symbol, abbreviation, or code number; ~~and~~ ☐ Yes ☐ No ☐ N/A  
33.2.5. the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021). ☐ Yes ☐ No ☐ N/A

33.3. Where a post-delivery discount(s) is applied, the sales receipt must provide:

- 33.3.1. ~~T~~the product identity by name, symbol, abbreviation, or code number; ☐ Yes ☐ No ☐ N/A  
33.3.2. the total quantity, unit price, and total computed price that were displayed on the dispenser at the end of the delivery prior to any post-delivery discount(s); ☐ Yes ☐ No ☐ N/A  
33.3.3. an itemization of the post-delivery discounts to the unit price; and ☐ Yes ☐ No ☐ N/A  
33.3.4. the final total price of each fuel sale after all post-delivery discounts are applied; ~~and~~ ☐ Yes ☐ No ☐ N/A  
33.3.5. the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021). ☐ Yes ☐ No ☐ N/A

## Checklist and Test Procedures for Card-Activated Retail Motor-Fuel Dispensers

### Page LMD-84, Section 3.

### 3. Recorded Representations

**Code References:** S.1.6.7. Recorded Representations; and S.1.6.8. Recorded Representations for Transaction Where a Post-Delivery Discount(s) is Provided.

Except for fleet sales and other price contract sales, for transactions conducted with point-of-sale systems or devices activated by credit cards, debit cards, or cash, a printed receipt containing information about the transaction shall be available to the customer as outlined in the following items. A printed receipt must always be available to the customer upon request and printing of the receipt may be initiated at the option of the customer. In addition, some systems may be equipped with the capability to issue an electronic receipt; for those systems, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.).

Device capabilities: ☐ Printed Receipt ☐ Electronic Receipt

- 3.1. The system must provide a receipt to be made available to the customer at the completion of the transaction through either:
- 3.1.1. a built-in recording element OR ☐ Yes ☐ No ☐ N/A
  - 3.1.2. a separate recording element that is part of the system ☐ Yes ☐ No ☐ N/A
- 3.2. Except for transactions where a post-delivery discount is provided, the customer receipt must contain the following information:
- 3.2.1. ~~The~~ the total volume of the delivery; ☐ Yes ☐ No ☐ N/A
  - 3.2.2. ~~The~~ the unit price; ☐ Yes ☐ No ☐ N/A
  - 3.2.3. ~~The~~ the total computed price; **and** ☐ Yes ☐ No ☐ N/A
  - 3.2.4. ~~The~~ the product identity by name, symbol, abbreviation, or code number; **and** ☐ Yes ☐ No ☐ N/A
  - 3.2.5. **the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021).** ☒ Yes ☐ No ☐ N/A
- 3.3. Where a post-delivery discount(s) is applied, the sales receipt must provide.
- 3.3.1. ~~The~~ the product identity by name, symbol, abbreviation, or code number ☐ Yes ☐ No ☐ N/A
  - 3.3.2. ~~The~~ the total quantity, unit price, and total computed price that were displayed on the dispenser at the end of the delivery prior to any post-delivery discount(s); ☐ Yes ☐ No ☐ N/A
  - 3.3.3. **An** itemization of the post-delivery discounts to the unit price; **and** ☐ Yes ☐ No ☐ N/A
  - 3.3.4. ~~The~~ the final total price of each fuel sale after all post-delivery discounts are applied; **and** ☐ Yes ☐ No ☐ N/A
  - 3.3.5. **the dispenser designation by either and alpha or numerical description (effective as of January 1, 2021).** ☒ Yes ☐ No ☐ N/A
- 3.4. 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. ☒ Yes ☐ No ☐ N/A

**Appendix D – Recorded Representations, RMFDs - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4C**

- 3.5. 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
- 3.6. 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:
- 3.6.1. 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
- 3.6.2. 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
- 3.7. Each fuel delivery in a transaction for a single customer must be recorded separately. ☐ Yes ☐ No ☐ N/A
- 3.8. 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. See LMD Code S.1.6.4. ☐ Yes ☐ No ☐ N/A

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: NIST 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.*

- 3.9. 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

**Appendix E**  
**September 2018 NTEP Measuring Sector Meeting**

**Proposed Changes to NCWM Publication 14**  
**to Reflect Changes Adopted by the NCWM in July 2018**  
**Sealing – Water Meters**

The Sector is asked to consider recommending modifications to NCWM Publication 14 to reflect the changes to the Water Meters Code in NIST Handbook 44 to add specific criteria for sealing water meters and to align the sealing requirements with that of other measuring device codes in HB44. For reference, see the Item WTR-2 on the NCWM S&T Committees 2018 Agenda.

Changes are proposed to Pub 14 (as shown further below in highlighted, marked text) in the following sections of the Liquid-Measuring Devices Checklist and Test Procedures:

- **Additional Checklists and Test Procedures for Water Meters** – Code Reference: S.2.1. Provision for Sealing, Page LMD-92

Changes are also proposed to align the existing Code Reference S.2.1. Provision for Sealing with corresponding checklist items in other sections of the Liquid-Measuring Devices Checklist.

**Additional Checklists and Test Procedures for Water Meters**  
**Page LMD-92, Section 43.**

**43. Measuring Elements**

Code Reference: S.2.1. Provision for Sealing

**Measuring elements shall be designed with adequate provisions to prevent changes from being made to the measuring element or the flow rate control (if the flow rate control affects the accuracy of deliveries) without evidence of the change being made. These provisions can be an approved means of security (e.g., data change audit trail) or physically applying a security seal which must be broken before adjustments can be made. When applicable, the adjusting mechanism shall be readily accessible for the purposes of affixing a security seal.**

**43.1. Adequate provision shall be made for applying security seals in such a manner that no adjustment or interchange may be made of:**

**43.1.1. any measurement elements, AND**

☐ Yes ☐ No ☐ N/A

**43.1.2. any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries.**

☐ Yes ☐ No ☐ N/A

**43.1.3. The adjusting mechanism shall be readily accessible for purposes of affixing a security seal.**

☐ Yes ☐ No ☐ N/A

**43.1. A measuring element shall have provisions for either:**

**43.1.1. Applying a physical security seal. OR**

☐ Yes ☐ No ☐ N/A

**43.1.2. An approved means of security (e.g., data change audit trail) so that no changes may be made to its adjustable components.**

☐ Yes ☐ No ☐ N/A

**43.2. Any adjustable element controlling the delivery rate shall provide for sealing or other approved means of security (e.g., data audit trail) if the flow rate affects the accuracy of deliveries.**

☐ Yes ☐ No ☐ N/A

Appendix E – Sealing, Water Meters - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4D

43.3. When applicable, the adjusting mechanism shall be readily accessible for the purposes of affixing a security seal. ☐ Yes ☐ No ☐ N/A

43.4. Audit trails shall use the format set forth in the Common and General Code Criteria section of this checklist (Code Reference G-S.8) and in Appendix A, Philosophy for Sealing, and Appendix B, Requirements for Metrological Audit Trails. ☐ Yes ☐ No ☐ N/A

43.5. Water meters with remote configuration capabilities shall be sealed according to Appendix A, Philosophy for Sealing, and Appendix B, Requirements for Metrological Audit Trails (Table S.2.2.) and under the "Common and General Code Criteria" section of this checklist. ☐ Yes ☐ No ☐ N/A

43.6. A change to the adjustment of any measuring element shall be individually identified. ☐ Yes ☐ No ☐ N/A

*Note: Examples of acceptable identification of a change to the adjustment of a measuring element include but are not limited to:*

- a. A broken, missing, or replaced physical seal on an individual measuring element.
- b. A change in a calibration factor for each measuring element.
- c. Display of the date of or the number of days since the last calibration event for each measuring element.
- d. A counter indicating the number of calibration events per measuring element.

## Appendix F September 2018 NTEP Measuring Sector Meeting

### Power Loss - Proposed Changes to Align NCWM Pub 14 and HB 44

The Sector is asked to consider changes to the following sections of the NCWM Publication 14 Liquid-Measuring Devices Checklist to align requirements for Power Loss for retail motor-fuel applications with corresponding NIST Handbook 44 requirements. Changes are proposed (as shown further below in highlighted, marked text) in the following sections of the Liquid-Measuring Devices Checklist and Test Procedures:

- **Retail Motor-Fuel Dispensers (RMFDs)** – Code References S.1.6.2.1. and S.1.6.2.2. Provisions for Power Loss – Page LMD-37
- **Cash-Activated RMFDs** - S.1.6.2. Provisions for Power Loss – Page LMD-47
- **Liquefied Petroleum Gas (LPG) Liquid Measuring Devices** – Code Reference S.1.5.6. - Page LMD-68
- **Mass Flow Meters** - Code References S.2.4.1. and S.2.4.2. on Page LMD-76
- **Hydrogen Gas Measuring Devices** - Code Reference S.2.3. on Page LMD-100 and LMD-106
- **Field Evaluation & Permanence Tests - CNG Devices** - Code References S.2.4.1. and S.2.4.2. on Page LMD-123

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#### Liquid Measuring Devices – Checklists and Test Procedures for Retail Motor-Fuel Dispensers Excerpt – Page LMD-37

##### Code Reference: S.1.6.2.1. and S.1.6.2.2. Provisions for Power Loss

Even if power fails during a delivery, it is still necessary to correctly complete all transactions in progress at the time of the power failure. **Quantity and total sales price information necessary to complete a transaction in process (e.g., the quantity along with the total sales price and/or the unit price)** shall be recallable for at least 15 minutes after the power failure. The information may be recalled at the dispenser or at the console if the console indications are accessible to the customer. Operator information, such as fuel and money value totals, shall be retained in memory during a power failure. The operator information is not required to be recallable during the power failure, but shall be recallable after power is restored. Test to determine if the indications are accurate when the delivery is continued after a power failure.

*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, means (e.g., uninterruptible power supply or other means) must be provided to enable the transaction information to be recalled and verified for at least 15 minutes following a power outage.*

- 59.1. **The quantity and total sales price information needed to complete a transaction in progress such as the quantity along with the total sales price and/or the unit price** shall be recallable for 15 minutes after the power failure. ☐ Yes ☐ No ☐ N/A
- 59.2. **This information may be recalled at the dispenser or at the console, provided the console is accessible to the customer.** ☐ Yes ☐ No ☐ N/A
- 59.3. The quantity and total sales price values shall be correct if the power fails between deliveries. ☐ Yes ☐ No ☐ N/A
- 59.4. The quantity and total sales price values shall be correct if the delivery is continued after a power failure. ☐ Yes ☐ No ☐ N/A
- 59.5. The operator's information shall be retained in memory during a power failure. ☐ Yes ☐ No ☐ N/A

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

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**Liquid Measuring Devices – Checklists and Test Procedures  
for Cash-Activated Retail Motor Fuel Dispensers  
Excerpt – Page LMD-47**

**60. Code Reference: S.1.6.2. Provisions for Power Loss**

Even if power is interrupted during a delivery, it is still necessary to correctly complete all transactions in progress at the time of the power interruption. In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss **(such as the quantity and unit price, sales price, or amount of money already inserted into the cash acceptor)** shall be determinable for at least 15 minutes at the dispenser or at the console or journal printer if the console or journal printer is accessible to the customer.

All portions of the transaction must be accounted for in order to complete the transaction. This information **would** include the following: (1) the total amount of money that was inserted into the device prior to the power interruption, (2) the **amount/quantity** of product already dispensed **along with the total sales price and/or the unit price** (which should be available from the dispenser and which must comply with the requirements of S.1.6.2., (3) and any bill that has been inserted but has not yet been recognized by the cash acceptor.

*Note: For bills that have not yet been drawn into the cash acceptor to the point that the bill is no longer visible, it is assumed that the information on the bill denomination can be obtained from visual examination.*

Various methods may be used to recall specific portions of the transaction depending on how the basic system operates. For example, systems that can print a record of the amount fed into the machine as each bill is fed into the device maintain an ongoing record of bills recognized by the system. Other systems may not print a receipt until the end of the transaction, so the information is recalled on a journal printer accessible to the customer or can be recalled on the cash acceptor display.

Check to see what happens when the power is interrupted at different points of the transaction. Note what occurs at the points where power is interrupted, what information is provided to the customer on the receipt, audibly and visually in the form of instructions or error messages. Because systems may be installed with separate power lines to the console, card reader, and dispenser may be installed, tests should be run with power interruptions to different parts of the system to evaluate the potential for accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the delivery sequence.

- 60.1. Systems with Battery Back-up or Uninterruptible Power Supply or Equivalent - Some ☐ Yes ☐ No ☐ N/A systems are equipped with a battery back-up or an uninterruptible power supply (or equivalent) which allows a transaction to continue in the event of a power loss. For such systems, the transaction in progress at the time of a power interrupted must continue as if no power interruption had occurred (or comply with the requirements for systems not equipped with a battery back-up.) That is, all bills (including bills being fed into the device at the time of the power loss) must be correctly accounted for, and the quantity and total sale amounts must be mathematically correct. Check these systems by interrupting power at several points in the transaction to ensure that all information (total price, quantity, mathematical agreement, and total dollar amount inserted by the customer) is accounted for correctly.

**All Other Systems:** To check the operation of systems not equipped with a battery backup, uninterruptible power supply, or equivalent, interrupt power as described below. As noted earlier, if separate power lines supply different components in the system, interrupt power to different parts of the system.



**Appendix F - Power Loss - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4E**

- 60.2. When one or more bills has been accepted and registered by the device, but product has not yet been dispensed, at least one of the following criteria must be met to ensure that this information can be recalled in the event of a power interruption:
- 60.2.1. The denomination of the bill must be printed by the printer on the device as the device recognizes the bill. (The printed receipt must be available to the customer.) ☐ Yes ☐ No ☐ N/A
  - 60.2.2. The denomination of each bill must be printed by a journal or other printer accessible to the customer as each bill is recognized by the device. ☐ Yes ☐ No ☐ N/A
  - 60.2.3. The running total display must be capable of being recalled for at least 15 minutes. ☐ Yes ☐ No ☐ N/A
  - 60.2.4. Means provided to enable the customer to retrieve the money inserted into the device (e.g., a button which can be used during a power interruption to eject the money inserted by the customer.) ☐ Yes ☐ No ☐ N/A
  - 60.2.5. Other means used to provide a visual or printed record of the total amount of money accepted by the device. ☐ Yes ☐ No ☐ N/A
- 60.3. There is a brief period of time during which a bill has been accepted by the cash acceptor but has not yet been recognized by the device. The following criteria must be met to ensure that this information can be recalled in the event of a power failure.
- 60.3.1. Means provided to enable the attendant or customer to retrieve the bill (for example, a button which can be used during a power interruption to eject the bill or if the cash acceptor box can be removed by the attendant and the bill retrieved.) ☐ Yes ☐ No ☐ N/A

*Note: There may be a space of time in which a bill can be caught partially in and out of the cash acceptor during a power interruption. In such a case, if the denomination of the bill is visible to the customer and attendant, this is sufficient to provide information about the bill being fed into the device at the time of the power interruption. The cash acceptor must comply with the other applicable items noted above.*

It is expected that the retail motor fuel dispenser will comply with S.1.6.2. and the information on the product already dispensed can be recalled through this portion of the system.

- 60.4. **Power should be interrupted** **Interrupt power** at different points in the transaction to determine that all transaction information can be recalled **(either at the dispenser or at the console, provided the console is accessible to the customer)** in the event of a power interruption including combinations of the following:
- 60.4.1. After one bill has been inserted. ☐ Yes ☐ No ☐ N/A
  - 60.4.2. After several bills have been inserted. ☐ Yes ☐ No ☐ N/A
  - 60.4.3. While a bill is being inserted. ☐ Yes ☐ No ☐ N/A
  - 60.4.4. After a bill has been inserted but not yet recognized. ☐ Yes ☐ No ☐ N/A
  - 60.4.5. After a bill(s) has been inserted and recognized, but the on/off handle is still in the "off" position. ☐ Yes ☐ No ☐ N/A
  - 60.4.6. After a bill(s) has been inserted and recognized, the on/off handle is in the "on" position, but no product has been dispensed. ☐ Yes ☐ No ☐ N/A
  - 60.4.7. After a bill(s) has been inserted and recognized, the on/off handle is in the "on" position, and product is being dispensed. ☐ Yes ☐ No ☐ N/A

### Excerpt - Page LMD-68

#### Code Reference: S.1.5.6. Provisions for Power Loss

Even if power fails during a delivery, it is still necessary to correctly complete all transactions in progress at the time of the power failure. **Information needed to complete a transaction in progress, such as Quantity and along with total sales price and/or unit price** information shall be recallable for at least 15 minutes after the power failure. The information may be recalled at the dispenser or at the console if the console indications are accessible to the customer. Operator information, such as fuel and money value totals, shall be retained in memory during a power failure. The operator information is not required to be recallable during the power failure, but shall be recallable after power is restored. Test to determine if the indications are accurate when the delivery is continued after a power failure.

*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, means (e.g., uninterruptible power supply or other means) must be provided to enable the transaction information to be recalled and verified for at least 15 minutes following a power outage.*

- 28.6. **The quantity and total sales price Information needed to complete a transaction in progress such as the quantity along with the total sales price and/or the unit price** shall be recallable for 15 minutes after the power failure. ☐ Yes ☐ No ☐ N/A
- 28.7. **This information may be recalled at the dispenser or at the console, provided the console is accessible to the customer.** ☐ Yes ☐ No ☐ N/A
- 28.8. The quantity and total sales price values shall be correct if the power fails between deliveries. ☐ Yes ☐ No ☐ N/A
- 28.9. The quantity and total sales price values shall be correct if the delivery is continued after a power failure. ☐ Yes ☐ No ☐ N/A
- 28.10. The operator's information shall be retained in memory during a power failure. ☐ Yes ☐ No ☐ N/A
- 28.11. 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

In addition to the above criteria for power, loss, the following applies to evaluations of Cash-Activated LPG Retail Motor-Fuel Dispensers:

In addition to the above checklist complete those portions of Section 15. of LMD Checklist, Checklists and Test Procedures for Cash-Activated Retail Motor-Fuel Dispensers which relate to provisions for power loss.

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### Liquid Measuring Devices – Checklists and Test Procedures for Mass Flow Meters Excerpt – Page LMD-76

#### Code Reference: S.2.4.1. and S.2.4.2. Provisions for Power Loss

Even if power fails during a delivery, it is still necessary to correctly complete all transactions in progress at the time of the power failure. Quantity and total sales price information shall be recallable for at least 15 minutes after the power failure. The information may be recalled at the dispenser or at the console if the console indications are accessible to the customer. Operator information, such as fuel and money value totals, shall be retained in memory during a power failure. The operator information is not required to be recallable during the power failure, but shall be recallable after power is restored. Test to determine if the indications are accurate when the delivery is continued after a power failure.

- 32.23. ~~The quantity and total sales price~~ **Information needed to complete a transaction in progress such as the quantity along with the total sales price and/or the unit price** shall be recallable for 15 minutes after the power failure. ☐ Yes ☐ No ☐ N/A
- 32.24. **This information may be recalled at the dispenser or at the console, provided the console is accessible to the customer.** ☐ Yes ☐ No ☐ N/A
- 32.25. The quantity and total sales price values shall be correct if the power fails between deliveries. ☐ Yes ☐ No ☐ N/A
- 32.26. The quantity and total sales price values shall be correct if the delivery is continued after a power failure. ☐ Yes ☐ No ☐ N/A
- 32.27. The operator's information shall be retained in memory during a power failure. ☐ Yes ☐ No ☐ N/A
- 

**Liquid Measuring Devices – Additional Checklists and Test Procedures  
for Hydrogen Gas – Measuring Devices  
Excerpt – Page LMD-100 and LMD-106**

**Code Reference: S.2.3. Provisions for Power Loss and S.2.3.1. Transaction Information**

Even if power fails during a delivery, it is still necessary to correctly complete all transactions in progress at the time of the power failure. ~~Quantity and total sales price~~ **Information necessary to complete a transaction in process (e.g., the quantity along with the total sales price and/or the unit price)** shall be recallable for at least 15 minutes after the power failure. The information may be recalled at the dispenser or at the console if the console indications are accessible to the customer. Operator information, such as fuel and money value totals, shall be retained in memory during a power failure. The operator information is not required to be recallable during the power failure, but shall be recallable after power is restored. Test to determine if the indications are accurate when the delivery is continued after a power failure.

*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, means (e.g., uninterruptible power supply or other means) must be provided to enable the transaction information to be recalled and verified for at least 15 minutes following a power outage.*

**Code Reference: S.2.3.2. User Information**

- 33.1. ~~The quantity and total sales price~~ **Information needed to complete a transaction in progress such as the quantity along with the total sales price and/or the unit price** shall be recallable for 15 minutes after the power failure. ☐ Yes ☐ No ☐ N/A
- 33.2. **This information may be recalled at the dispenser or at the console, provided the console is accessible to the customer.** ☐ Yes ☐ No ☐ N/A
- 33.3. The quantity and total sales price values shall be correct if the power fails between deliveries. ☐ Yes ☐ No ☐ N/A
- 33.4. The quantity and total sales price values shall be correct if the delivery is continued after a power failure. ☐ Yes ☐ No ☐ N/A
- 33.5. The operator's information shall be retained in memory during a power failure. ☐ Yes ☐ No ☐ N/A
- 33.6. 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

Page LMD-106:

### 34. Cash Activated Hydrogen Gas-Measuring Devices

The following criteria and test procedures apply to cash-activated retail vehicle fuel dispensers. Tests using various denominations of bills accepted by the cash acceptor should be performed.

Certificates of Conformance will cover the use of the cash acceptor option at both attended and unattended stations. Cash Acceptors which are used at unattended locations must meet the marking requirements of paragraph G-UR.3.4. Responsibility, Money-Operated Devices shall be 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.

Even if power is interrupted during a delivery, it is still necessary to correctly complete all transactions in progress at the time of the power interruption. In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss ~~(such as the quantity and unit price, sales price, or amount of money already inserted into the cash acceptor)~~ shall be determinable for at least 15 minutes at the dispenser or at the console or journal printer if the console or journal printer is accessible to the customer.

All portions of the transaction must be accounted for in order to complete the transaction. This information includes the following: (1) the total amount of money that was inserted into the device prior to the power interruption, (2) the ~~amount~~quantity of product already dispensed ~~along with the total sales price and/or the unit price~~ (which should be available from the dispenser and which must comply with the requirements of S.2.3. Provision for Power Loss, ~~and~~ (3) ~~and~~ any bill that has been inserted but has not yet been recognized by the cash acceptor.

Note: For bills that have not yet been drawn into the cash acceptor to the point that the bill is no longer visible, it is assumed that the information on the bill denomination can be obtained from visual examination.

Various methods may be used to recall specific portions of the transaction depending on how the basic system operates. For example, systems that can print a record of the amount fed into the machine as each bill is fed into the device maintain an ongoing record of bills recognized by the system. Other systems may not print a receipt until the end of the transaction, so the information is recalled on a journal printer accessible to the customer or can be recalled on the cash acceptor display.

Check to see what happens when the power is interrupted at different points of the transaction. Note what occurs at the points where power is interrupted, what information is provided to the customer on the receipt, audibly and visually in the form of instructions or error messages. Because systems may be installed with separate power lines to the console, card reader, and dispenser may be installed, tests should be run with power interruptions to different parts of the system to evaluate the potential for accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the delivery sequence.

#### Code Reference: S.2.3. Provisions for Power Loss

- 34.1. Systems with Battery Back-up or Uninterruptible Power Supply or Equivalent - Some ☐ Yes ☐ No ☐ N/A  
systems are equipped with a battery back-up or an uninterruptible power supply (or equivalent) which allows a transaction to continue in the event of a power loss. For such systems, the transaction in progress at the time of a power interrupt must continue as if no power interruption had occurred (or comply with the requirements for systems not equipped with a battery back-up.) That is, all bills (including bills being fed into the device at the time of the power loss) must be correctly accounted for, and the quantity and total sale amounts must be mathematically correct. Check these systems by interrupting power at several points in the transaction to ensure that all information (total price, quantity, mathematical agreement, and total dollar amount inserted by the customer) is accounted for correctly.

#### All Other Systems:

To check the operation of systems not equipped with a battery backup, uninterruptible power supply, or equivalent, interrupt power as described below. As noted earlier, if separate power lines supply different components in the system, interrupt power to different parts of the system.

**Appendix F - Power Loss - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4E**

- 33.1. When one or more bills has been accepted and registered by the device, but product has not yet been dispensed, at least one of the following criteria must be met to ensure that this information can be recalled in the event of a power interruption:
- 33.2. When one or more bills has been accepted and registered by the device, but product has not yet been dispensed, at least one of the following criteria must be met to ensure that this information can be recalled in the event of a power interruption:
- 33.2.1. The denomination of the bill must be printed by the printer on the device as the device recognizes the bill. (The printed receipt must be available to the customer.) ☐ Yes ☐ No ☐ N/A
  - 33.2.2. The denomination of each bill must be printed by a journal or other printer accessible to the customer as each bill is recognized by the device. ☐ Yes ☐ No ☐ N/A
  - 33.2.3. The running total display must be capable of being recalled for at least 15 minutes. ☐ Yes ☐ No ☐ N/A
  - 33.2.4. Means provided to enable the customer to retrieve the money inserted into the device (e.g., a button which can be used during a power interruption to eject the money inserted by the customer.) ☐ Yes ☐ No ☐ N/A
  - 33.2.5. Other means used to provide a visual or printed record of the total amount of money accepted by the device. ☐ Yes ☐ No ☐ N/A
- 33.3. There is a brief period of time during which a bill has been accepted by the cash acceptor but has not yet been recognized by the device. The following criteria must be met to ensure that this information can be recalled in the event of a power failure.
- 33.3.1. Means provided to enable the attendant or customer to retrieve the bill (for example, a button which can be used during a power interruption to eject the bill or if the cash acceptor box can be removed by the attendant and the bill retrieved.) ☐ Yes ☐ No ☐ N/A

*Note: There may be a space of time in which a bill can be caught partially in and out of the cash acceptor during a power interruption. In such a case, if the denomination of the bill is visible to the customer and attendant, this is sufficient to provide information about the bill being fed into the device at the time of the power interruption. The cash acceptor must comply with the other applicable items noted above.*

*It is expected that the retail vehicle fuel dispenser will comply with paragraph S.2.3. Provision for Power Loss; and the information on the product already dispensed can be recalled through this portion of the system.*

- 33.4. **Power should be interrupted** **Interrupt power** at different points in the transaction to determine that all transaction information can be recalled **(either at the dispenser or at the console, provided the console is accessible to the customer)** in the event of a power interruption including combinations of the following:
- 33.4.1. After one bill has been inserted. ☐ Yes ☐ No ☐ N/A
  - 33.4.2. After several bills have been inserted. ☐ Yes ☐ No ☐ N/A
  - 33.4.3. While a bill is being inserted. ☐ Yes ☐ No ☐ N/A
  - 33.4.4. After a bill has been inserted but not yet recognized. ☐ Yes ☐ No ☐ N/A
  - 33.4.5. After a bill(s) has been inserted and recognized, but the on/off control is still in the "off" position. ☐ Yes ☐ No ☐ N/A
  - 33.4.6. After a bill(s) has been inserted and recognized, the on/off control is in the "on" position, but no product has been dispensed. ☐ Yes ☐ No ☐ N/A
  - 33.4.7. After a bill(s) has been inserted and recognized, the on/off control is in the "on" position, and product is being dispensed. ☐ Yes ☐ No ☐ N/A

**Appendix F - Power Loss - Proposed Changes to Pub 14  
2018 NTEP Measuring Sector Agenda-Item 4E**

## Liquid Measuring Devices – Field Evaluation and Permanence Tests for Metering Systems Excerpt – Page LMD-123

The Following Tests are Considered Appropriate for CNG Dispensers:

...

4. Power loss test. (Code References S.2.4.1. and S.2.4.2.)

- Transaction in progress at power loss, information shall be retainable for 15 minutes **at the dispenser or at the console, provided the console is accessible to the customer.**
- Device memory shall retain quantity of product and sales price during power loss.

**5. Other tasks.**

- Security seal--apply wire security seal to secure adjusting mechanism (if applicable.)
- (Code References G-UR.4.5. and S.3.5.)
- Note on the official report the number of gasoline gallon equivalents of product dispensed during the test.
- After all equipment at a location has been tested, review results to determine compliance with equipment maintenance and use of adjustments. (Code Reference G-UR.4.1. and G-UR.4.3.)

## Appendix G September 2018 NTEP Measuring Sector Meeting

### Items Under Consideration for 2019 NCWM S&T Committee Carryover and New Items For Measuring Sector Discussion as Time Allows

The “Additional Items as Time Allows” section of the 2018 NTEP Measuring Sector Agenda, includes “carryover” and “new” items which may appear on the 2019 NCWM S&T Committee’s Interim Agenda and which may be of interest to Measuring Sector members. To streamline the Sector’s agenda, the “Items Under Consideration” for these items are included in this Appendix. Numbering corresponds to the item numbers on the Sector’s Agenda. Additional details on carryover items can be found in Appendix A, Page S&T – A5 in the S&T Committee’s 2018 Interim Report found at: [http://www.ncwm.net/\\_resources/e30d:p74t7a-2qg/files/76035627zccf278df/\\_fn/4-ST-Web.pdf](http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/_fn/4-ST-Web.pdf)

#### 6. S&T 2018 Carryover Item VTM-1B – S.3.1.1. Diversion of Measured Liquid and UR.2.6. Clearing the Discharge Hose

**Items Under Consideration:** Modify paragraph S.3.1.1. as follows:

**S.3.1.1. Means for Clearing the Discharge Hose.** - Metering systems may be equipped with systems specifically designed to facilitate clearing of the discharge hose prior to delivery to avoid product contamination. In such systems, a valve to temporarily divert product from the measuring chamber of the meter to a storage tank, shall be installed only if:

- (a) The discharge hose remains of the wet hose type; and
- (b) the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use; and
- (c) the valve is permanently marked with its purpose (e.g., flush valve); and
- (d) the valve is installed in a conspicuous manner and as far from the hose reel as practical; and
- (e) the system clearly and automatically indicates the direction of product flow during operation of the flush system; and
- (f) clear means, such as an indicator light or audible alarm, is used to identify when the valve is in use on both quantity indications and any associated recorded representations (e.g., using such terms such as “flushing mode” or “not for commercial use); and
- (g) effective automatic means shall be provided to prevent passage of liquid through any such flush system during normal operation of the measuring system; and
- (h) no hoses or piping are connected to the inlet when it is not in use.

Add a new paragraph UR.2.6.1. as follows and renumber paragraph UR.2.6.1. (assuming new paragraph UR.2.6.1. is adopted as shown in Part 1 above) as follows:

#### UR.2.6. Clearing the Discharge Hose

**UR.2.6.1. Clearing the Discharge Hose, General.** - A manifold flush or similar system designed to assist in flushing product between deliveries is not to be used or operational during a commercial transaction. The inlet valves for the system are not to be connected to any hose or piping (dust covers are permitted) when not in use. When the flushing system is in operation, the discharge hose is only to be connected to the port for the product type being flushed from the discharge line. Following the flushing process, indications and recording elements must be reset to zero prior to beginning a commercial delivery.



(Added 20XX)

**UR.2.6.2.** Records. Whenever, prior to delivery, a different product is pumped through the discharge hose to avoid contamination, a record including the date, time, original product, new product and gallons pumped shall be maintained. These records shall be kept and available for inspection by weights and measures for a period of 12 months (Added 20XX)

## 8. S&T 2018 Carryover Items in Block 5 – Define Field Reference Standard

**Item under Consideration:** Amend paragraphs in the following codes and as shown in the table below.

B5: CLM-2	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: CDL-2	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: HGM-2	D	N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method
B5: OTH-4	D	Appendix D – Definitions: field reference standard meter and transfer standard

### **B5: CLM-2 D N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards**

Amend NIST Handbook 44, Cryogenic Liquid-Measuring Devices Code as follows:

**N.3.2. ~~Field Reference~~Transfer Standard ~~Meter~~ Test.** – When comparing a meter with a calibrated field reference~~transfer~~ standard meter, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate, and shall in no case be less than 180 L (50 gal) or equivalent thereof. When testing uncompensated volumetric meters in a continuous recycle mode, appropriate corrections shall be applied if product conditions are abnormally affected by this test mode.  
(Amended 1976 and 20XX)

**T.3. On Tests Using ~~Field Reference~~Transfer Standards ~~Meters~~.** – **To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable field reference~~transfer~~ standard meter when compared to a basic reference standard.** (Added 1976)

### **B5: CDL-2 D N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards**

Amend NIST Handbook 44, Carbon Dioxide Liquid-Measuring Devices Code as follows:

**N.3.2. ~~Field Reference~~Transfer Standard ~~Meter~~ Test.** – When comparing a meter with a calibrated field reference~~transfer~~ standard meter, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.  
**(Amended 20XX)**

**T.3. On Tests Using ~~Field Reference~~Transfer Standards ~~Meters~~.** – To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable field reference~~transfer~~ standard when compared to a basic field reference~~reference~~ standard meter.

**B5: HGM-2 D N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method**

Amend NIST Handbook 44, Hydrogen Gas-Measuring Devices Tentative Code as follows:

**N.4.1. ~~Field Reference~~Master Meter (Transfer) Standard ~~Meter~~ Test.** – When comparing a measuring system with a calibrated ~~field reference~~~~transfer~~ standard ~~meter~~, the minimum test shall be one test draft at the declared minimum measured quantity and one test draft at approximately ten times the minimum measured quantity or 1 kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed.

**(Amended 20XX)**

**T.4. Tolerance Application on Test Using ~~Field Reference~~Transfer Standard ~~Meters~~ Test Method.** – To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable ~~field reference~~~~transfer~~ standard ~~meter~~ when compared to a basic reference standard.

**B5: OTH-4 D Appendix D – Definitions: field reference standard meter and transfer standard**

Amend NIST Handbook 44, Appendix D as follows:

**field reference standard meter – A measurement system designed for use in proving and testing measuring devices and meters.**

~~transfer standard – A measurement system designed for use in proving and testing cryogenic liquid measuring devices.~~

**9. S&T 2018 Carryover Items in Block 7 – Address Devices and Systems Adjusted Using a Removable Digital Storage Device**

**Item under Consideration:** The Sector is asked to review and provide input on the following items under this block.

- B7: GEN-2 D G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage
- B7: LMD-1 D S.2.2. Provision for Sealing.
- B7: VTM-2 D S.2.2. Provision for Sealing.
- B7: LPG-2 D S.2.2. Provision for Sealing.
- B7: HGV-1 D S.2.2. Provision for Sealing.
- B7: CLM-4 D S.2.5. Provision for Sealing.
- B7: MLK-1 D S.2.3. Provision for Sealing.
- B7: WTR-1 D S.2.1. Provision for Sealing.
- B7: MFM-1 D S.3.5. Provision for Sealing.
- B7: CDL-4 D S.2.5. Provision for Sealing.
- B7: HGM-3 D S.3.3. Provision for Sealing.

**B7: GEN-2 D G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage**

**Item Under Consideration:** Modify the General Code as follows. Note this version of the proposed paragraph includes updates recommended by the submitter at the 2018 NCWM Annual Meeting in response to comments from industry and others.

**G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Device. - For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device\*, such as a secure digital (SD) card, USB flash drive, etc., security shall be provided for those parameters using either (1) an event logger in the device; or (2) a physical seal that must be broken in order to remove the digital storage device from the device (or system). If security is provided using an event logger, the event logger shall 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. In addition to providing a printed copy of the information, the information may be made 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.)**

**\*Applies only to removable digital storage devices that must remain in the device or system for it to be operational.**

**(Added 20XX)**

**B7: LMD-1 D S.2.2. Provision for Sealing.**

**Item Under Consideration:** Modify the Liquid Measuring Devices Code as follows.

**S.2.2. Provision for Sealing. – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange can be made of:

- (a) any measuring or indicating element;
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries; and
- (c) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

*[Audit trails shall use the format set forth in Table S.2.2.]\**

*[\*Nonretroactive and Enforceable as of January 1, 1995]*

(Amended 1991, 1993, 1995, 2006, and **20XX**)

**B7: VTM-2 D S.2.2. Provision for Sealing.**

**Item Under Consideration:** Modify the Vehicle Tank Meters Code as follows.

**S.2.2. Provision for Sealing. – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for**

**those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before a change or an adjustment or interchange may be made of:

- (a) any measuring or indicating element;
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries; and
- (c) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

*[Audit trails shall use the format set forth in Table S.2.2. Categories of Device and Methods Sealing.]\**

*[\*Nonretroactive as of January 1, 1995]*

(Amended 2006 **and 20XX**)

**B7: LPG-2     D     S.2.2. Provision for Sealing.**

**Item Under Consideration:** Modify the LPG and Anhydrous Ammonia Liquid-Measuring Devices Code as follows.

**S.2.2. Provision for Sealing. For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange may be made of:

- (a) any measuring or indicating element;
- (b) any adjustable element for controlling delivery rate, when such rate tends to affect the accuracy of deliveries; and
- (c) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

*[Audit trails shall use the format set forth in Table S.2.2. Categories of Device and Methods of Sealing.]\**

*[\*Nonretroactive as of January 1, 1995]*

(Amended 2006 **and 20XX**)

**B7: HGV-1     D     S.2.2. Provision for Sealing.**

**Item Under Consideration:** Modify the Hydrocarbon Gas Vapor-Measuring Devices Code as follows.

**S.2.2. Provision for Sealing.** For devices or systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:

Adequate provision shall be made for applying security seals in such a manner that no adjustment or interchange may be made of any measurement element.

**(Amended 20XX)**

**B7: CLM-4 D S.2.5. Provision for Sealing.**

**Item Under Consideration:** Modify Cryogenic Liquid-Measuring Devices Code as follows.

**S.2.5. Provision for Sealing.** – For devices or systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange may be made of:

- (a) any measuring or indicating element;
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries;
- (c) any automatic temperature or density compensating system; and
- (d) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable, any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

[Audit trails shall use the format set forth in Table S.2.5. Categories of Device and Methods of Sealing]\*[\*Nonretroactive as of January 1, 1995]

(Amended 2006 **and 20XX**)

**B7: MLK-1 D S.2.3. Provision for Sealing.**

**Item Under Consideration:** Modify Milk Meters Code as follows.

**S.2.3. Provision for Sealing.** – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange may be made of any:

- (a) measuring element or indicating element;
- (b) adjustable element for controlling delivery rate, when such rate tends to affect the accuracy of deliveries; and
- (c) metrological parameter that will affect the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

*[Audit trails shall use the format set forth in Table S.2.3. Categories of Device and Methods of Sealing]\**

*[\*Nonretroactive as of January 1, 1995]*

(Amended 2006 and 20XX)

**B7: WTR-1 D S.2.1. Provision for Sealing.**

**Item Under Consideration:** Modify Water Meters Code as follows.

**S.2.1. Provision for Sealing. – For devices or systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for applying security seals in such a manner that no adjustment or interchange may be made of:

- (a) any measurement elements; and
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries.

The adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

(Amended 20XX)

**B7: MFM-1 D S.3.5. Provision for Sealing.**

**Item Under Consideration:** Modify Mass Flow Meters Code as follows.

**S.3.5. Provision for Sealing. – For devices or systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment or interchange may be made of:

- (a) any measuring or indicating element;
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries;
- (c) the zero adjustment mechanism; and
- (d) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

*[Audit trails shall use the format set forth in Table S.3.5. Categories of Device and Methods of Sealing]\**

*[\*Nonretroactive as of January 1, 1995]*

(Amended 1992, 1995, 2006, and 20XX)

**B7: CDL-4 D S.2.5. Provision for Sealing.**

**Item Under Consideration:** Modify Carbon Dioxide Liquid-Measuring Devices Code as follows.

**S.2.5. Provision for Sealing. – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange may be made of:

- (a) any measuring or indicating element;
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries;
- (c) any automatic temperature or density compensating system; and
- (d) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

*[Audit trails shall use the format set forth in Table S.2.5. Provision for Sealing]\**

*[\*Nonretroactive as of January 1, 1995]*

(Amended 2006 **and 20XX**)

**B7: HGM-3 D S.3.3. Provision for Sealing.**

**Item Under Consideration:** Modify Hydrogen Gas-Measuring Devices Tentative Code as follows.

**S.3.3. Provision for Sealing. – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. For parameters adjusted using other means, the following applies:**

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment may be made of:

- (a) each individual measurement element;
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries;
- (c) the zero adjustment mechanism; and
- (d) any metrological parameter that detrimentally affects the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal. Audit trails shall use the format set forth in Table S.3.3. Categories of Device and Methods of Sealing.

**(Amended 20XX)**

**Appendix H**  
**September 2018**  
**NTEP Measuring Sector Meeting**

**New Proposals (Form 15's) Submitted to  
the NCWM S&T Committee  
for the 2019 NCWM Cycle**

**For Measuring Sector Discussion as Time Allows**

This Appendix Includes NCWM Form 15s with Proposals to the NCWM S&T Committee for the Following Items:

- Section 3.30 LMD Code – Airport Refueling Systems
- Section 3.30 LMD Code – Recognition of DEF and Other Products
- Section 3.37 MFM Code – Location of Marking Information RMFDs
- Section 3.37 MFM Code; Section 3.39 Hydrogen Gas-Measuring Devices Code; and 3.40 Electric Vehicle Fueling Systems Code – Automatic Timeout – RMFDs
- Section 3.37 MFM Code – Maximum Unit Size for DGE & Delete Reference to GLE
- Section 3.40 Electric Vehicle Fueling Systems Code – Definition – Power Factor



# Form 15: Proposal to Amend NIST Handbooks, Guidance Documents, NCWM Bylaws or NCWM Publication 14



DRAFT

**Submit proposals by September 1.** See meeting dates at [www.ncwm.net/meetings](http://www.ncwm.net/meetings). If the item is deemed by a region to have merit, that region will forward the item to NCWM for national consideration. See <http://www.ncwm.net/standards-development/idea> for more information on the Form 15 process. Submit in Microsoft Word Format to the NCWM Executive Director via email at [don.onwiler@ncwm.net](mailto:don.onwiler@ncwm.net) for review and dispersal to selected regions.

General Information			
<b>1. Date:</b> 08/22/2018		<b>2. Regional Association(s):</b> (Not applicable for proposals to the Board of Directors or NTEP Committee) <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input checked="" type="checkbox"/> Southern (SWMA) <input checked="" type="checkbox"/> Western (WWMA)	
<b>3. Standing Committee:</b> <input type="checkbox"/> Laws & Regulations <input checked="" type="checkbox"/> Specifications & Tolerances <input type="checkbox"/> Professional Development <input type="checkbox"/> Board of Directors <input type="checkbox"/> NTEP Committee			
<b>4. Submitter's Name:</b> Office of Weights and Measures (OWM)		<b>Submitter's Organization:</b> National Institute of Standards and Technology	
<b>5. Address:</b> 100 Bureau Drive.			
<b>6. City:</b> Gaithersburg		<b>7. State:</b> MD	<b>8. Zip Code:</b> 20899 <b>9. Country:</b> U.S.
<b>10. Phone Number:</b> 410-975-4405	<b>11. Fax Number:</b>		<b>12. Email Address:</b> Diane.lee@nist.gov
Proposal Information			
<b>13. Purpose:</b> Concise statement as to the intent or purpose of this proposal, such as problem being fixed. (Do not include justification here.) Modify the Liquid Measuring Devices Code to address self-service airport fueling dispensing systems equipped with a primary analog indicator and a separate card activated console with a printer that are used to fuel multiple tanks on aircrafts.			
<b>14. Document to be Amended:</b> <input checked="" type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input type="checkbox"/> NIST Handbook 133 <input type="checkbox"/> NCWM Guidance Document <input type="checkbox"/> NCWM Bylaws <input type="checkbox"/> NTEP Administrative Policy			
<b>15. Cite portion to be Amended:</b> Please file a separate Form 15 for each code, model law or regulation to be amended. Section: 3.30 Paragraph: Various paragraphs to include: G.S.5.2.2, S.1.6.3, S.2.5., and UR.3.1.			
<b>16. Proposal:</b> Please use <del>strikeout</del> to show words to be deleted and <u>underline</u> to show new words.  A specific proposal is not yet ready for consideration. This item is requested as a "Developing" item to allow an opportunity for the community to provide input on possible approaches that could be used to solve this problem. Details of the issue are provided in the "Justification" below.			
<b>17. Justification:</b> Please include national importance, background on the issue, and reference to supporting data or documents.  MN Weights and Measures informed NIST that, during an inspection prompted by a complaint of an overcharge, metering systems at a self-serve airport fueling facility failed to comply with NIST HB 44, Liquid Measuring Devices Code. Specifically, the systems did not comply with the following requirements in Handbook 44: <ul style="list-style-type: none"><li>• S.2.5</li><li>• UR.3.1, and</li><li>• G-S.5.2.2.2</li></ul> These systems consist of one or more stationary meters, each of which is equipped with an individual analog indicator to register the fuel as it is			

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delivered. These analog metering systems are interfaced with a central controller (typically located adjacent to the meters), which is used by the customer to activate an individual meter using a payment card such as a credit or debit card. The controller is also an indicator. After activating the transaction with a payment card, the customer delivers fuel using one of the individual metering systems interfaced to the controller. Each metering system is equipped with a mechanical reset, which is used by the customer to return the indications to a zero condition prior to delivery. Typically, customers will fill one receiving tank on an airplane and then, prior to filling the next tank on the plane, will use this reset feature to reset the indications to zero. This resetting action is not tracked by the controller.

When the customer is finished delivering product to all receiving tanks, he or she prints a receipt using the controller. The controller is not capable of **indicating** the quantity for either individual drafts or the total quantity delivered over the course of the transaction. The controller is not capable of **printing** the quantity for **individual** drafts; however, it does **print** the **total** quantity delivered over the course of the transaction and it calculates a total sale amount based on this quantity and a preprogrammed unit price. As a result, at the end of a delivery, if the customer has reset the analog meter indications during the course of the total delivery, the indicated quantity on the meter does not agree with the total quantity printed on the receipt.

After MN W&M rejected one of these systems for failing to comply with the provisions of NIST Handbook 44, the MN Department of Transportation (DOT) contacted both MN Weights and Measures (W&M) and NIST, OWM to ask for assistance in addressing these systems. Numerous systems of this type were installed as part of a grant to establish a network of fueling points across a geographic area. A key purpose was to provide a safety net, which allows pilots to more readily access fueling points in the event of low fuel. Thus, the operation of these systems represents a significant safety issue. Changes to these systems to gain compliance could prove so costly as to result in closure of many of these sites. Having just become aware of the requirements in HB 44 after the action by MN, MN DOT asked for assistance in developing proposed changes to HB 44 which might allow these systems to continue to operate.

MN DOT, MN Weights and Measures and OWM held a teleconference to review the requirements of Handbook 44 and the impact on these devices and agreed that a proposal with a developing status should be drafted and submitted for discussion at the 2018-2019 Regional meetings and the NCWM Interim meeting. OWM agreed to champion the item in its developing stage to help gather input which will help develop proposed changes to HB 44 that will best meet the needs of the community. A key goal is to identify requirements for how such systems need to operate to provide clear and transparent transaction information, without interrupting the service needed by consumers. A possible approach is to develop nonretroactive requirements which will apply to new systems and develop other requirements which will help existing systems move closer to compliance without significant cost or interruption to service.

In its review of this issue, NIST identified multiple other paragraphs in H44 which need to be considered as this proposal is developed. These include:

- G.S.2.
- S.1.6.3.
- S.1.6.5.6. (a)
- S..1.6.10.

NIST is still discussing options for these changes and are specifically discussing how to address systems currently in use and systems installed after a specific date. NIST, OWM has not developed a specific proposal, but wants to begin sharing this situation with officials, manufacturers, and users and allow an opportunity for input and discussion, beginning with the regional weights and measures associations and industry groups such as the Meter Manufacturers Association.

Plans are to have MN DOT available to provide information, and possibly a short presentation, on these devices at some of the Regional Weights and Measures Association meetings and/or the NCWM Interim Meeting. OWM's initial thoughts are to provide requirements such that:

- (1) Indicated and recorded representations are able to display quantity of individual drafts and the total quantity dispensed for the transaction and each clearly identified (e.g., "draft 1", "draft 2," "draft 3," etc. along with "total quantity."
- (2) Permit use in self-serve operations.
- (3) Include individual and totalized displays which are visible to the customer during the transaction.
- (4) Ensure clear instructions are provided (possibly elaborating on current instructions).
- (5) Ensure agreement between printed ticket and primary indicator.
- (6) Ensure quantities are appropriately identified (e.g., "total quantity" vs. "draft 1").

In addition, consideration might be given to applying all these requirements to new systems while allowing current systems to only meet some of them (e.g., items 2, 3, and 4,) or to be given an extended time frame after which they must meet all requirements.

This could be done with a combination of nonretroactive and retroactive requirements.

**18. Possible Opposing Argument's:** Please demonstrate that you are aware and have considered possible opposition.

The State of Minnesota inspected these systems because of a complaint from a customer who stated that 8 gallons of fuel was purchased but he was charged for 12 gallons. Allowing continued operation without changes to the systems or which exempt them from all current requirements for agreement and clarity might result in additional complaints and customer confusion and, thus may lead to possible safety concerns.

Providing exemptions to current requirements for these systems may be perceived as unfair treatment to other systems used in similar applications. For example, retail motor-fuel dispensers in a service station interfaced with a console/controller; vehicle-mounted metering systems interfaced with a controller, and loading-rack metering systems interfaced with a centralized controller.

Pilots represented by the Aircraft Owners and Pilot Associations(AOPA), State Aviation Administrations, FAA, Operators of small regional airports, particularly businesses, do not necessarily oppose the requirements of NIST Handbook 44 or good measurement practices, but they are very concerned that the cost of any corrections should not be so large that it forces small airports to abandon fueling services thereby threatening the network of regional airports which support small aircraft. These airports provide a safety net in case of emergencies. Additionally, for physical and environmental safety, having aviation fuel stored and dispensed through a central service at small airports is preferable to pilots bringing fuel into airports or storing it in their hangars.

**19. Requested Action if Considered for NCWM Agenda:**

☐ Voting Item ☒ Developing Item ☐ Informational Item ☐ Other (Please Describe):

**20. List of Attachments:**

# Form 15: Proposal to Amend NIST Handbooks, Guidance Documents, NCWM Bylaws or NCWM Publication 14



Submit proposals by **September 1**. See meeting dates at [www.ncwm.net/meetings](http://www.ncwm.net/meetings). If the item is deemed by a region to have merit, that region will forward the item to NCWM for national consideration. See <http://www.ncwm.net/standards-development/idea> for more information on the Form 15 process. Submit in Microsoft Word Format to the NCWM Executive Director via email at [don.onwiler@ncwm.net](mailto:don.onwiler@ncwm.net) for review and dispersal to selected regions.

General Information			
<b>1. Date:</b> 8-24-2018		<b>2. Regional Association(s):</b> (Not applicable for proposals to the Board of Directors or NTEP Committee) <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input checked="" type="checkbox"/> Southern (SWMA) <input checked="" type="checkbox"/> Western (WWMA)	
<b>3. Standing Committee:</b> <input type="checkbox"/> Laws & Regulations <input checked="" type="checkbox"/> Specifications & Tolerances <input type="checkbox"/> Professional Development <input type="checkbox"/> Board of Directors <input type="checkbox"/> NTEP Committee			
<b>4. Submitter's Name:</b> G. Diane Lee/Tina Butcher		<b>Submitter's Organization:</b> NIST, Office of Weights and Measures	
<b>5. Address:</b> 100 Bureau Drive			
<b>6. City:</b> Gaithersburg		<b>7. State:</b> MD	<b>8. Zip Code:</b> 20899 <b>9. Country:</b> U.S.
<b>10. Phone Number:</b> 301-975-4405 / 301-975-2196	<b>11. Fax Number:</b> 301-975-8001		<b>12. Email Address:</b> <a href="mailto:diane.lee@nist.gov">diane.lee@nist.gov</a> / <a href="mailto:tina.butcher@nist.gov">tina.butcher@nist.gov</a>
Proposal Information			
<b>13. Purpose:</b> Concise statement as to the intent or purpose of this proposal, such as problem being fixed. (Do not include justification here.) Modify the Liquid Measuring Devices Code to adequately address requirements for retail liquid measuring devices that measure DEF and other products.			
<b>14. Document to be Amended:</b> <input checked="" type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input type="checkbox"/> NIST Handbook 133 <input type="checkbox"/> NCWM Guidance Document <input type="checkbox"/> NCWM Bylaws <input type="checkbox"/> NTEP Administrative Policy			
<b>15. Cite portion to be Amended:</b> Please file a separate Form 15 for each code, model law or regulation to be amended. Section: 3.30 Paragraphs: A.1., S.1.6.10, S.2.5., S.4.4.1, S.4.4.2, S.5, N.4.2.2., UR.2.4, UR.3.5.			
<b>16. Proposal:</b> Please use <del>strikeout</del> to show words to be deleted and <u>underline</u> to show new words.  Modify the Liquid Measuring Devices (LMD) Code as follows:  <b>A.1. General.</b> – This code applies to:  (a) devices used for the measurement of liquids, <del>including liquid fuels and lubricants</del> , and (b) wholesale devices used for the measurement and delivery of agri-chemical liquids such as fertilizers, feeds, herbicides, pesticides, insecticides, fungicides, and defoliantes. (Added 1985)  <i>S.1.6.10. Automatic Timeout – Pay-At-Pump <u>for Retail Motor-Fuel Devices</u>.</i> – Once a device has been authorized, it must de-authorize within two minutes if not activated. Re-authorization of the device must be performed before any product can be dispensed. If the time limit to de-authorize the device is programmable, it shall not accept an entry greater than two minutes [Nonretroactive as of January 1, 2017] (Added 2016) ( <u>Amended 20XX</u> )  <b>S.2.5. Zero-Set-Back Interlock, <u>for Retail Motor-Fuel Devices</u>.</b> – A device shall be constructed so that:			

- (a) 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, and recording elements if the device is equipped and activated to record, have been returned to their zero positions;
- (b) the discharge nozzle cannot be returned to its designed hanging position (that is, any position where the tip of the nozzle is placed in its designed receptacle and the lock can be inserted) until the starting lever is in its designed shut-off position and the zero-set-back interlock has been engaged; and
- (c) in a system with more than one dispenser supplied by a single pump, an effective automatic control valve in each dispenser prevents product from being delivered until the indicating elements on that dispenser are in a correct zero position.

(Amended 1981~~and~~ 1985, and 20XX)

**S.4.4.1. Discharge Rates.** – *On a retail device with a designed maximum discharge rate of 115 L (30 gal) per minute or greater, the maximum and minimum discharge rates shall be marked in accordance with S.4.4.2. Location of Marking Information; Retail ~~Motor-Fuel~~ Dispensers. The marked minimum discharge rate shall not exceed 20 % of the marked maximum discharge rate.*

*[Nonretroactive as of January 1, 1985]*

(Added 1984) (Amended 2003 and 20XX)

**S.4.4.2. Location of Marking Information; for Retail ~~Motor-Fuel~~ Dispensers.** – *The marking information required in the General Code, paragraph G-S.1. Identification shall appear as follows:*

- (a) *within 60 cm (24 in) to 150 cm (60 in) from the base of the dispenser for system in a dispenser;*
- (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.*

*[Nonretroactive as of January 1, 2003]*

(Added 2002) (Amended 2004 and 20XX)

**S.5. Totalizers for Retail ~~Motor-Fuel~~ Dispensers.** – *Retail ~~motor-fuel~~ dispensers shall be equipped with a non-resettable totalizer for the quantity delivered through the metering device.*

*[Nonretroactive as of January 1, 1995]*

(Added 1993) (Amended 1994 and 20XX)

#### **N.4.2.2. Retail Motor-Fuel and DEF Devices.**

- (a) Devices without a marked minimum flow-rate shall have a “special” test performed at the slower of the following rates:
  - (1) 19 L (5 gal) per minute; or

(2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.

(b) Devices with a marked minimum flow-rate shall have a “special” test performed at or near the marked minimum flow rate.

(Added 1984) (Amended 2005 and 20XX)

**UR.2.4. Diversion of Liquid Flow.** – A ~~motor-fuel~~ device equipped with two delivery outlets used exclusively in the fueling of trucks shall be so installed that any diversion of flow to other than the receiving vehicle cannot be readily accomplished and is readily apparent. Allowable deterrents include, but are not limited to, physical barriers to adjacent driveways, visible valves, or lighting systems that indicate which outlets are in operation, and explanatory signs.

(Amended 1991 and 20XX)

**UR.2.5. Product Storage Identification.**

(a) The fill connection for any petroleum product or other product storage tank or vessel supplying petroleum product or other products ~~motor-fuel devices~~ shall be permanently, plainly, and visibly marked as to product contained.

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(Added 1975) (Amended 1976, and 20XX)

**17. Justification:** Please include national importance, background on the issue, and reference to supporting data or documents.

Diesel exhaust fluid (DEF) is a solution of urea and deionized water. It is used as an additive to diesel exhaust systems to lower the Nitrous Oxide (NOx) concentration in the diesel exhaust emissions from diesel engines. It is sold as a packaged product or dispensed using a liquid-measuring system. When sold in direct sales to retail customers, it is often dispensed directly into the customer’s vehicle using a liquid-measuring device or system similar to or identical in design to a retail motor-fuel dispenser and in the same type of retail environment. The LMD Code includes a number of paragraphs designed to help ensure transparency in transactions and deter facilitation of fraud in the retail environment. However, many of these paragraphs are currently limited to retail “motor-fuel” applications and DEF is not a motor fuel.

These paragraphs in the LMD Code that specifically apply to retail *motor-fuel* devices, should also apply to DEF and possibly other retail liquid measuring devices that measure products other than motor fuels. The NCWM has already recognized that requirements designed to ensure measurement accuracy and transparency shouldn’t be limited to motor-fuel applications only and similar proposals to extend some of these requirements (e.g., zero-setback interlock and timeout features) to devices in other codes have already been adopted or are being considered by the NCWM for other retail measuring applications. As such, appropriate sections of the LMD Code must be modified so that these requirements are not restricted to devices that measure motor fuel.

**18. Possible Opposing Argument’s:** Please demonstrate that you are aware and have considered possible opposition.

Many DEF dispensing applications use the same type of dispensing systems as do retail motor-fuel applications and, thus, may already comply with the proposed changes. However, there may be other types of DEF measuring systems which do not currently comply with the proposed changes. [NOTE: Information regarding this question will likely emerge during the vetting of the initial proposal and can be updated at that point. Additional concerns may also emerge during the vetting process and need to be included in this section.]

**19. Requested Action if Considered for NCWM Agenda:**

☐ Voting Item ☒ Developing Item ☐ Informational Item ☐ Other (Please Describe):

**20. List of Attachments:**

**None**

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General Information			
<b>1. Date:</b> 08/30/18		<b>2. Regional Association(s):</b> (Not applicable for proposals to the Board of Directors or NTEP Committee) <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input checked="" type="checkbox"/> Southern (SWMA) <input checked="" type="checkbox"/> Western (WWMA)	
<b>3. Standing Committee:</b> <input type="checkbox"/> Laws & Regulations <input checked="" type="checkbox"/> Specifications & Tolerances <input type="checkbox"/> Professional Development <input type="checkbox"/> Board of Directors <input type="checkbox"/> NTEP Committee			
<b>4. Submitter's Name:</b> Juana Williams		<b>Submitter's Organization:</b> NIST Office of Weights & Measures (OWM)	
<b>5. Address:</b> 100 Bureau Dr. MS2600			
<b>6. City:</b> Gaithersburg		<b>7. State:</b> MD	<b>8. Zip Code:</b> 20899
<b>9. Country:</b> USA			
<b>10. Phone Number:</b> 301-975-3989		<b>11. Fax Number:</b> 301-975-8091	
<b>12. Email Address:</b> juana.williams@nist.gov			
Proposal Information			
<b>13. Purpose:</b> Concise statement as to the intent or purpose of this proposal, such as problem being fixed. (Do not include justification here.): Extend the NIST Handbook 44 Mass Flow Meters Code provision allowing the use of a key or tool for accessing internal required markings for <i>liquid</i> retail motor-fuel dispensers to include retail motor-fuel dispensers delivering <i>compressed gases</i> .			
<b>14. Document to be Amended:</b> <input checked="" type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input type="checkbox"/> NIST Handbook 133 <input type="checkbox"/> NCWM Guidance Document <input type="checkbox"/> NCWM Bylaws <input type="checkbox"/> NTEP Administrative Policy			
<b>15. Cite portion to be Amended:</b> Please file a separate Form 15 for each code, model law or regulation to be amended. Section: 3.37. Mass Flow Meters Code Paragraph: S.5.1. Location of Marking Information; Retail Motor-Fuel Dispenser; Note			
<b>16. Proposal:</b> Please use <del>strikeout</del> to show words to be deleted and <u>underline</u> to show new words. <b>S.5.1. <u>Location of Marking Information; Retail Motor-Fuel Dispensers.</u></b> – <i>The marking information required in General Code, paragraph G-S.1. Identification shall appear as follows:</i>  (a) <i>within 60 cm (24 in) to 150 cm (60 in) from the base of the dispenser;</i>  (b) <i>either internally and/or externally provided the information is permanent and easily read; and</i>  (c) <i>on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).</i>  <b>Note:</b> <i>The use of a dispenser key or tool to access internal marking information is permitted for retail liquid <u>and compressed gas</u>-measuring devices.</i> <i>[Nonretroactive as of January 1, 2003]</i> <i>(Added 2006) (<b>Amended 2019</b>)</i>			



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**17. Justification:** Please include national importance, background on the issue, and reference to supporting data or documents.

General Code paragraph G-S.1. Identification specifies that required markings must be visible after installation. A provision in the Liquid-Measuring Devices Code provides an exception that permits the use of a dispenser key or tool to access internal marking information. This provision was extended to the LPG and Anhydrous Ammonia Liquid-Measuring Devices Code and the Mass Flow Meters (MFM) Code in 2005. However, as currently written, the corresponding paragraph in the MFM Code appears to restrict this provision to only “liquid” retail dispenser fueling applications. The intent of the proposed modification is to permit the exception to include dispensers used to deliver compressed natural gas (CNG).

**18. Possible Opposing Argument’s:** Please demonstrate that you are aware and have considered possible opposition.

None identified at this time. While it is possible that the exception was intentionally limited to liquid fuels in the MFM Code, there is no evidence of this in the background and history. The 2005 action to extend this exception to other measuring codes was intended to align requirements for all retail vehicle fueling applications.

**19. Requested Action if Considered for NCWM Agenda:**

☒ Voting Item    ☐ Developing Item    ☐ Informational Item    ☐ Other (Please Describe):

**20. List of Attachments:**

N/A

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<b>3. Standing Committee:</b> <input type="checkbox"/> Laws & Regulations <input checked="" type="checkbox"/> Specifications & Tolerances <input type="checkbox"/> Professional Development <input type="checkbox"/> Board of Directors <input type="checkbox"/> NTEP Committee				
<b>4. Submitter's Name:</b> Juana Williams		<b>Submitter's Organization:</b> NIST Off. of Wgts. & Meas. (OWM)		
<b>5. Address:</b> 100 Bureau Dr. MS2600				
<b>6. City:</b> Gaithersburg		<b>7. State:</b> MD	<b>8. Zip Code:</b> 20899	<b>9. Country:</b> USA
<b>10. Phone Number:</b> 301-975-3989		<b>11. Fax Number:</b> 301-975-8091		<b>12. Email Address:</b> <a href="mailto:juana.williams@nist.gov">juana.williams@nist.gov</a>
Proposal Information				
<b>13. Purpose:</b> Concise statement as to the intent or purpose of this proposal, such as problem being fixed. (Do not include justification here.) To prevent the facilitation of fraud on a vehicle fueling system equipped with the capability for authorization of a transaction by a credit card, debit card, or cash.				
<b>14. Document to be Amended:</b> <input checked="" type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input type="checkbox"/> NIST Handbook 133 <input type="checkbox"/> NCWM Guidance Document <input type="checkbox"/> NCWM Bylaws <input type="checkbox"/> NTEP Administrative Policy				
<b>15. Cite portion to be Amended:</b> Please file a separate Form 15 for each code, model law or regulation to be amended.				
Section: 3.37 Mass Flow Meters Paragraph: New paragraph S.2.9. Automatic Timeout – Pay-At-Retail Motor-Fuel Devices Section: 3.39 Hydrogen Gas-Measuring Devices – Tentative Code Paragraph: New paragraph S.2.8. Automatic Timeout – Pay-At-Vehicle Fuel Dispensers Section: 3.40. Electric Vehicle Fueling Systems – Tentative Code Paragraph: New paragraph S.2.8. Automatic Timeout – Pay-At-EVSE				

**16. Proposal:** Please use ~~strikeout~~ to show words to be deleted and underline to show new words.

**Section: 3.37 Mass Flow Meters**

**S.2.8. Automatic Timeout – Pay-At-Retail Motor-Fuel Devices.** – Once a retail motor-fuel device has been authorized, it must de-authorize within two minutes if not activated. Re-authorization of the retail motor-fuel device must be performed before product is delivered. If the time limit to de-authorize the retail motor-fuel device is programmable, it shall not accept an entry greater than two minutes.

[Nonretroactive as of January 1, 2020]

(Added 2019)

**Section: 3.39 Hydrogen Gas-Measuring Devices – Tentative Code**

**S.2.8. Automatic Timeout – Pay-At-Vehicle Fuel Dispensers.** – Once a vehicle fuel dispenser has been authorized, it must de-authorize within two minutes if not activated. Re-authorization of the vehicle fuel dispenser must be performed before any product is delivered. If the time limit to de-authorize the vehicle fuel dispenser is programmable, it shall not accept an entry greater than two minutes.

[Nonretroactive as of January 1, 2020]

(Added 2019)

**Section: 3.40. Electric Vehicle Fueling Systems – Tentative Code**

**S.2.8. Automatic Timeout – Pay-At-EVSE.** – Once an EVSE has been authorized, it must de-authorize within two minutes if not activated. Re-authorization of the EVSE must be performed before any electrical energy is delivered and/or timing charges assessed. If the time limit to de-authorize the EVSE is programmable, it shall not accept an entry greater than two minutes.

[Nonretroactive as of January 1, 2020]

(Added 2019)

**17. Justification:** Please include national importance, background on the issue, and reference to supporting data or documents.

There is great concern about the proper operation of fueling systems when customers use payment cards (e.g., credit and debit) to purchase fuel and the potential for accidental or intentional fraud created by the use of this payment feature. General Code paragraph G-S.2. Facilitation of Fraud can be applied to the use of these features; however, the proposed paragraph provides more specific guidance to manufacturers, regulatory officials, and users about how this transaction feature needs to operate.

The proposed paragraph draws on interpretations and procedures used in NTEP evaluations and laid out in the NCWM Publication 14 checklists and test procedures. Although device specific design requirements for this feature are not part of NIST Handbook (HB) 44 Sections: 3.37 Mass Flow Meters Code; 3.39 Hydrogen Gas-Measuring Devices – Tentative Code; and 3.40 Electric Vehicle Fueling Systems – Tentative Code, NTEP has evaluated this feature based on interpretations of General Code, paragraph G-S.2. Facilitation of Fraud for a number of years. Although this proposal is for a nonretroactive requirement with a January 1, 2020 enforcement date; General Code paragraph G-S.2 will continue to apply to all devices, and the proposed new device specific code paragraphs will more clearly spell out options for avoiding fraudulent use of the card authorization feature for devices manufactured after the effective date.

This proposal will also align language in Sections 3.37, 3.39, and 3.40 with a time-out feature requirement that was added to the HB 44 Section 3.30 Liquid-Measuring Devices Code in 2016. A similar requirement is also included in the Vehicle-Tank Meters Code that requires an automatic end to a transaction after a specified period of inactivity (no product flow) during individual deliveries.

**18. Possible Opposing Argument's:** Please demonstrate that you are aware and have considered possible opposition.

Other communication devices such as cell phones may be available for activation of the transaction that were not included in the proposal. This proposal is intended to more thoroughly address any card and cash activated fueling systems since this feature is already in the marketplace. The community may need additional time to assess the capabilities and operation of other technologies being used for transaction activation to ensure a full understanding of its operation and to be able to arrive at a strategy to address these next generation device features.

**19. Requested Action if Considered for NCWM Agenda:**

☒ Voting Item   ☐ Developing Item   ☐ Informational Item   ☐ Other (Please Describe):

**20. List of Attachments:** N/A

# Form 15: Proposal to Amend NIST Handbooks, Guidance Documents, NCWM Bylaws or NCWM Publication 14



Submit proposals by **September 1**. See meeting dates at [www.ncwm.net/meetings](http://www.ncwm.net/meetings). If the item is deemed by a region to have merit, that region will forward the item to NCWM for national consideration. See <http://www.ncwm.net/standards-development/idea> for more information on the Form 15 process. Submit in Microsoft Word Format to the NCWM Executive Director via email at [don.onwiler@ncwm.net](mailto:don.onwiler@ncwm.net) for review and dispersal to selected regions.

General Information			
<b>1. Date:</b> 08/30/18		<b>2. Regional Association(s):</b> (Not applicable for proposals to the Board of Directors or NTEP Committee) <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input checked="" type="checkbox"/> Southern (SWMA) <input checked="" type="checkbox"/> Western (WWMA)	
<b>3. Standing Committee:</b> <input type="checkbox"/> Laws & Regulations <input checked="" type="checkbox"/> Specifications & Tolerances <input type="checkbox"/> Professional Development <input type="checkbox"/> Board of Directors <input type="checkbox"/> NTEP Committee			
<b>4. Submitter's Name:</b> Juana Williams		<b>Submitter's Organization:</b> NIST Office of Weights & Measures (OWM)	
<b>5. Address:</b> 100 Bureau Dr. MS2600			
<b>6. City:</b> Gaithersburg		<b>7. State:</b> MD	<b>8. Zip Code:</b> 20899
		<b>9. Country:</b> USA	
<b>10. Phone Number:</b> 301-975-3989	<b>11. Fax Number:</b> 301-975-8091	<b>12. Email Address:</b> juana.williams@nist.gov	
Proposal Information			
<b>13. Purpose:</b> Concise statement as to the intent or purpose of this proposal, such as problem being fixed. (Do not include justification here.) Delete the reference to "gasoline liter equivalent (GLE)" since that term that was removed from all Mass Flow Meters Code requirements in 2016. Clarify and limit the maximum value of the quantity division for indicated and recorded deliveries in the diesel gallon equivalent (DGE) to an increment of 0.001.			
<b>14. Document to be Amended:</b> <input checked="" type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input type="checkbox"/> NIST Handbook 133 <input type="checkbox"/> NCWM Guidance Document <input type="checkbox"/> NCWM Bylaws <input type="checkbox"/> NTEP Administrative Policy			
<b>15. Cite portion to be Amended:</b> Please file a separate Form 15 for each code, model law or regulation to be amended. Section: 3.37. Mass Flow Meters Code Paragraph: S.1.3.3.(b) Maximum Value of Quantity-Value Divisions.			
<b>16. Proposal:</b> Please use <del>strikeout</del> to show words to be deleted and <u>underline</u> to show new words. <b>S.1.3.3. Maximum Value of Quantity-Value Divisions.</b>  (a) The maximum value of the quantity-value division for liquids shall not be greater than 0.2 % of the minimum measured quantity.  (b) For dispensers of compressed natural gas used to refuel vehicles, the value of the division for the <del>gasoline liter equivalent shall not exceed 0.01 GLE; the division for</del> gasoline gallon equivalent (GGE) shall not exceed 0.001 GGE; <u>the division for the diesel gallon equivalent (DGE) shall not exceed 0.001 DGE. Dispensers of liquefied natural gas used to refuel vehicles; the value of the division for the DGE shall not exceed 0.001 DGE. For dispensers of either fuel;</u> <del>The</del> maximum value of the mass division shall not exceed 0.001 kg or 0.001 lb.  (Amended 1994 <u>and 2019</u> )			
<b>17. Justification:</b> Please include national importance, background on the issue, and reference to supporting data or documents.			

Submit Form Via Email To: [don.onwiler@ncwm.net](mailto:don.onwiler@ncwm.net)

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Revised: February 2018

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In 2016, the NCWM concluded three years of discussions about HB 44 Mass Flow Meters Code applications that address the sale of natural gas as a vehicle fuel. At that time, the NCWM agreed to eliminate the unit of “gasoline liter equivalent (GLE).” Although the GLE was removed from paragraphs S.1.3.1.1. Compressed Natural Gas Used as an Engine Fuel and S.5.2. Marking of Gasoline Volume Equivalent Conversion Factor, the unit was inadvertently overlooked for removal from paragraph S.1.3.3.(b) Maximum Value of Quantity-Value Divisions.

Also in 2016, the NCWM agreed to recognize mass; a *new* unit of measurement the diesel gallon equivalent (DGE); and sales of the commodity “liquefied natural gas (LNG)” for indicated deliveries. The DGE is an approximate volume unit derived from the energy content of a gallon of diesel fuel. Unlike all other vehicle fuel quantity units in HB 44 no requirement was published establishing a suitable limit on the maximum division value for indicated or recorded deliveries of CNG and LNG in DGE units. The maximum quantity value division is prescribed for retail vehicle fuel deliveries in units of the gallon, the kilogram or pound, as well as the gasoline gallon equivalent or GGE (i.e., in increments not greater than 0.001) in HB44. The factor specified for converting LNG and CNG mass to volume equivalent units is fixed and assigned a numerical value out to three decimal places.

A 0.001 increment needs to be assigned as the maximum allowable value of the DGE to avoid difficulties in calculating the total sale for each transaction. During the exhaustive deliberations and poring through countless pages documenting these discussions, an agreement on the maximum value for the DGE’s quantity-value division was inadvertently overlooked. Consequently, this proposal is being submitted to clarify and limit the maximum value of the quantity division for indicated and recorded deliveries in the DGE to a 0.001 increment.

**18. Possible Opposing Argument’s:** Please demonstrate that you are aware and have considered possible opposition.

None at this time since both modifications to paragraph S.1.3.3.(b) are considered housekeeping items. One that removes a unit of measurement that ceased to be recognized for natural gas sales; and one that corrects the omission of a specification that specifies the maximum quantity value for the DGE as one of four measurement units recognized for natural gas vehicle fuel applications in the Mass Flow Meters Code.

**19. Requested Action if Considered for NCWM Agenda:**

☒ Voting Item   ☐ Developing Item   ☐ Informational Item   ☐ Other (Please Describe):

**20. List of Attachments:**

N/A

# Form 15: Proposal to Amend NIST Handbooks, Guidance Documents, NCWM Bylaws or NCWM Publication 14



Submit proposals by **September 1**. See meeting dates at [www.ncwm.net/meetings](http://www.ncwm.net/meetings). If the item is deemed by a region to have merit, that region will forward the item to NCWM for national consideration. See <http://www.ncwm.net/standards-development/idea> for more information on the Form 15 process. Submit in Microsoft Word Format to the NCWM Executive Director via email at [don.onwiler@ncwm.net](mailto:don.onwiler@ncwm.net) for review and dispersal to selected regions.

General Information				
<b>1. Date:</b> 8/30/18		<b>2. Regional Association(s):</b> (Not applicable for proposals to the Board of Directors or NTEP Committee) <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input checked="" type="checkbox"/> Southern (SWMA) <input checked="" type="checkbox"/> Western (WWMA)		
<b>3. Standing Committee:</b> <input type="checkbox"/> Laws & Regulations <input checked="" type="checkbox"/> Specifications & Tolerances <input type="checkbox"/> Professional Development <input type="checkbox"/> Board of Directors <input type="checkbox"/> NTEP Committee				
<b>4. Submitter's Name:</b> Tina G. Butcher		<b>Submitter's Organization:</b> NIST Office of Weights and Measures		
<b>5. Address:</b> 100 Bureau Dr. MS 2600				
<b>6. City:</b> Gaithersburg		<b>7. State:</b> MD.	<b>8. Zip Code:</b> 20899	<b>9. Country:</b> USA
<b>10. Phone Number:</b> (301) 975-2196		<b>11. Fax Number:</b> (301) 975-8091		<b>12. Email Address:</b> tbutcher@nist.gov
Proposal Information				
<b>13. Purpose:</b> Concise statement as to the intent or purpose of this proposal, such as problem being fixed. (Do not include justification here.)  To simplify the definition for "Power Factor" currently included in NIST Handbook 44 (HB44) Section 3.40. Electric Vehicle Fueling Systems – Tentative Code. To align the current HB 44 definition with a definition included in a proposal to adopt a "Method of Sale" requirement for electric watt hour meters that is currently under consideration by the NCWM Laws & Regulations Committee.				
<b>14. Document to be Amended:</b> <input checked="" type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input type="checkbox"/> NIST Handbook 133 <input type="checkbox"/> NCWM Guidance Document <input type="checkbox"/> NCWM Bylaws <input type="checkbox"/> NTEP Administrative Policy				
<b>15. Cite portion to be Amended:</b> Please file a separate Form 15 for each code, model law or regulation to be amended. Section: 3.40. Paragraph: Definitions Section (at the end of the tentative code)				
<b>16. Proposal:</b> Please use <del>strikeout</del> to show words to be deleted and <u>underline</u> to show new words. <b>power factor (PF).</b> – The ratio of <del>the</del> <u>"active power"</u> to <del>the</del> <u>"apparent power"</u> in an AC circuit. <del>The power factor is a number between 0 and 1 that is equal to 1 when the voltage and current are in phase (load is entirely resistive).</del> <u>It describes the efficient use of available power.</u> [3.40]				
<b>17. Justification:</b> Please include national importance, background on the issue, and reference to supporting data or documents.  The USNWG on Electric Vehicle Fueling & Submetering's Electric Watthour Subgroup (EWH SG) has developed a proposal to for a new provision in NIST Handbook 130's Uniform Regulation for the Method of Sale (MOS) of Commodities to address the sale of electrical energy through electric watt hour meters. In the process of developing this draft (and a still-under-development NIST Handbook 44 code for these devices), the SG developed a definition for "power factor" that differs from the definition currently included in Section 3.40. Electric Vehicle-Fueling Systems – Tentative Code.				

The SG, which includes many of the same experts involved in the development of Section 3.40 and which consulted other industry standards in the development of this proposal, believes the definition shown in the “proposal” section of this form is equivalent to that in the current Section 3.40. However, the new definition is simpler and eliminates possible confusion about its application in instances in which there are negative values. To avoid confusion about whether the two definitions are equivalent, it is desirable to align the definitions in Section 3.40 with that in the draft MOS proposal (and ultimately any definition proposed in a future code for electric watt hour meters).

**18. Possible Opposing Argument’s:** Please demonstrate that you are aware and have considered possible opposition.

None that are known.

**19. Requested Action if Considered for NCWM Agenda:**

☒ Voting Item    ☐ Developing Item    ☐ Informational Item    ☐ Other (Please Describe):

**20. List of Attachments:**