

**National Type Evaluation Program (NTEP)  
Measuring Sector**

**Annual Meeting  
September 24-25, 2019 Denver, CO**

**Agenda - DRAFT**

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<b>Glossary of Acronyms</b>			
CC	Certificate of Conformance	NTETC	National Type Evaluation Technical Committee
DMS	Division of Measurement Standards	OIML	International Organization of Legal Metrology
ECR	Electronic Cash Register	OWM	Office of Weights and Measures (NIST)
EVFS	Electric Vehicle Fueling Systems	PD	Positive Displacement
HB 44	NIST Handbook 44 “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices”	Pub 14	NCWM Publication 14
LMD	Liquid Measuring Devices	RMFD	Retail Motor-Fuel Dispenser
mA	milliamp	SI	International System of Units
MFM	Mass Flow Meters	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
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. The Sector discussed this issue at length and develop alternate suggestions without being able to reach agreement on revised language. Consequently, the Sector appointed a small group to work on revisions to be presented at the next Sector meeting.

**Recommendation:** The Sector will hear an update on this work and will be asked to consider an alternate proposal developed by this group (to be distributed prior to the Sector meeting).

## 2. Development of Proposal to Modify Sealing Requirements to Clarify Application

**Source:** 2018 Measuring Sector (Ref Item 3 D on 2018 Agenda)

**Background Information:** During its 2018 annual meeting, the Sector reviewed the changes made by the NCWM to include specific requirements for “categories of devices” and “methods of sealing” for water meters agreed upon recommended changes for NCWM Publication 14 to correspond to these requirements. See Agenda Item 3D on the Sector’s 2018 Agenda.

As part of its discussions in 2018, the Sector had considered a modification to the provisions for sealing in the Publication 14 Water Meters Checklist as shown below; however, recognized that such a change would not be appropriate without supporting language in NIST Handbook 44.

An approved means of security (e.g., data change audit trail) so that no changes may be made to its adjustable components **without evidence of the change.**

At that meeting, the Sector agreed include a future agenda and item and consider developing a proposal to recommend modifications to paragraph S.2.1. Provision for Sealing and corresponding paragraphs in other HB44 measuring device codes to clarify that audit trails are intended to track and provide evidence of metrologically significant changes as a way of *detering* unauthorized changes, not *prevent* such changes from being made.

**Recommendation:** No specific recommended language has been submitted by any Sector member. To assist the Sector in addressing this item, Technical Advisor, Tina Butcher prepared the draft recommendation shown below for the Sector to use as a starting point in its discussions. The following represents suggested changes to paragraph S.2.2. Provision for Sealing in Section 3.30 Liquid-Measuring Devices Code. Once the Sector reaches agreement on the basic language changes, corresponding recommendations can be developed for the remaining measuring codes, which presently include similar or identical requirements for sealing.

**S.2.2. Provision for Sealing.** – Adequate provision shall be made for an approved means of security **such that no changes may be made to metrologically significant parameters without evidence of the change to or evidence of access to the adjustable components.**

**Means include electronic provisions for security such as a** (~~e.g.,~~ data change audit trail) or provisions 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 as of January 1, 1995]*

(Amended 1991, 1993, 1995, and 2006)

**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 104th Annual Meeting, the National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2020 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 2019 Interim Report and its accompanying appendix along with the addendum sheets issued by the S&T Committee during the 2019 NCWM Annual Meeting, all of which can be found on the NCWM’s web site at:

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

**A. Provisions for Sealing for Devices and Systems Adjusted Using Removable Digital Device Storage – 2019 S&T Committee Agenda Block 3 Items**

**Background:** At its 2019 Annual Meeting, the NCWM adopted a series of changes to address sealing provisions for devices adjusted using a removable digital storage device. These were considered on the S&T Committee’s Agenda as a single “block” of items referenced as “Block 3.” Included in this block were changes to the following Codes; paragraphs affected are shown following the Code reference. These changes included the addition of a new paragraph to the General Code and modifications to existing paragraphs in the other codes listed to refer back to that new General Code paragraph.

Code	Paragraph and Action	Location in 2019 Edition of Pub 14 Checklist
General	Paragraph G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage – Add a new Code Reference.	LMD-29 See Appendix A to Agenda
Liquid-Measuring Devices	Paragraph S.2.2. Provision for Sealing – Modify existing Code Reference. (for RMFDs)	Section 9; LMD-41 See Appendix A to Agenda
	Paragraph S.2.2. Provision for Sealing – Modify existing Code Reference. (for Wholesale & Loading Rack Meters)	Section 17.; LMD-54 See Appendix A to Agenda
Vehicle-Tank Meters	Paragraph S.2.2. Provision for Sealing - Modify existing Code Reference.	Section 24; LMD-60 See Appendix A to Agenda
Liquefied Petroleum Gas & Anhydrous Ammonia Liquid-Measuring Devices	Paragraph S.2.2. Provision for Sealing - Modify existing Code Reference.	Section 29; LMD-71 See Appendix A to Agenda
Hydrocarbon Gas Vapor-Measuring Devices	Paragraph S.2.2. Provision for Sealing - Modify existing Code Reference.	Section 3; HGVM-7 See Appendix B to Agenda
Cryogenic Liquid Measuring Devices	Paragraph S.2.5. Provision for Sealing - Modify existing Code	Section 8; CLMD-15 See Appendix C to Agenda

	Reference.	
Milk Meters	Paragraph S.2.3. Provision for Sealing - Modify existing Code Reference.	Section 40; LMD-89 See Appendix A to Agenda
Water Meters	Paragraph S.2.1. Provision for Sealing - Modify existing Code Reference.	Section 43; LMD-94 See Appendix A to Agenda
Mass Flow Meters	Paragraph S.3.5. Provision for Sealing - Modify existing Code Reference.	Section 34; LMD-81 See Appendix A to Agenda
Carbon Dioxide Liquid-Measuring Devices	Paragraph S.2.5. Provision for Sealing - Modify existing Code Reference.	Presently no specific checklist criteria for carbon dioxide liquid-measuring devices.
Hydrogen Gas Measuring Devices	Paragraph S.3.3. Provision for Sealing - Modify existing Code Reference.	Section 49; LMD-105 See Appendix A to Agenda

**Recommendation:** The Sector is asked to consider changes to NCWM Publication 14 to reflect the changes made to the above codes. See the S&T Committee’s 2019 Interim Report for background on these changes.

Proposed changes are outlined in Appendices A, B, and C to this agenda as noted in the table above.

**B. Provisions for Timeout on Retail Motor-Fuel Dispensers – 2019 S&T Committee Agenda Block 4 Items**

**Background:** At its 2019 Annual Meeting, the NCWM adopted changes to the Mass Flow Meters Code and the Hydrogen Gas Measuring Devices Code to add provisions for an automatic timeout for vehicle fuel dispensers. These requirements were to correspond to the existing requirement for timeout on retail motor-fuel dispensers already specified in the LMD Code. These were considered on the S&T Committee’s Agenda as a single “block” of items referenced as “Block 4.” Included in this block were changes to the following Codes; paragraphs affected are shown following the Code reference. Except for the General Code which included the addition of a new paragraph, paragraphs were modified to address these devices and refer back to the new General Code paragraph.

Code	Paragraph	Location in 2019 Edition of Pub 14 Checklist
Mass Flow Meters	Paragraph S.2.9. Automatic Timeout – Pay at Retail Motor Fuel Devices. Move current reference to “Credit-Card and Debit-Card Activated RMFD” on page LMD-77 to a new section 38 and expand to include reference to new paragraph S.2.8. and G-S.2. Facilitation of Fraud (this mirrors references in the LMD Code and Hydrogen Code sections of Pub 14)	LMD-77 and LMD-84 See Appendix A to Agenda
Hydrogen Gas Measuring Devices	Paragraph S.2.8. Automatic Timeout – Pay-At-Vehicle Fuel Dispensers	Section 55; LMD-111 See Appendix A to Agenda

**Recommendations:** The Sector is asked to consider the following changes to NCWM Publication 14 to reflect the changes made to the above codes. See the S&T Committee’s 2019 Interim Report for background on these changes

Proposed changes are outlined in Appendix A to this agenda as noted in the table above.

In reviewing these proposed changes, the Technical Advisor noted an additional “housekeeping” item related to these changes. When changes were made by the Measuring Sector in 2016 to reflect the adoption of LMD Code paragraph S.6.1.10. Automatic Timeout – Pay-At-Pump Retail Motor-Fuel Devices the proposed changes should have included the addition of a reference to the corresponding LMD Code paragraph in the “Code Reference” title. A proposed change is included in Appendix A to address this under Code Reference G-S.2. in the Additional Checklists and Test Procedures for Card-Activated Retail Motor-Fuel Dispensers, page LMD-85 in the 2019 LMD Pub 14 checklist. The Sector is asked to also consider this change in its review. Consideration might be given to consolidating references to pay-at dispenser requirements for all metering types into a single section and including a reference to this section in individual checklist sections.

**C. Repeatability Requirements and Tolerances – 2019 S&T Committee Agenda Block 5 Items**

**Background:** At its 2019 Annual Meeting, the NCWM adopted a series of changes to clarify and align repeatability tests and tolerances across multiple measuring codes in NIST Handbook 44. These were considered on the S&T Committee’s Agenda as a single “block” of items referenced as “Block 5.” Included in this block were changes to the following Codes; paragraphs affected are shown following the Code reference.

Code	Paragraph	Location in 2019 Edition of Pub 14 Checklist
Liquid-Measuring Devices	Paragraphs N.4.1.2. Repeatability Tests; N.4.6. Repeatability Tests; and T.3. Repeatability RMFDs and Wholesale PD Meters and Magnetic Flow Meters and Ultrasonic Meters	Section A, Field Evaluation; LMD-114 AND Section D, Field Evaluation; LMD-117 AND Section M, Field Evaluation; LMD-129
Vehicle-Tank Meters	Paragraphs N.4.1.2. Repeatability Tests; N.4.7. Repeatability Tests; and T.3. Repeatability	Section C, Field Evaluation; LMD-115
Liquefied Petroleum Gas & Anhydrous Ammonia Liquid-Measuring Devices	Paragraphs N.4.1.2. Repeatability Tests; N.4.4. Repeatability Tests; and T.3. Repeatability	Section E, Field Evaluation; LMD-117 and LMD-118
Hydrocarbon Gas Vapor-Measuring Devices	Paragraphs N.4.1.2. Repeatability Tests; N.4.3. Repeatability Tests; and T.2. Repeatability.	Section H, Field Evaluation; HGVMMD-14
Cryogenic Liquid Measuring Devices	Paragraphs N.5.1.1. Repeatability Tests; N.5.3. Repeatability Tests; and T.4. Repeatability	Section E, Field Evaluation; CLMD-20
Milk Meters	Paragraphs N.4.1.1. Repeatability Tests; N.4.4. Repeatability Tests; and T.3. Repeatability	Section G, Field Evaluation; LMD-118
Water Meters	Paragraphs N.4.1.1. Repeatability Tests and N.4.4. Repeatability Tests	Section L, Field Evaluation; LMD-128
Mass Flow Meters	Paragraphs N.6.1.1. Repeatability Tests; N.6.3. Repeatability Tests; and T.3. Repeatability	Section I, Field Evaluation; LMD-122
Carbon Dioxide Liquid-Measuring	Paragraphs N.4.1.1. Repeatability	Presently no specific

Devices	Tests; N.4.5. Repeatability Tests; and T.2.1. Repeatability	checklist criteria for carbon dioxide liquid-measuring devices.
Hydrogen Gas Measuring Devices	Paragraphs N.6.1.1. Repeatability Tests; N.6.2. Repeatability Tests; and T.3. Repeatability	Presently no separate checklist criteria for testing of hydrogen devices in the “Field Test” portion of the LMD checklist. Add a new section N. to the Field Evaluation and Permanence Tests for Metering Systems to address Hydrogen Gas-Measuring Devices. See also Item 3G later in this agenda.

**Recommendation:** The Sector is asked to consider the following changes to NCWM Publication 14 to reflect the changes made to the above codes. See the S&T Committee’s 2019 Interim Report for details.

Proposed changes are outlined in Appendices A, B, and C to this agenda as noted in the table above.

**D. Provisions to Address Systems Dispensing Diesel Exhaust Fluid (DEF) in the LMD Code – 2019 S&T Committee Agenda Item LMD-3**

**Background:** At its 2019 Annual Meeting, the NCWM adopted changes to the following paragraphs in the LMD Code (along with changes to the “Application” Section and “User Requirements” which do not impact the Pub 14 checklist) in NIST Handbook 44 to better address metering systems used to dispense Diesel Exhaust Fluids and other products. These were considered on the S&T Committee’s Agenda under Item LMD-3 and are shown in the table below for reference.

- S.1.6.10. Pay-at-Pump Retail Motor Fuel Dispensers (LMD Checklist 2019 Edition, Page LMD-85)
- S.2.5. Zero-Set-Back Interlock, for Retail Motor-Fuel Devices. (No change needed to LMD Checklist 2019 Edition, Page LMD-42)
- S.4. Marking Requirements.
- S.5. Zero-Set-Back Interlock, for Retail Motor-Fuel Devices

**A.1. General.** – This code applies to:

- (a) devices used for the measurement of liquids, ~~including liquid fuels and lubricants,~~ and
  - (b) wholesale devices used for the measurement and delivery of agri-chemical liquids such as fertilizers, feeds, herbicides, pesticides, insecticides, fungicides, and defoliant.
- (Added 1985)

***S.1.6.10. Automatic Timeout – Pay-At-Pump ~~for Retail Motor-Fuel Devices.~~** – 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) (**Amended 20XX**)*

S.2.5. Zero-Set-Back Interlock, **for** Retail ~~Motor-Fuel~~ Devices. – **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)

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**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.

**Recommendation:** While the specification sections noted above are currently referenced in the LMD Checklist, these sections are specifically covered under the “Retail Motor-Fuel Dispensers” portion of the checklist. The changes to NIST Handbook 44 were intended to make the references more generic so as to provide the ability to apply criteria to systems dispensing DEF. However, the current Pub14 checklist does not facilitate this.

The Sector is asked to discuss how to best address this issue so that NTEP evaluators have clear checklist criteria to apply to DEF-dispensing systems. Among possible options for the Sector to consider are:

- 1) Broaden the “RMFD” Checklist to Refer to “Stationary Retail Dispensing Systems”
- 2) Create as separate section for DEF dispensing systems, which would mirror many of the RMFD Checklist requirements and, perhaps, include additional guidance relative to DEF dispensing systems.

**E. Liquefied Petroleum Gas Liquid-Measuring & Anhydrous Ammonia Liquid-Measuring Devices Code Paragraph S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic – 2019 S&T Committee Agenda Item LPG-2**

**Background:** At its 2019 Annual Meeting, the NCWM adopted a new paragraph S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic in the Liquefied Petroleum Gas (LPG) Liquid-Measuring Devices & Anhydrous Ammonia Liquid-Measuring Devices Code of NIST Handbook 44. Subsequent paragraphs were renumbered accordingly. This was considered on the S&T Committee’s Agenda under Item LPG-2; see the Committee’s Interim Report for additional details.

**S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic. - A device shall be so constructed that after an individual or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for two minutes the transaction must be completed before additional product flow is allowed. The 2-minute timeout shall be a sealable feature on an indicator.**

**(Added 2019) (Nonretroactive as of 2021)**

**Recommendation:** This paragraph does not become effective until 2021. Given that NTEP Evaluators will be evaluating equipment as 2021 approaches, the Sector is asked to consider adding a note to the checklist under Code Reference S.2.5. Zero-Set-Back Interlock in the LPG LMD Checklist to alert evaluators and manufacturers to the approaching change as shown below. This proposed change is also shown in Appendix A to this Agenda.

**Code Reference: S.2.5. Zero-Set-Back Interlock**

The zero-set-back interlock on a dispenser is critical to prevent fraudulent practices. A retail motor fuel device shall have an effective automatic interlock such that once the dispenser shuts off, it cannot be restarted without resetting the indicating element to zero. This requirement also applies to the recording element if one is present. The dispenser shall be designed so that the starting lever must be in the shut-off position and the interlock engaged before the discharge nozzle can be returned to its designed hanging position. If a single pump supplies more than one dispenser, then each dispenser shall have an automatic control valve that prevents product from being delivered by a dispenser until its indications have been set to zero.

**Note that the following NIST Handbook 44 requirement becomes nonretroactively effective as of 2021. NTEP evaluators and manufacturers must be cognizant of the approaching requirement, especially for evaluations conducted as 2021 approaches.**

**S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic. - A device shall be so constructed that after an individual or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for two minutes the transaction must be completed before additional product flow is allowed. The 2-minute timeout shall be a sealable feature on an indicator.**

**(Added 2019) (Nonretroactive as of 2021)**

**F. Mass Flow Meters Code Paragraph S.1.3.3. Maximum Value of Quantity-Value Divisions**

**Background:** At its 2019 Annual Meeting, the NCWM adopted the following changes to paragraph S.1.3.3. Maximum Value of Quantity-Value Divisions in the Mass Flow Meters Code of NIST Handbook 44. This was considered on the S&T Committee's Agenda under Item MFM-2; see the Committee's Interim Report for additional details.

Amend NIST Handbook 44 Mass Flow Meters Code as follows:

**S.1.3.3. Maximum Value of Quantity-Value Divisions.**

**~~(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 gasoline liter equivalent shall not exceed 0.01 GLE; the division for gasoline gallon equivalent (GGE) shall not exceed 0.001 GGE. The maximum value of the mass division shall not exceed 0.001 kg or 0.001 lb.~~

~~(Amended 1994)~~

The maximum value of the quantity-value division shall not exceed the following.

(a) For compressed natural gas dispensed as an engine fuel:

- (1) 0.001 for gasoline gallon equivalent (GGE) units; or
- (2) 0.001 diesel gallon equivalent (DGE) units; or
- (3) 0.001 kg or 0.001 lb for mass units.

(b) For liquefied natural gas dispensed as an engine fuel:

- (1) 0.001 for diesel gallon equivalent (DGE) units; or
- (2) 0.001 kg or 0.001 lb for mass units.

(c) For all liquids other than liquefied natural gas dispensed as an engine fuel a maximum value not greater than 0.2 % of the minimum measured quantity.

(Amended 1994 and 2019)

**Recommendations:** The Sector is asked to consider changes to the “Checklists and Test Procedures for Mass Flow Meters” portion of the LMD Checklist to reflect the changes adopted to S.1.3.3. References to this paragraph in Pub 14 are found under “Code Reference S.1.3.3. Money-Value Divisions, Digital” and Code Reference S.1.3.3. Value of Smallest Unit,” both of which are found on page LMD-78 in the 2019 checklist.

See Appendix A for proposed changes.

#### **G. MFM-4 V S.5.1. Location of Marking Information; Retail Motor-Fuel Dispensers.**

**Background:** At its 2019 Annual Meeting, the NCWM adopted the following changes to paragraph S.5.1. Location of Marking Information; Retail Motor-Fuel Dispensers in the Mass Flow Meters Code of NIST Handbook 44. This was considered on the S&T Committee’s Agenda under Item MFM-4; see the Committee’s Interim Report for additional details.

Amend NIST Handbook 44 Mass Flow Meters Code as follows:

*S.5.1. Location of Marking Information; Retail Motor-Fuel Dispensers. – The marking information required in 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;*
- (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 and compressed gas-measuring devices.*

*[Nonretroactive as of January 1, 2003]*

*(Added 2006) (Amended 2019)*

**Recommendations:** The Sector is asked to consider changes to the “Checklists and Test Procedures for Mass Flow Meters” portion of the LMD Checklist to reflect the changes adopted to S.5.1. Location of Marking Information; Retail Motor-Fuel Dispensers. References to this paragraph in Pub 14 are found under “Code Reference: S.5.1. Location of Marking Information; Retail Motor Fuel Dispensers” found on page LMD-84 in the 2019 checklist.

See Appendix A for proposed changes.

**H. HGM-6 Hydrogen-Gas Measuring Devices Code. N.2 Test Medium., N.3. Test Drafts., N.4.1. Master Meter (Transfer) Standard Test., N.4.2. Gravimetric Tests., N.4.3 PVT Pressure Volume Temperature Test., N.6.1.1. Repeatability Tests., T.3. Repeatability., T.6. Tolerance –Minimum Measured Quantity (MMQ). and Appendix D. Definitions where applicable.**

**Recommendations:** The Sector is asked to consider adding a new section to the “Field Evaluation and Permanence Tests for Metering Systems” portion of the LMD Checklist to include references to tests of hydrogen gas-measuring devices. Criteria proposed for this section are to reflect the following paragraphs and associated changes adopted to Hydrogen Gas-Measuring Devices Code at the 2019 NCWM Annual Meeting. See the NCWM S&T Committee’s 2019 Interim Report and Annual Meeting Addendum Sheets for details and additional background information.

**N.2. Test Medium.** – The device shall be tested with the product commercially measured except that, in a type evaluation examination, hydrogen gas as specified in NIST Handbook 130 shall be used.

**Note: Corresponding requirements are under development and this paragraph will be revisited.**

**N.3. Test Drafts.** –The minimum test shall be one test draft at **twice** the declared minimum measured quantity and one test draft at approximately ~~ten~~**five** times the minimum measured quantity or ~~1~~**4** kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed. (See T.3. Repeatability)

The test draft shall be made at flows representative of that during normal delivery. The pressure drop between the dispenser and the proving system shall not be greater than that for normal deliveries. The control of the flow (e.g., pipework or valve(s) size, etc.) shall be such that the flow of the measuring system is maintained within the range specified by the manufacturer.

**N.4. Tests.**

**N.4.1. Master Meter (Transfer) Standard Test.** –When comparing a measuring system with a calibrated transfer standard, 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.**

**N.4.1.1. Verification of Master Metering Systems.** – A master metering system used to verify a hydrogen gas-measuring device shall be verified before and after the verification process. A master metering system used to calibrate a hydrogen gas-measuring device shall be verified before starting the calibration and after the calibration process.

**N.4.2. Gravimetric Tests.** – The weight of the test drafts shall be equal to at least **twice** the amount delivered by the device at the declared minimum measured quantity and one test draft at approximately ~~ten~~ **five** times the minimum measured quantity or ~~1~~ **4** kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed

**N.4.3. PVT Pressure Volume Temperature Test.** – The minimum test with a calibrated volumetric standard shall be one test draft at **twice** the declared minimum measured quantity and one test draft at approximately ~~ten~~ **five** times the minimum measured quantity or ~~1~~ **4** kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed.

This new section is proposed to be added following existing Section M of the Field Evaluation and Permanence Tests for Metering Systems section of the LMD Checklist found on page LMD-130 in the 2019 checklist.

Proposed changes are shown in Appendix A to this agenda.

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

**Background:** This Item is included on the Sector’s agenda to allow for input from Sector members on future meetings and to allow NTEP Administration to apprise the Sector of dates that have already been set.

#### **Additional Items as Time Allows:**

**Current NCWM S&T Chairman, Loren Minnich, requested input (time permitting) from the Sector on the following “carryover” items on the S&T Committee’s agenda:**

- GEN-1 G-A.1. Commercial and Law-Enforcement Equipment. and G-S.2. Facilitation of Fraud. (Skimmers)
- New Block 1 Field Standards (Block 1, Block 2, GEN-3, LPG-3, MFM-5, and from the Hydrogen Code N.4.1 and N.4.1.1.)
- EVF-3 D S.3.5. Temperature Range for System Components and S.5.2. EVSE Identification and Marking, Temperature Range for System Components
- OTH-4 D Electric Watthour Meters Code under Development

