

# National Type Evaluation Program Measuring Sector Meeting Summary

September 21, 2021, 8:30 am to 5:00 pm EDT and September 22, 2021, 9:00 am to 5:00 pm EDT  
Embassy Suites by Hilton, 535 Smithfield Street, Pittsburgh, PA

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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. At its 2019 meeting, the Sector reviewed proposed changes from a small task group appointed in 2018 to clarify this portion of the checklist. After some discussion and additional changes, the Sector agreed to recommend changes to this section for inclusion in the 2020 edition of NCWM Publication 14.

At that meeting, the Sector agreed that a future discussion needs to be held to explore the different aspects of “compatibility,” including compatibility of separately evaluated and certified measuring and indicating elements as well as compatibility of changes to metrologically significant components of complete devices.

- The following individuals agreed to work on this issue of “Compatibility of Components:”
  - Marc Buttler (Emerson)
  - Tina Butcher (NIST Office of Weights and Measures)
  - Craig Cavanaugh (Tuthill Transfer Systems)
  - Allen Katalinic (NCWM NTEP)
  - Dmitri Karimov (Teri G agreed to explore the possibility of LC involvement)
  - Rich Miller (FMC)
  - John Hathaway (Murray Equipment)
- The group was asked to consider at least the following two key areas relating to “compatibility” and prepare a recommendation for the Sector to consider at its next meeting for addressing these in type evaluation:
  - The case in which individual certified equipment is used to create a metrologically complete, certified system.
  - The case in which an existing, certified system is extended through the addition compatible devices through the addition of certified equipment.
- The group was also asked to consider how third-party software is to be addressed with regard to compatibility.

At the 2019 Measuring Sector meeting, a small task group of volunteers were tasked with developing more definitive criteria for the current “20-day permanence test” used in the NTEP Field and Permanence Testing phase of evaluating mobile electronic devices and making recommendations to the Sector for possible changes to NCWM Publication 14. The **20-Day Permanence Criteria Task Group** consisted of the following individuals:

- Tina Butcher (NIST Office of Weights and Measures)
- Craig Cavanaugh (Tuthill Transfer Systems)
- John Hathaway (Murray Equipment)
- Allen Katalinic (NCWM NTEP)
- Dmitri Karimov (LC)
- Rich Miller (FMC)
- Randy Ramsey (NC)
- John Roach (CA DMS)

The task group was asked to develop more specific standards to ensure consistency with items such as duration, road conditions, standards for degree of use, mileage, etc. need to be encompassed in the discussion.

### **2020 MS Meeting Discussion:**

Before discussing the charge of the Work Group, it must be noted that the changes in Appendix E of the 2019 MS meeting and agreed to be included in the 2020 edition of Publication 14; did not get put into the publication. The agreed to changes are listed in Appendix A of this agenda.

The Sector will hear updates and consider recommendations from both the “Compatibility of Components Task Group” (See Appendix B for a copy of the task groups recommendation) and the “20-Day Permanence Test for Mobile Electronic Devices Task Group” (See Appendix C for a copy of the task groups recommendation.)

During the 2020 MS Meeting, the members reviewed the recommendation from the Compatibility of Components Task Group as written in Appendix B. In general, all members agreed with the recommendation. Darrell Flocken (NTEP) asked for some additional time to review the recommendations to determine if any changes to Publication 14 are needed to support them. Darrell Flocken (NTEP) will bring any suggested change to Pub 14 to the 2021 MS Meeting.

The members also reviewed the recommendations from the 20-Day Permanence Test for Mobile Electronic Devices Task Group (See Appendix C for a copy of the task groups recommendation.) The discussion clearly indicated that the option to have the permanence testing performed in an accredited laboratory, in controlled conditions, was supported by industry members while NTEP Laboratory representatives expressed concerns with this approach. The members were asked to discuss the option of laboratory testing and determine if the option should be further developed. The consensus was to move forward with adding the wording as offered as “Recommendation 1”, with changing the word “should” to “shall” in the third bullet of paragraph 1.b., to the 2021 edition of Pub 14 and not pursue option 2 at this time.

After review of the recommendation from the Compatibility of Components Task Group, not changes to Publication 14 were found to be necessary to support the recommendation. Unless there is additional information presented, this item is considered closed and will be removed from the Sector’s agenda.

### **2021 MS Meeting Discussion:**

During the 2021 MS Meeting, Michael Keilty (MS Chair) along with Darrell Flocken reviewed the item and confirmed the changes to the 2021 edition of Pub 14 with the MS members. The members agreed and no additional action is required. The item is complete and will not appear in the 2022 meeting agenda.

## **2. 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)

...

**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.

**2019 MS Meeting Discussion:** Technical Advisor, Tina Butcher presented the item and reviewed the two possible options noted above and asked if Sector members preferred one or the other of these options. She pointed out there is presently no section in the checklist to address DEF dispensers.

Randy Moses (Wayne Fueling) commented he doesn’t want to see separate checklists, and Allen Katalinic (NCWM NTEP) agreed, noting he doesn’t want to add to the overall size of the checklist.

There was general agreement among Sector members present to lean toward the first option of broadening the RMFD checklist. Mrs. Butcher recommended that, if the Sector decides to pursue the option of broadening the RMFD checklist, the Sector should go back and review the RMFD checklist and develop a proposal to modify the checklist to encompass stationary retail dispensing systems. She also noted there are likely sections of that checklist which may not be appropriate for use with DEF.

Mr. Moses suggested the Sector’s objective should be for Pub 14 to align with NIST Handbook 44. For any gaps identified, the Sector should develop proposed changes to HB 44 and once those are adopted make corresponding recommendations to modify the Pub 14 checklist.

Measuring Sector Chairman, Michael Keilty noted the MFM Code doesn’t include these references to allow recognition for DEF.

The NTEP Laboratories are already applying these requirements, so there shouldn’t be a significant impact on devices already evaluated.

Mrs. Butcher questioned how best to go about broadening current references to “retail motor-fuel dispensers” to include other stationary retail devices. A “search and replace” might be useful in identifying these references, but it would not be appropriate to replace all of them; some references might correctly apply to only RMFDs. The Sector discussed having one or a group of people do such as search to identify the references. Mr. Keilty suggested we include this as a carryover item with regard to these checklist changes.

***Decisions:***

***The Sector agreed to the following corrections to the LMD Checklist:***

- ***Correct the reference to “S.1.6.10. Automatic Timeout-Pay-At-Pump for Retail Devices” on pg. LMD-89. It reads S.6.1.10. and it should read S.1.6.10.***
- ***Correct the existing reference to S.5. Totalizers on page LMD-45 of Appendix A to the Sector’s Agenda. It reads “S.5.1.” and should read “S.5.”***

***Appendix A to the Sector’s agenda has been revised to include the above corrections and other updates made during the Sector’s meeting. The revised version is included as Appendix A to this summary.***

*The Sector also acknowledged the changes made by the NCWM to broaden the application of the LMD Code to encompass DEF and other devices. This is consistent with what the laboratories have already been doing and will continue to do.*

*The Sector agreed the RMFD section of the checklist needs to be broadened and not limited to “retail motor-fuel.” However, the Sector is reluctant to do a “search and replace” without specifically reviewing the proposed changes to ensure there isn’t an inadvertent problem created by a given change. Consequently, the Sector agreed that NTEP will through the RMFD checklist and do a “search and replace” marking the replacements as proposed changes for Sector review at its next meeting. This effort will include the following tasks and parameters.*

- *The search will include a search for the terms such as the following as well as any terms that are limiting:*
  - *“retail motor-fuel” (with the hyphen)*
  - *“retail motor fuel” (without the hyphen)*
  - *“retail fuel devices”*
  - *“motor-fuel”*
  - *“motor fuel”*
  - *“retail” and “fuel” and motor”*
- *Darrell Flocken will assign Mike Manheim the task of doing a search for and highlighting these terms in the electronic version of Pub 14*
- *The following people agreed to serve on a small task group who will assist by reviewing the marked document:*
  - *Tina Butcher (NIST OWM)*
  - *Michael Keilty (Endress + Hauser)*
  - *Allen Katalinic (NCWM NTEP)*
  - *Brent Price (Gilbarco)*

*These individuals will provide comments back to Darrell Flocken. Darrell will ask Mike to incorporate changes proposed by the task group.*

- *The final proposed changes as identified and agreed to by the task group will be included as a “carryover item” on the Sector’s 2020 Meeting Agenda and presented to the Sector for review and agreement at that meeting.*

## **2020 MS Meeting Discussion:**

Appendix D (from the 2020 MS agenda) was the highlighted version from Mike Manheim showing all references to the term ‘retail motor fuel’.

During the 2020 MS Meeting the members discussed the need to modify the current wording in Pub 14, to follow the changes in HB44 to recognize DEF dispensers as being different than RMFDs. This led to a discussion of the possibility of other “dispensers” also being included. Both industry and NTEP evaluators believe that the current wording in Pub 14 is sufficient for the evaluation of either dispenser type. Darrell Flocken (NTEP) accepted the assignment of searching Pub 14 for any reference back to HB44, N.4.2.2. The following morning Darrell Flocken (NTEP) report that 1 occurrence of N.4.2.2 was found in Pub 14, page LMD-116, A. *Field Evaluation and Permanence Test of New-Design Meters in*



*Retail Motor Fuel Dispensers, Repeatability.* The members reviewed the occurrence and agreed that it was generic in nature and could apply to any dispensing device type. Because of this, the membership agreed that no change to Pub 14 is needed. However, the members also agreed that additional research should be done to confirm that the mentioning of a specific dispenser type does not preclude the application of the specification when evaluating DEF dispensers. The members agreed to hold this item over until the 2021 MS Meeting. However, to accomplish this review a small task group was identified which will review the contents of Appendix D and provide comments regarding the need to add DEF to any of the locations which mention a specific dispenser type. The group is made up of the following: Tina Butcher (NIST, OWM) (Group Leader), John Hathaway (Murray Equipment), Brent Price (Gilbarco, Inc.), Randy Moses (Wayne Fueling Systems), Randy Ramsey (North Carolina), Michael Keilty (Endress + Hauser Flowtec AG, USA), Rick Miller (FMC Technologies Measurement Solutions, Inc.), and Darrell Flocken (NTEP). The group members agreed to review Appendix D and report their findings to Tina Butcher (NIST, OWM) and Darrell Flocken (NTEP) by the end of January 2021. Darrell Flocken (NTEP) will summarize the comments received from the work group members into one document and schedule a Zoom Meeting in the March/April 2021 time frame for the work group to review all comments and develop a recommendation for the MS Members to consider at the 2021 meeting.

No comments were received. If no additional work is needed for this item, the item will be removed from the Sectors agenda.

### **2021 MS Meeting Discussion:**

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. After a review of the item and much discussion the members of the MS group felt that a change to include DEF to footnote 1 in Table T.2. of the LMD Code in HB 44 was needed. The MS agreed to submit a Form 15 for the change. Michael Keilty on behalf of the MS developed the proposal on a Form 15 which attending members reviewed and agreed too.

MS submitted the Form 15 to the NCWM (Don Onwiler) on 9-22-2021 in an attempt to get this walk on item to the regional meetings this year and get it on the National S&T agenda this year.

With the submittal of the Form 15, Michael Keilty (MS Chairman) and the MS consider this item closed, with all attending members agreeing. This item can be removed from the 2022 meeting agenda and may be replaced by the submitted proposal if voted on in the July 2022 Annual meeting.

## **New Items:**

### **3. Changes to Security for Retail Motor-Fuel Devices**

Background: At its 2020 Annual Meeting, the NCWM adopted changes to the following paragraphs in the LMD Code in NIST Handbook 44. This item was considered on the S&T Committee's Agenda under Item LMD 19.1.

The purpose of this item is 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.

**UR.4.2. Security for Retail Motor-Fuel Devices (RMFD). Any retail motor fuel device capable of conducting customer initiated electronic financial transactions must be**

**secured to substantially restrict the ability of unauthorized persons to manipulate it to obtain payment information that could be used to commit fraud. The following is a non-exhaustive list of ways that restriction of such manipulation may be accomplished:**

- (a) A physical lock, locking device, or a physical securing device that will restrict access to the electronic financial transaction compartment of the RMFD. A lock, locking device or securing device shall not be manipulated with commonly available tools. A lock shall not allow the use of a universal key. A universal key is a key that is readily available in the market or can be easily purchased in a hardware or common retail store. A single non-universal key for all of the like devices at a retail facility or for all of the like devices at a chain of retail facilities is acceptable or;**
  - (b) Electronic alarming or disabling of the equipment if unauthorized access is attempted or;**
  - (c) Advanced payment acceptance technologies that increase protections against the theft of payment information itself or do not allow access to such information in a form that may be used to commit fraud or;**
  - (d) Another security solution that has been approved by the local or state weights and measures jurisdiction with authority.**
- (Added, 20XX)**

**NTEP Administrators Suggested Change to Publication 14:**

Seeing that this is a User requirement and NTEP does not evaluate devices to User Requirements, no additional action is required by the Measuring Sector.

**2021 MS Meeting Discussion:**

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. Darrell Flocken discussed this item, since NTEP does not evaluate User Requirements (UR) the item does not need to be added. MS members agreed to not add the UR to Pub 14.

Michael Keilty (MS Chairman) asked for further comments with no more comments Mr. Keilty found this item to be complete. This item is considered closed and will not appear on the 2022 meeting agenda.

**4. Increase the Automatic Timeout at Pay-At-Pump Retail Motor-Fuel Devices**

Background: At its 2020 Annual Meeting, the NCWM adopted changes to the following paragraphs in the LMD Code in NIST Handbook 44. This item was considered on the S&T Committee's Agenda under Item LMD-20.2 and are shown in the table below for reference.

The purpose of this item is to allow additional time to automatic timeout on retail motor fuel dispensers, as conditions may warrant.

*S.1.6.10. Automatic Timeout – Pay-At-Pump Retail Motor-Fuel Devices. – Once a device has been authorized, it must de-authorize within three minutes ~~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 three minutes ~~two minutes~~.*

*[Nonretroactive as of January 1, 2017]*

(Added 2016)

**NTEP Administrators Suggested Change to Publication 14:**

Page LMD-91 (2021 edition of Pub 14) make the following changes to the automatic timeout value.

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**Code Reference: G-S.2. Facilitation of Fraud and LMD Code S.1.6.10. Automatic Timeout - Pay-at-Pump for Retail Devices.**

There is great concern regarding the potential for accidental or intentional fraud when card-activated systems are used in service stations, especially because bank-card-activated systems give direct access to bank accounts.

A card-activated system shall authorize the dispensing of product for not more than ~~two~~ three minutes of the time between authorization and "handle on" at the dispenser. Additionally, once a device has been authorized, it must de-authorize within two minutes if not activated. It shall properly record transactions on the appropriate card account.

When a card-activated system is subjected to power loss of greater than 10 seconds, the dispenser shall deauthorize. Because systems may be installed with separate power lines to the console, card reader, and dispenser, to different parts of the system should be tested with power failures to evaluate the potential for accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the delivery sequence.

- 39.1. The dispenser must de-authorize in not more than ~~two~~ three minutes if the pump "handle" is not turned on.  Yes  No  N/A
- 39.2. The dispenser must be de-authorized in not more than ~~two~~ three minutes if not activated.  Yes  No  N/A
- 39.3. If the time limit to de-authorize a dispenser is programmable, it shall not accept an entry greater than two minutes.  Yes  No  N/A
- 39.4. When a power loss greater than 10 seconds occurs after the pump "handle" is on, the dispenser must de-authorize.  Yes  No  N/A
- 39.5. When there is a loss of power, but the pump "handle" is not on, the dispenser must de-authorize in not more than three minutes.  Yes  No  N/A
- 

**2021 MS Meeting Discussion:**

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. After a review of the item and discussion a few errors were found in the item. Please see below for the corrected items .

It was also noted that the Code reference: G-S.2. in LMD-88 Chapter 38 is incorrect.

MS Chairman asked for any other comments. The attending members agreed with the proposed recommendations to change Pub 14 as shown below. Mr. Keilty than asked to consider this item complete once above changes are made.

Page LMD-91 (2022 edition of Pub 14) make the following changes.

**Code Reference: G-S.2. Facilitation of Fraud and LMD Code S.1.6.10. Automatic Timeout-Pay-at-Pump for Retail Devices.**

There is great concern regarding the potential for accidental or intentional fraud when card-activated systems are used in service stations, especially because bank-card-activated systems give direct access to bank accounts.

A card-activated system shall authorize the dispensing of product for not more than ~~two~~ three minutes of the time between authorization and "handle on" at the dispenser. Additionally, once a device has been authorized, it must de-authorize within ~~two~~ three minutes if not activated. It shall properly record transactions on the appropriate card account.

When a card-activated system is subjected to power loss of greater than 10 seconds, the dispenser shall deauthorize. Because systems may be installed with separate power lines to the console, card reader, and dispenser, to different parts of the system should be tested with power failures to evaluate the potential for accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the delivery sequence.

- |  |   |
|--|---|
| 39.3. The dispenser must de-authorize in not more than <del>two</del> <u>three</u> minutes if the pump "handle" is not turned on.            | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |
| 39.4. The dispenser must be de-authorized in not more than <del>two</del> <u>three</u> minutes if not activated.                             | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |
| 39.5. If the time limit to de-authorize a dispenser is programmable, it shall not accept an entry greater than <del>two</del> <u>three</u> . | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |
| 39.6. When a power loss greater than 10 seconds occurs after the pump "handle" is on, the dispenser must de-authorize.                       | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |
| 39.7. When there is a loss of power, but the pump "handle" is not on, the dispenser must de-authorize in not more than three minutes.        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |

Page LMD-88 (2022 edition of Pub 14) make the following changes.

**Code Reference: G-S.2. Facilitation of Fraud and MFM Code S.2.89. Automatic Timeout - Pay-at-Vehicle Fuel Dispensers.**

## 5. Changes to the Zero-Set-Back Interlock and Automatic Timeout for LPG and Anhydrous Ammonia Liquid-Measuring Devices

Background: At its 2020 Annual Meeting, the NCWM adopted changes to the following paragraphs in the LPG Code in NIST Handbook 44. This item was considered on the S&T Committee's Agenda under Item LPG 20.1 and are shown in the table below for reference.

The purpose of this item is to reformat the requirements for zero-set-back interlock and time-out features for clarity and consistency in the LPG code to align the format with other measuring devices codes.

### S.2.5. ~~Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic.~~

**S.2.5.1. Zero-Set-Back Interlock, Electronic Stationary Meters (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle-Mounted Meters, Electronic.** - A device shall be ~~so~~ constructed so that after an individual delivery or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating element and, if equipped, recording element 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 scalable feature on an indicator.~~

~~[Nonretroactive as of 2021]~~

~~(Added 2019)(Renumbered and Amended 2020 2021)~~

S.2.6. Automatic Timeout.

S.2.6.1. Electronic Stationary (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle-Mounted Meters., Electronic. For individual deliveries, if there is no product flow for three minutes the transaction must be completed before additional product flow is allowed. The three-minute timeout shall be a scalable feature on an indicator.

[Nonretroactive as of 2021]

(Added 2020 2021)

S.2.6.2. Automatic Timeout Pay-at-Pump Retail Motor-Fuel Devices. – Once a device has been authorized, it must de-authorize within two three 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 three minutes.

[Nonretroactive as of 2021 2022]

(Added 2020 2021)

**NTEP Administrators Suggested Change to Publication 14:**

Page LMD-75 (2021 edition of Pub 14) make the following changes to the Zero-Set-Back Interlock.

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**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 non retroactively 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.~~**

S.2.5.1. Zero-Set-Back Interlock, Electronic Stationery Meters (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle Mounted Meters, Electronic. - A device shall be so constructed so 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 scalable feature on an indicator.~~

(Added 2020) (Nonretroactive as of 2021)

(Added 2019)(Renumbered and Amended 2020 2021)

- 29.5. After the device is turned off by moving the lever that stops the flow, a subsequent delivery shall be prevented until the indicators (and recording element if present) have returned to their correct zero positions.  Yes  No  N/A
- 29.6. The starting lever shall be in shut off position and zero-set-back interlock engaged before the nozzle can 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.  Yes  No  N/A
- 29.7. If more than one dispenser is connected to a single pump, an automatic control valve shall prevent fuel from being delivered until the indicating elements have been returned to their correct zero position and engaged.  Yes  No  N/A
- 29.8. The use of the interlock shall be effective under all conditions when any control on the console, except a system emergency shut-off, is operating and after any momentary power failure.  Yes  No  N/A

**S.2.65.2. Zero-Set-Back Interlock for Stationary Retail Motor-Fuel Devices.** – A device shall be constructed so that:

.....

**Code Reference: S.2.6. Automatic Timeout**

**S.2.6.1. Electronic Stationary (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle-Mounted Meters., Electronic**

**[Nonretroactive as of ~~2021~~ 2022]**

**(Added ~~2020~~ 2021)**

29.9. **For individual deliveries, if there is no product flow for three minutes the transaction must be completed before additional product flow is allowed.**  Yes  No  N/A

29.10. **The three-minute timeout shall be a sealable feature on an indicator.**  Yes  No  N/A

**S.2.6.2. Automatic Timeout Pay-at-Pump Retail Motor-Fuel Devices**

**[Nonretroactive as of ~~2021~~ 2022]**

**(Added ~~2020~~ 2021)**

29.11. **Once a device has been authorized, it must de-authorize within ~~two~~ three minutes if not activated.**  Yes  No  N/A

29.12. **Re-authorization of the device must be performed before any product can be dispensed.**  Yes  No  N/A

29.13. **If the time limit to de-authorize the device is programmable, it shall not accept an entry greater than ~~two~~ three minutes.**  Yes  No  N/A

*Renumber existing sections*

## 2021 MS Meeting Discussion:

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. After a review of the item and discussion a few changes to the items were proposed . Please see below for the discussed item changes. Mr. Keilty asked for any other comments. The attending members agreed with the proposed recommendations to change Pub 14 as shown below. Mr. Keilty than asked to consider this item closed once below changes are made.

Page LMD-75 (2021 edition of Pub 14) make the following changes.

### **Code Reference: S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic.**

The zero-set-back interlock on stationery and vehicle-mounted meters is critical to prevent fraudulent practices. These devices shall have an effective automatic interlock such that, after either individual or multiple deliveries at one location have been completed and the device is shut off, it cannot be restarted without resetting the indicating element to zero. This requirement also applies to the recording element if one is present.

Additionally, for individual deliveries, devices are required to be designed such that, if there is no product flow for two minutes, the transaction must be completed before additional product flow is allowed. Particularly for vehicle-mounted systems, this helps to prevent the vehicle from being moved to another location and product being delivered into a different receiving tank that does not belong to the original customer. The 2-minute timeout shall be a sealable feature on an indicator.

### **Code Reference: S.2.5.1. Zero-Set-Back Interlock Electronic Stationary Meters (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle-Mounted Meters, Electronic.**

~~S.2.5. Zero Set Back Interlock, Stationery and Vehicle Mounted Meters, Electronic.~~ — A device shall be so constructed so 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.**

29.5. Stationary and vehicle-mounted meters shall have an effective automatic interlock such that, after either individual or multiple deliveries at one location have been completed and the device is shut off, it cannot be restarted without resetting the indicating element to zero.  Yes  No  N/A

29.6. This requirement also applies to the recording element if one is present.  Yes  No  N/A

~~29.7. For individual deliveries, if there is no product flow for two minutes, the transaction must be completed before additional product flow is allowed.~~  Yes  No  N/A

~~29.8. The 2 minute timeout shall be a sealable feature on an indicator.~~  Yes  No  N/A

### **Code Reference: S.2.65.2. Zero-Set-Back Interlock for Stationary Retail Motor-Fuel Devices.**

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.

29.7. The dispenser shall have an effective automatic interlock such that once the dispenser shuts off, it cannot be restarted without resetting the indicating element to zero.  Yes  No  N/A

- 29.8. This requirement also applies to the recording element if one is present.  Yes  No  N/A
- 29.9. After the device is turned off by moving the lever that stops the flow, a subsequent delivery shall be prevented until the indicators (and recording element if present) have returned to their correct zero positions.  Yes  No  N/A
- 29.10. The starting lever shall be in shut off position and zero-set-back interlock engaged before the nozzle can 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.  Yes  No  N/A
- 29.11. If more than one dispenser is connected to a single pump, an automatic control valve shall prevent fuel from being delivered until the indicating elements have been returned to their correct zero position and engaged.  Yes  No  N/A
- 29.12. The use of the interlock shall be effective under all conditions when any control on the console, except a system emergency shut-off, is operating and after any momentary power failure.  Yes  No  N/A

**Code Reference: S.2.6.1. Electronic Stationary (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle-Mounted Meters.,-Electronic**

- 29.13. **For individual deliveries, if there is no product flow for three minutes the transaction must be completed before additional product flow is allowed.**  Yes  No  N/A
- 29.14. **The three-minute timeout shall be a sealable feature on an indicator.**  Yes  No  N/A

**Code Reference: S.2.6.2. Automatic Timeout Pay-at-Pump Retail Motor-Fuel Devices**

- 29.15. **Once a device has been authorized, it must de-authorize within three minutes if not activated.**  Yes  No  N/A
- 29.16. **Re-authorization of the device must be performed before any product can be dispensed.**  Yes  No  N/A
- 29.17. **If the time limit to de-authorize the device is programmable, it shall not accept an entry greater than three minutes.**  Yes  No  N/A



## 6. Changes to Add Marking Requirements for Water Meters

Background: At its 2020 Annual Meeting, the NCWM adopted changes to the following paragraphs in the WTR Code in NIST Handbook 44. This item was considered on the S&T Committee's Agenda under Item WTR 20.1 and are shown in the table below for reference.

The purpose of this item is to add marking requirements for meter size and water flow direction indication marking requirements.

**S.3.2. Meter Size and Directional Flow Marking Information. A water meter shall be clearly and indelibly marked with the following information:**

**(a) meter size on the indicator face plate; and**

**(b) water flow direction.**

**[Nonretroactive as of January 1, 2022]**

**(Added 2021)**

### **NTEP Administrators Suggested Change to Publication 14:**

The NTEP Administrator could not find an existing section in Pub 14 detailing with water meter marking requirements. I ask the members to determine if a change/addition to Pub 14 is needed to document this new specification, and if so, where does it fit?

### **2021 MS Meeting Discussion:**

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. After a review of the item and discussion a few changes to the item were proposed. Please see below for the discussed item changes. Mr. Keilty asked for any other comments. The attending members agreed with the proposed recommendations to change Pub 14 as shown below. Mr. Keilty then asked to consider this item closed once below changes are made.

Page LMD-101 (2022 edition of Pub 14) make the following changes.

### **46. ~~Multi-jet Meter Indication~~ Markings**

**Code Reference: S.3.1. Location of Marking Information; Utility Type Meters**

46.1. All required markings, including those required by G-S.1. Identification shall be either on the meter body or primary indicator.  Yes  No  N/A

**Code Reference: S.3.2. Meter Size and Directional Flow Marking Information.**

**A water meter shall be clearly and indelibly marked with the following information:**

46.2. meter size on the indicator face plate; and  Yes  No  N/A

46.3. water flow direction.  Yes  No  N/A

**Code Reference: S.2.3. Multi-jet Meter Indication**

46.4. Multi-jet water meters shall be clearly and permanently marked as such on the device or identified on the Certificate of Approval.  Yes  No  N/A

## 7. Changes to Advancement of Indicating and Recording Elements for Water Meters

Background: At its 2020 Annual Meeting, the NCWM adopted changes to the following paragraphs in the WTR Code in NIST Handbook 44. This item was considered on the S&T Committee's Agenda under Item WTR 20.2 and are shown in the table below for reference.

The purpose of this item is to clarify that S.1.1.4. Advancement of Indicating and Recording Elements shall also be applicable to non-mechanical water meters.

**S.1.1.4. Advancement of Indicating and Recording Elements.** – Primary indicating and recording elements shall ~~be susceptible to advancement~~ **advance** only by the ~~mechanical normal~~ **designed** operation of the device, intended by the manufacturer.

### NTEP Administrators Suggested Change to Publication 14:

Page LMD-99 (2021 edition of Pub 14) make the following changes to the code reference S.1.1.4. Advancement of Indicating and Recording Elements.

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#### Code Reference: S.1.1.4. Advanced of Indicating and Recording Elements

46.1. Primary indicating and recording elements shall ~~be susceptible to advancement~~ **advance** only by the ~~mechanical~~ **designed** operation of the device, intended by the manufacturer.  Yes  No  N/A

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### 2021 MS Meeting Discussion:

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. After a review of the item and discussion members agreed to the changes to Pub 14 as proposed. Please see below for the discussed item changes. Mr. Keilty than asked to consider this item complete once above changes are made.

Page LMD-99 (2022 edition of Pub 14) make the following changes.

#### Code Reference: S.1.1.4. Advanced of Indicating and Recording Elements

43.4. Primary indicating and recording elements shall ~~be susceptible to advancement~~ **advance** only by the ~~mechanical~~ **designed** operation of the device, intended by the manufacturer.  Yes  No  N/A

## 8. Changes to Clarify Specification for Maximum Value of Quantity-Value Divisions for Mass Flow Meters

Background: At its 2020 Annual Meeting, the NCWM adopted changes to the following paragraphs in the MFM Code in NIST Handbook 44. This item was considered on the S&T Committee's Agenda under Item MFM 20.1 and are shown in the table below for reference.

The purpose of this item was to combine the two paragraphs that address "all gases other than" and "all liquids other than" into one paragraph. .

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

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.(Added 2019)
- (c) For all **other gases or** 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)  
(Amended 1994, ~~and 2019~~, **and 2021**)

### NTEP Administrators Suggested Change to Publication 14:

Page LMD-82 (2021 edition of Pub 14) make the following changes to the code reference S.1.3.3. Maximum Value of Quantity-Value Division.

#### Code Reference: S.1.3.3. Value of Smallest Unit

- 32.23. The maximum value of the quantity-value division for compressed natural gas dispensed as an engine fuel shall not exceed:
  - 32.23.1. 0.001 for gasoline gallon equivalent (GGE) units; or  Yes  No  N/A
  - 32.23.2. 0.001 diesel gallon equivalent (DGE) units; or  Yes  No  N/A
  - 32.23.3. 0.001 kg or 0.001 lb for mass units.  Yes  No  N/A
- 32.24. The maximum value of the quantity-value division for liquefied natural gas dispensed as an engine fuel shall not exceed:
  - 32.24.1. 0.001 for diesel gallon equivalent (DGE) units; or  Yes  No  N/A
  - 32.24.2. 0.001 kg or 0.001 lb for mass units  Yes  No  N/A
- 32.25. For all **other gases or** liquids ~~other than liquefied natural gas~~ dispensed as an engine fuel the maximum value of the quantity-value division shall have maximum value not greater than 0.2 % of the minimum measured quantity.

### 2021 MS Meeting Discussion:

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. After a review of the item and discussion members agreed to the change to Pub 14 as proposed. Mr. Keilty than asked to consider this item complete once below changes are made.

Page LMD-82 (2022 edition of Pub 14) make the following changes

#### Code Reference: S.1.3.3. Value of Smallest Unit

32.23. The maximum value of the quantity-value division for compressed natural gas dispensed as an engine fuel shall not exceed:

32.23.1. 0.001 for gasoline gallon equivalent (GGE) units; or

Yes  No  N/A

32.23.2. 0.001 diesel gallon equivalent (DGE) units; or

Yes  No  N/A

32.23.3. 0.001 kg or 0.001 lb for mass units.

Yes  No  N/A

32.24. The maximum value of the quantity-value division for liquefied natural gas dispensed as an engine fuel shall not exceed:

32.24.1. 0.001 for diesel gallon equivalent (DGE) units; or

Yes  No  N/A

32.24.2. 0.001 kg or 0.001 lb for mass units

Yes  No  N/A

32.25. For all other gases or liquids ~~other than liquefied natural gas~~ dispensed as an engine fuel the maximum value of the quantity-value division shall have maximum value not greater than 0.2 % of the minimum measured quantity.

Yes  No  N/A

### 9. New Proposal for 2022 NCWM Interim Meeting, for Discussion only

The following Form 15 was submitted to the L&R Committee by Mr. Ron Hayes, Retired. The proposal is shown below and is being provided for discussion only. Mr. Hayes would appreciate any comments or feedback from the members of the Measuring Sector. This discussion will not be captured in the meeting summary, all comments and feedback should be provided directly to Mr. Hayes.

See Appendix A for proposal

### 2021 MS Meeting Discussion:

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. MS took no action . Mr. Keilty declared this item as closed.

## **Closing Items:**

### **10. Changes in Meeting Documentation Development Process**

**Source:**

NTEP Administrator

**Background:**

The responsibility for the development of the meeting agenda and summary documents has changed. Beginning with the 2021 meeting a member of the Measuring Sector, with the help of NTEP personnel, will assume this responsibility. This change is based on direction from the NTEP Committee and the NCWM Board of Directors and aligns the responsibility with the current action of other Sectors, Work Groups, and Task Groups.

The NTEP Administrator will create a meeting summary report, for the 2020 Measuring Sector Meeting and will distribute to the Sector Members, at a later date.

In addition to the assignment of the individual or individuals responsible for these documents, I would encourage the Sector to develop a timeline document to assist the individual in the ability to develop a meeting agenda in a timely manner and with the least impact to their current responsibilities. Due to meeting time constraints, I would offer my assistance to develop this timeline document offline, with the distribution, review, and acceptance of the document to occur within six months from the adjournment of this meeting. A few items to be addressed in this timeline document would include:

1. A deadline for the submittal of new proposals, and reports from subgroups with specific assigned tasks,
2. A deadline for the distribution of the agenda and summary documents.

I would suggest that the timeline document be placed on the Measuring Sector's home page on the NCWM Web Site.

**2021 MS Meeting Discussion:**

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. Darrell Flocken asked that this item is to be put on hold pending the outcome of a similar topic with the standing committee reports. This was followed by some discussion on the need to finalize the outcome of an item before moving on to the next item. A second approach was suggested that the in-meeting work could consist of listing a series of bullet points to make the creation of the meeting summary easier. MS member Marc Buttler volunteered to take on the responsibility under certain meeting style conditions where the summary is finalized before moving on to the next item.

Mr. Keilty declared this item as closed.

### **11. Meeting Location and Date of 2022 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.

**(Note:** The members of the Weighing Sector recommended meeting locations of Annapolis, Maryland; Pittsburgh, Pennsylvania; or Minneapolis, Minnesota.)

## 2021 MS Meeting Discussion:

During the 2021 MS Meeting, Michael Keilty (MS Chair) opened the item up for discussion. Darrell Flocken (NTEP) shared the locations suggested by the Weighing Sector for their 2022 meeting. Darrell Flocken (NTEP) Also reminded the members that when considering a meeting location, we need to be aware of the States that our members from California cannot travel too. Possible dates for the meeting September 20-21, 2022. Comments on location Annapolis, MD / Charlotte, NC / Albany, NY / Denver, CO / San Antonio, TX / Albuquerque, NM / Santa Fe, NM / Santa Ana Pueblo Resort, NM

## 12. Meeting Attendees

The following individuals participated in the 2021 Measuring Sector meeting.

### Measuring Sector Members:

Michael Keilty	Endress + Hauser Flowtec AG USA
Marc Buttler	Emerson – Micro Motion
Ron Gallon	Zenner Performance Meters, Inc.
Randy Moses	Wayne
John Hathaway	Murray Equipment, Inc., Total Control Systems
Dmitri Karimov	Liquid Controls
Richard Miller	FMC Technologies Measurement Solutions, Inc.
Brent Price	Gilbarco, Inc.
Randy Ramsey	North Carolina Department of Agriculture
Chad Parker	North Carolina Department of Agriculture
Tina Butcher	NIST, Office of Weights and Measures
Darrell Flocken	NCWM/NTEP
Mike Manheim	NCWM/NTEP
Allen Katalinic	NCWM/NTEP
Louis Martinet	Measurement Canada
John Roach	California Department of Food and Agriculture/DMS